पंडित रविशंकर शुक्ल विश्वविद्यालय, रायपुर छत्तीसगढ़ भारत
Pt. Ravishankar Shukla University, Raipur Chhattisgarh, India
Estd-1964 – recognized by UGC U/s 2(f) and 12 (B)
NAAC "A" Grade

SYLLABUS 2017-18

सत्र 2017–2018

पाठ्यक्रम

पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर
प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व
अध्ययनशाला

एम. ए. प्रथम, द्वितीय, तृतीय एवं चतुर्थ सेमेस्टर

प्राचीन भारतीय इतिहास संस्कृति एवं पुरातत्व अध्ययनशाला
पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर
सत्र 2017-2018
Semester - I

No.	Name of the Paper	Internal	Theory	Total
	Compulsory Papers			
1	Pre historic India	20	80	100
2	History of India Indus valley civilization to 4th Cent. B.C.	20	80	100
3	History of India 4th Century B.C. to 319 A.D.	20	80	100

Optional Paper (Any Two)
Semester I & II Group A or B

GROUP A

4	Art and Iconography Part-I	20	80	100
5	Architecture Part-- I	20	80	100

GROUP B

4	Ancient Indian Social and Economic Institutions Part-I	20	80	100
5	Ancient Indian Polity Part-I	20	80	100

Compulsory Paper-I
Pre Historic India
Maximam Marks- 80

प्रागैतिहासिक भारत

Unit-1

1. Palaeo-environment and changing culture
   परिवर्तित संस्कृति एवं जीवाश्म पर्यावरण
2. Geo archaeology: Palaeontology, Palaeo Botony
   भू–पुरातत्व : जीवाश्म विज्ञान एवं पुरा वनस्पतिशास्त्र

Unit-2

Tool type and its technique of manufacture
प्रागैतिहासिक प्रस्तर उपकरण, प्रकार एवं निर्माण तकनीक

Unit-3

Palaeolothic cultures: Lower Palaeolothic, Middle Palaeolothic, Upper Palaeolothic, distribution stratigraphy and cultural distribution in Himalyan context (Extra Peninsular India) and Paninsular India.

पुराप्रागैतिहासिक संस्कृति, निम्न पुरापाषाण काल, मध्य पुरापाषाण काल, उच्च पुरापाषाण काल का स्तर–विन्यास एवं वितरण क्षेत्र भारतीय उपमहाद्वीप के संदर्भ में

Unit:4

1. Mesolithic cultures: alluvial Plain adaptation, Horse shoe lae sites, sandstone landscape, plateau occupation.
   मध्यपाषाण काल का अभिग्रहण क्षेत्र एवं भू–परिदृश्य– कछारी क्षेत्र, रेतीली क्षेत्र घुड़नाल आकार झील तथा पठारी क्षेत्र
2. Neolithic cuktures of India
   नव पाषाणकालीन भारत

Unit:5

Sites with special reference to Sohan, Belan, Narmada, Mahanadi, Son, Godawari.

पुरास्थल– सोहन, बेलन, नर्मदा, महानदी एवं गोदावरी घाटियों के विशेष संदर्भ में।

Books Recommended:-

Krishnaswami, V.D. –Stone Age India, Ancient India No.3.
IAR-- --Relevant Portions. Excavations & Exploration.
Braidwood, R.J. Prehistoric India.
Ghosh, A. – Encyclopedia of Indian Archaeology
Pandey, R.P. – Pre-historic Archaeology Of Madhya Pradesh.
Sankalia, H.D. Prehistory and Protohistory of India & Pakistan.
Jayaswal, Vidula—Bhartiya Itihas ke aadicharn ki roopreekha.
Mishra, D.P. ---Protohistory of India(English and Hindi)

Compulsory Paper-II

भारत का इतिहास (सिंधु घाटी सभ्यता से 4 थीं शताब्दी ई.पूर्व तक)

History Of India, From Indus Valley Civilization To 4th B.C.

Unit-1

1. प्राचीन भारतीय इतिहास के अध्ययन स्रोत.
   Sources of ancient Indian History
2. साहित्यिक एवं पुरातात्विक स्रोत.
   Archaeological and Literary sources.

Unit-2

1. सिन्धु घाटी की सभ्यता का उद्भव एवं विकास.
   Origin and Development of Indus Valley Civilization
2. सिन्धु सभ्यता के प्रमुख नगर मोहनजोदड़ो, हड़प्पा, कालीबंगा
   Important sites of Indus valley. Mohan Jodaro, Harrappa and Kalibanga.

Unit-3

1. वैदिक काल– आर्य कौन थे ,उनके मूल स्थान व ऋग्वैदिक कालीन एवं उत्तर वैदिक कालीन राजनीतिक, सामाजिक, धार्मिक एवं आर्थिक स्थितियॉ
   Vedic age—who were the Aryans? Their original place.
   Vedic and Later Vedic Age, Polity, Society, Economy and religion.

Unit-4

1. महाजनपद काल
   Mahajanapada Period
2. छठवीं शताब्दी ई. पूर्व में भारत की राजनीतिक परिस्थितियॉ
   Political Conditions in the 6th cent. B.C.

Unit-5

1 नन्दवंश के शासन काल तक मगध साम्राज्य का उत्कर्ष
   Rise of Magadha upto the Nanda Period.

3. सिकन्दर का भारत पर आक्रमण और इसका भारतीय सभ्यता एवं संस्कृति पर प्रभाव
   Alexander's Invasion of India and its impact on Indian Culture and Society.

Books Recommended:-

Ray, H.C. –Dynastic History of Northern India, Vol.I & II (Relevant Chapters)
Wheeler, M.—Indus Civilization
Narayan, A.K. --- Indogreeks.
Pandey, Vimal Chandra ---Prachin Bharat ka Rajnetik evam Sanskritik Itihaas.
Thapriyaal, K.K.—Shindhu Sabyata.
Cambridge History of India Vol.-I

Compulsory Paper-III

भारत का इतिहास (4 थीं शताब्दी ई.पू.से 319 ई. तक)
History Of India, From 4th B.C. To 319 A.D.

Unit-1

1. राजनीतिक शक्ति के रूप में मौर्यों का उत्कर्ष.
   Rise of Mauryas as the pilitical power.
2. चन्द्रगुप्त मौर्य और उनका साम्राज्य विस्तार.
   Chandragupta Maurya and expansion of his Empire.

Unit-2

1. बिन्दुसार एवं अशोक का राजत्व काल.
   Bindusar and Ashok and their times.
2. मौर्य साम्राज्य का पतन
   Decline of the Mauryan Empire.

Unit-3

1. शुंग राजवंश (Sunga Dynasty)
2. सातवाहन वंश (Satavahan Dynasty)
3. कलिंग नरेश खारवेल (Chedi dynasty of kalinga)

Unit-4

1. हिन्द–यूनानी शासन (Indo-Greek Rulers)
2. पश्चिम भारत के शक क्षत्रप (Western Shatrapa rulers)

Unit-5

1. कुषाण साम्राज्य का उत्कर्ष एवं पतन (Rise and Decline of Kushan Dynasty)
2. गुप्त वंश के अभ्युदय से पूर्व उत्तरी भारत के जनपदीय राजवंशों एवं राज्यों का अध्ययन ,(Political Condition of Northern India Before The Rise of Guptas)

Books Recommended:-

Ray, H.C. –Dynastic History of Northern India, Vol.I & II (Relevant Chapters)
Pandey, Vimal Chandra ---Prachin Bharat ka Rajnetik evam Sanskritik Itihaas.
Pandey,R.N.—Uttar bharat ka Rjnetik Itihas
Bhandarkar ,R D—Ashoka
Majundar,R C, Pusalkar, A.D. –Age if Imperial Unity.
Puri,B. N –- India Under the Kushans.

Group-A

एम0ए0 (प्रथम सेमेस्टर)
वैकल्पिक प्रश्न–पत्र (चतुर्थ)
कला एवं प्रतिमा विज्ञान (Art & Iconography)
Part-I

Unit-1

1. भारतीय कला की परम्परा एवं इसकी प्रमुख विशेषताएं
Art tradition of India and its salient features.

2. भारत की प्रागैतिहासिक कला
Pre-historic art of India.

3. सिन्धु घाटी – मूर्तिकला, मृण्मय, मुहरे
Indus Valley- Sculptures, Terracotta & Seal.

Unit-2

1. शिशुनाग एवं नन्द युग की कला
Art of Shaisunaga and Nanda Age.

2. मौर्य कला
Mauryan Art.

Unit-3

1. शुंग कालीन कला, यक्ष एवं यक्षिणी मूर्तिया
Art of the Sunga period-Yaksha & Yakshini Images,

2. सांची, भरहुत, बोध गया, अमरावती की कला
Sculputes of Sanchi, Bharhut, Bhodhyaya and Amaravati

3. बुद्ध प्रतिमा की उत्पत्ति एवं विकास
Origin And Development of Buddha Image.

Unit-4

1. कुषाण कला के केन्द्र
Main schools of Art in the Kushana period.
(a) गंधार कला केन्द्र Gandhara School of Art.
(b) मथुरा कला केन्द्र Mathura School of Art

2. गुप्त कला Art of Gupta :
(a) गुप्त मूर्तिकला Gupta Sculptures.
(b) अजन्ता एवं बाघ की चित्रकला Paintings of Ajanta & Bagh

Books Recommended:-

Agrawal, V. S. – Indian Art
Ray, Nihar Ranjan—Maurayn and Sunga art.
Kumar swami A.K. – Earlt Indian Iconography
Banergee,J N ---Development of Hindu Iconography.
Singh, A K --- Bhartiya Vastukala tatha Kala ke mool tatwa
Ray, Udaya Narayan—Bhartiya Kala.

एम0ए0 (प्रथम सेमेस्टर)
वैकल्पिक प्रश्न–पत्र (पंचम)
स्थापत्य (Architecture)

Unit-1

01 प्राचीन भारतीय स्थापत्य के साहित्यिक एवं पुरातात्विक स्रोत
Literary and Archeaological sources of Ancient Indian Archeatecture.

02. प्राचीन भारतीय स्थापत्य का उद्भव
Origin of Ancient Indian Architecture.

Unit-2

01 सिन्धु घाटी सभ्यता के स्थापत्यः– मोहन जोदडो के नगर योजना, सभा भवन, महास्नानागार एवं हडप्पा के धान्यागार
Architecture of Indus valley civilization:- Pecial reference to great bath of Mohanjodaro, assembly hall, Godown of Harappa.

02. मौर्यकालीन कुम्हराहार का राजप्रसाद
Palace architecture of Mauryas-Kumarahar.

Unit-3

01. स्तूप वास्तु का उद्भव
Origin of Stupa Architecture.

02. स्तूप वास्तु के प्रकार एवं उसके अंग
Types and main features of Stupa Architecture.

Unit-4

01 भरहुत, सांची, बोधगया एवं अमरावती के स्तूप वास्तु
Bharut, Sanchi, Bodhgaya and Amaravati Stupas.

Unit-5

01. पूर्वी भारत के गुहा वास्तुः– उदयगिरि,खंडगिरि,एवं बराबर.
Rock Architecture of Eastern Ghats- Udayagiri Khandagiri and Barabar

02. पश्चिमी घाट के गुहाः– भाजा ,कोण्डेन, नासिक, कार्ले
Rock Architecture of western Ghats-Bhaja Kondane , Nasik, and Karle

Books Recommended:-

Agrawal, V. S. – Indian Art
Ray, Nihar Ranjan—Maurayn and Sunga art.
Brown, Percy—Indian Architecture Buddist and hindu.
Kumarswami, A.K.—Early Indian architecture.
Agrawal, P.K. – Gupta Temple Architecture.
Ray, U N. –Prachin Bhartiya Nagar evam nagrik Jeewan.
Vajpayee K.D. –Vastukala Ka Itihaas.
Upadhyaya Vasudeva— Prachin Bhartiya Guha Stup and Mandir.

Group-B

एम0ए0 (प्रथम सेमेस्टर)

वैकल्पिक प्रश्न–पत्र (चतुर्थ)

प्राचीन भारतीय सामाजिक एवं आर्थिक संस्थाएँ

Anciant Indian Social & Economic Institute

Part-I

Unit-1

01 प्राचीन भारतीय सामाजिक इतिहास के स्रोत।
Sources of ancient Indian social History

02 प्राचीन भारतीय सामाजिक चिंतन की अवधारणा।
Thought and Concept of Ancient Indian Society.

03 वर्ण व्यवस्था का उद्भव एवं विकास ।
Origin and development of Varna system.

Unit-2

01 प्राचीन भारतीय जाति व्यवस्था का उद्भव एवं विकास ।
Origin and development of caste system in Ancient India.

02 आश्रम व्यवस्था Ashram System

03 पुरूषार्थ Purusharth.

Unit-3

01 प्राचीन भारतीय परिवार का स्वरूप एवं विकास ।
Ancient Indian family system- Form and development.

02 परिवार की संपत्ति में उत्तराधिकार एवं पुत्र का स्थान ।
Heir of Family property and the position of son.

03 स्त्रियों का स्थान परिवार एवं समाज ।
Position of women in family and society.

Unit-4

01 हिन्दु संस्कार का अर्थ एवं प्रयोजन ।
Meaning and aims of Hindu Sanskars.

02 संस्कारों की संख्या एवं मुख्य संस्कार ।
Important Sanskars and their numbers.

03 विवाह संस्कार एवं उसका महत्व ।
Importance of Hindu Marriage Sanskar.

Unit-5

01 प्राचीन भारतीय शिक्षा पद्वति ।
Ancient Indian education system

02 प्राचीन भारत के प्रमुख शिक्षा केन्द्र ।
Main education centers of Ancient India Nalanda, Vikramshila and Vallabhi .
नालंदा विश्वविद्यालय, विक्रमशिला विश्वविद्यालय, वल्लभी विश्वविद्यालय

Books Recommended:-

Altekar, A. S. –Education in Ancient India,, Position of Women in Ancient India.
Kane, P.V. –History of Dharmashastra. Vol-2,3
Majumdar ,R.C.—Corporate Life of Ancient India.
Sarkar, D.C.—Study in the social and Economic History.
Prabhu P.N.—Hindu Social organization
Pandey R.V.—Hindu Sanskar.
Parhar, Dinesh Nandini—Chhattisgarh ka samajik arthik Itihaas.

एम0ए0 प्रथम सेमेस्टर
वैकल्पिक प्रश्न–पत्र पंचम
प्राचीन भारतीय राजशास्त्र Ancient Indian Polity.

Part-I

Unit-1

01 प्राचीन भारतीय राजशास्त्र के स्रोत
Sources of ancient Indian Polity.

02 राज्य के अंग – सप्तांग सिद्धांत
Parts of State—Theory of Saptang.

03 राज्य की उत्पत्ति ।
Origin of State.

Unit-2

01 राज्य के प्रकार ।
Types of States.

02 राज्य का उद्देश्य, आदर्श एवं कार्य
Aims and objects of Ideal state.

Unit-3

01 नागरिक ।
Citizens

02 सभा, समिति ।
Sabha and Samiti

03 पौर–जनपद ।
Paur and Janpad.

Unit-4

01 प्राचीन भारतीय प्रमुख गणराज्य एवं उनके कार्य एवं प्रशासन
Republican states and their functions and administrations.

02 गणराज्यों की निर्वाचन व्यवस्था
Election system of Republicans

03 गणराज्यों की प्रशासनिक व्यवस्था
Administrative system of republicans.

Unit-5

01 राजा की उत्पत्ति ।
Origin of Kingship

02 राज्य के अधिकार एवं कर्त्तव्य ।
Rights and Duties of King.

03 राजा के अधिकारों पर नियंत्रण
Control over king's rights.

Books Recommended:-

Altekar, A. S. – State and Government of Ancient India hindi/English.
Jaiswal K.P. –Hindu Polity hindi/English.
Majumdar ,R.C.—Corporate Life of Ancient India.
Sharma R,S.—Prachin Bhartiya Rajnaitik Vichar evam Sansthayen.
Kane, P.V. –History of Dharmashastra. Vol-2.

Semester- II

No.	Name of the Paper	Internel	Theroy	Total
Compulsory Papers				
1	(I) History of India from 319 A.G. to 550 A.D.	20	80	100
2	(II) History of India From 550 A.G. to 1300 A.D.	20	80	100
11	Survey and Field Work			100

Optional Paper (Any Two)
Semester I & II Group A or B

GROUP A

4	Art and Iconography Part--II	20	80	100
5	Architecture Part- II	20	80	100

GROUP B

4	Ancient Indian Social and Economic Institutions Part--II	20	80	100
5	Ancient Indian Polity Part--II	20	80	100

एम0ए0; द्वितीय सेमेस्टर
अनिवार्य प्रश्न–पत्र प्रथम
भारत का इतिहास (319 ई. से 550 ई. तक)
History Of India, From 319 A.D. To 550 A.D.

Unit-1

1. गुप्तराज वंश का अभ्युदय ,जाति एवं मूल स्थान .
   Origin of Gupta Dynasty and their cast and place .
2. प्रारंभिक गुप्त नरेश – श्रीगुप्त और घटोत्कच.
   Early Gupta Dynasty Rulers –Shri Gupta and Ghatotkatch.
3. चन्द्रगुप्त प्रथम...Chandragupta -I, समुद्रगुप्त. Samudragupta

Unit-2

1. रामगुप्त. Ramgupta, चन्द्रगुप्त द्वितीय. Chandragupta -II
2. कुमार गुप्त प्रथम. Kumar Gupta –I, स्कंद गुप्त. Skandagupta.

Unit-3

1. स्कंधगुप्त के पश्चात् गुप्तवंश का अनुक्रम.
   Post Skandagupta Rulers
2. वाकाटक वंश का इतिहास एवं गुप्त वाकाटक सम्बन्ध. History of Vakatak Dynasty & Relationship of Gupta and Vakatak Kings.
3. हूण वंश. Huns

Unit-4

1. वर्धन वंश. Vardhan Dynasty.
2. मौखरी. Maukhri Dynasty.
3. मागध गुप्त Magadha gupta Dynasty.

Unit-5

1. प्रारंभिक चालुक्य. Early Chalukya Dynasty.
2. पल्लव वंश Pallav Dynasty.

Books Recommended:-

Ray, H. C. –Dynastic History of North India. Vol.-2
Chaudhry, H.C. R. –Political History of Ancient India
Pandey ,V.C.—Pracin bharat ka Itihaas.
Gopalachari,R.S.—History of Pallavas of Kanchi.
Goyal, Shriram,--Gupta kaaleen bharat.
Upadhyaya vasudev-- Gupta Rajvans ka itihaas.

एम0ए0 (द्वितीय सेमेस्टर)
अनिवार्य प्रश्न–पत्र द्वितीय
भारत का इतिहास 550 ई. से 1300 ई. तक
History Of India, From 550 A.D. To 1300 A.D.

Unit-1

1. राजपूतों की उत्पत्ति, Origin of Rajput Dynasty
2. गुर्जर प्रतिहार, Gurjar Pratihar Dynasty
3. पाल. Paal Dynasty

Unit-2

1. चंदेल. Chandela Dynasty
2. परमार. Parmaar Dynasty
3. कलचुरि Kalchuri Dynasty

Unit-3

1. चाहमान. Chahmaan Dynasty
2. गहडवाल Gahadawal Dynasty

Unit-4

1. राष्ट्रकूट Rastrakuta Dynasty
2. परवर्ती चालुक्य Later Chalukya Dynasty

Unit-5

1 चोल Chola Dynasty
2 पाड्य Pandya Dynasty

Books Recommended:-

Ray, H. C. –Dynastic History of North India. Vol.-2
Chaudhry, H.C. R. –Political History of Ancient India
Pandey ,V.C.—Pracin bharat ka Itihaas.
Gopalachari,R.S.—History of Pallavas of Kanchi.
Tripathi R.S.—History of Kanya kubja.
Chatopadyaya, S-- early History of North India
Pathak,Vishudhanand—Uttar Bharat ka Rajnaitik Itihaas
Yaajdaani—Deecan ka Prachin itihaas.

अनिवार्य प्रश्न–पत्र तृतीय
Survey and Fieldwork.—Practical Record and viva voce.
OPTIONAL GROUP A
एम0ए0 द्वितीय सेमेस्टर प्रश्न–पत्र, चतुर्थ
कला एवं प्रतिमा विज्ञान Art and Iconography
Part-II

Unit-1

1 मध्यकालीन मूर्तिकला एवं क्षेत्रीय शैलियॉ
Regional Art styles in Medieval period

2. पल्लवकालीन कला एवं मूर्तिशिल्प .
Art and Iconography of Pallava age.

3. चालुक्यकालीन कला एवं मूर्तिशिल्प.
Art and Iconography of Chalukyas Age.

4. चोलकालीन कला एवं मूर्तिकला. Art and Iconography of Chola Age

Unit-2

1 पालकालीन कला एवं मूर्तिकला. Art and Iconography of Paal age

2 चंदेलकालीन कला एवं मूर्तिकला.Art and Iconography of Chandela age

3 कलचुरिकालीन कला एवं मूर्तिकला. Art and Iconography of Kalachuris age

4 परमारकालीन कला एवं मूर्तिकला. Art and Iconography of Parmars age.

Unit-3

1. उडीसा की मूर्तिकला एवं शिल्प. Iconography and sculpture of Orrisa.

2. दक्षिण कोसल मूर्तिकला एवं शिल्प Iconography and sculpture of South Kosal

3. राष्टकूटकालीन मूर्तिकला एवं शिल्प. Iconography and sculpture of Rastrakutas.

Unit-4

1. भारत में मूर्ति पूजा की उत्पत्ति एवं प्राचीनता.
Antiquity of Image worship in India.

2. प्रतिमा विज्ञान–आयुध वाहन,आसन और मुद्रा के संदर्भ में.
Iconography –In context of aayudh vahan, aasan and Mudra.

3. शैव प्रतिमा विज्ञान. Iconography of shiva

4. वैष्णव प्रतिमा विज्ञान. Iconography of Vaishnav.

Unit-5

1. ब्राम्हण धर्म के देवी–देवताओं का प्रतिमा विज्ञान–ब्रम्हा, शाक्त, सूर्य एवं नवग्रह. Iconography of Main Brahminical god and goddess—Brahma, Vishnu, surya, navagrah, Laksmi and Parvati.

2. बुद्व एवं बोधिसत्व का प्रतिमा विज्ञान.
Iconography of Buddha and Bhodhisatva.

3. जैन प्रतिमा विज्ञान–ऋषभनाथ,पार्श्वनाथ एवं महावीर के विशेष संदर्भ में.
Iconography of Jains—Rishabh nath, parshavnath and Mahavir.

Books Recommended:-

Agrawal, V. S. – Indian Art
Ray, Nihar Ranjan—Maurayn and Sunga art.
Kumar swami A.K. – Earlt Indian Iconography
Banergee,J N ---Development of Hindu Iconography.
Singh, A K --- Bhartiya Vastukala tatha Kala ke mool tatwa
Ray, Udaya Narayan—Bhartiya Kala.
Kumarswami, A.K. – Early Indian Iconography.
Kumarswami, A.K— Origin of Buddha image.

एम0ए0 द्वितीय सेमेस्टर, पंचम प्रश्न–पत्र
स्थापत्य(Architecture)
Part-II

Unit-1

01. मंदिर वास्तु का उद्भव,
Origin of Temple Architecture.
02. मंदिर वस्तु का प्रमुख शैली,
Main Types of Temple Architecture.

Unit-2

01. गुप्त कालीन मंदिर वास्तु की विशेषताये
Specific Features of Gupta Temple Architecture.
02. प्रारंभिक गुप्त कालीन मंदिर,
Early Gupta Temple Architecture.
03. प्रारंभिक इस्टीका निर्मित मंदिर वास्तु भीतरगॉव,एवं सिरपुर,
Early Brick Temples of Bhitar Gao and Sirpur.

Unit-3

01. प्रारंभिक चालुक्य मंदिर वास्तु,
Early Chalukya Temple Architecture.
02. उडीसा के मंदिर वास्तु लिंगराज एवं कोणार्क के विशेषतम संदर्भ में
Orrisian Temple Architecture With special reference to Lingaraj and Konark Temple.

Unit-4

01. चंदेल कालीन मंदिर वास्तु–खजुराहों
Chandela Temple Architecture at Khajuraho.
02. कलचुरि एवं परमार कालीन मंदिर वास्तु
Temple Architecture of Kalchuri and Parmars.

Unit-5

01. मंदिर वास्तु–एलिफेन्टा एवं एलोरा
Rock Cut Temple Architecture of Elephanta and Elora
02. चोल एवं पल्लव कालीन मंदिर वास्तु
Temple Architecture of Cholas and Pallavas

Books Recommended:-

Agrawal, V. S. – Indian Art
Ray, Nihar Ranjan—Maurayn and Sunga art.
Brown, Percy—Indian Architecture Buddist and hindu.
Kumarswami, A.K.—Early Indian architecture.
Agrawal, P.K. – Gupta Temple Architecture.
Ray, U N. –Prachin Bhartiya Nagar evam nagrik Jeewan.
Vajpayee K.D. –Vastukala Ka Itihaas.
Upadhyaya Vasudeva— Prachin Bhartiya Guha Stup and Mandir.
Kramirisch,S. – Hindu Temples.
Krishnadev—Uttar Bharat ke Mandir.
Srinivasan K.R.—Temples of South India. Dharamrajarath & its Sculputures.
Deheja V. –Early Buddist Rock Temples.

OPTIONAL GROUP B

एम0ए0 द्वितीय सेमेस्टर प्रश्न–पत्र, चतुर्थ

प्राचीन भारतीय सामाजिक एवं आर्थिक संस्थाएँ

Anciant Indian Social & Economic Institution

Part-II

Unit-1

01. प्राचीन भारतीय आर्थिक इतिहास के स्रोत.
Sources of Ancient Indian Economic History.
02. प्राचीन भारतीय आर्थिक इतिहास की चिंतन एवं अवधारणा.
Ancient Indian Economic thought and Concept.

Unit-2

01. प्राचीन भारतीय कृषि का स्वरूप सिधुधाटी की सभ्यता से पूर्व मध्यकाल तक ।
form of agriculture in Ancient India—Indus valley civilization to Medieval Period.
02. प्राचीन भारत में भू–स्वामित्व संबंधित सिद्वान्त एवं भू–स्वामित्व का प्रकार ।
Theories of Land Ownership and types of Owner in Ancient India

Unit-3

01. प्राचीन भारत में उद्योग एवं व्यवसाय की स्थिति सिंधु सभ्यता से पूर्व मध्य काल तक ।
Position of Trade and Commerce in Ancient India— Indus valley civilization to Middle Period.
02. प्राचीन भारतीय वाणिज्य का स्वरूप एवं श्रेणी संगठनों का स्वरूप ।
Ancient Indian Trade Organisations and their functions.

Unit-4

01. प्राचीन भारतीय आय एवं व्यय का साधन एवं स्वरूप ।
sources and types of Income and Expenditure in Ancient India.
02. विनिमय का साधन एवं प्रकार ।
Features and Types of Exchange in Ancient India.

Unit-5

01. प्राचीन भारतीय तौल एवं माप प्रणाली ।
Ancient Indian Weight and Mesurment-Tecnique.
02. प्राचीन भारतीय प्रमुख व्यवसायिक पथ प्रणाली ।
Major Trade routes in Ancient India.

Books Recommended:-

Jha D.N.—Revenu system in Post Maurya and Gupta Time.
Altekar,A.S.-- Ancient Indian Administration.
Bhatnagar K.P.—Indian Ruler Economy
Majumdar R.P,--Corporate Life Of Ancient India.
Randhawa M.S.—History of Agriculture in Ancient India.
Pranath—A Study Economic Condition of Ancient India
Motichand—Trade and Trade routes of Ancient India.

एम0ए0 (द्वितीय सेमेस्टर) प्रश्न–पत्र पंचम
प्राचीन भारतीय राजशास्त्र
Anciant Indian Polity
Part-II

Unit-1

1 मंत्रिपरिषद के कार्य. Funtions of Ministry

2 केन्द्रीय और प्रांतीय प्रशासनिक व्यवस्था. Ancient Indian Administration system of the central and Provinces.

Unit-2

1 प्राचीन भारतीय न्याय व्यवस्था–व्यवहार न्यायालय,,संम्पत्ति का अधिकार एवं उत्तराधिकार, Ancient Indian Judiciary System and Rights of Property and Ownership.

2 अपराध एवं दंड. Crime and Punishment.

3 भू–राजस्व एवं कर व्यवस्था. Taxation system of Ancient India.

Unit-3

1. अंर्तराज्य संबंध एवं मंडल सिंद्वांत. Interstate Relation and Mandal Theories.
2. दूत और दौत्य संबंध एवं षाड्गुण्य नीति. Ambassador and spy role and duties in Ancient India.

Unit-4

1. प्राचीन भारत में सैन्य व्यवस्था. Ancient Indian military system.
2. ग्राम शासन. Rural Administration

Unit-5

1. मौर्यकालीन प्रशासनिक व्यवस्था. Administration of Mauryan Period.
2. गुप्तकालीन प्रशासनिक व्यवस्था. Administration of Gupta Period.
3. हर्षकालीन प्रशासनिक व्यवस्था. Administration of Harsha Period.

Books Recommended:-

Altekar, A. S. – State and Government of Ancient India hindi/English.
Jaiswal K.P. –Hindu Polity hindi/English.
Majumdar ,R.C.—Corporate Life of Ancient India.
Sharma R,S.—Prachin Bhartiya Rajnaitik Vichar evam Sansthayen.
Kane, P.V. –History of Dharmashastra. Vol-2.
Mukharjee—Local self Government In Ancient India.
Ghoshal U N—A history of Indian Political Idea., Hindu revenue System.
Sarkar,D.K. --- Sukra neeti saar.
Prasad, Beni-- State in Ancient India.

SemesterIII

No.	Name of the Paper	Internel	Theroy	Total
Compulsory Papers				
1	Numismatics Part--I	20	80	100
2	Epigraphy & Palaeography Part--I	20	80	100
3	Historiography, Concept and Methods	20	80	100

Optional Paper (Any Two)
Semester III & IV Group A or B

GROUP C

4	Tourism Part--I	20	80	100
5	Museology Part--I	20	80	100

GROUP D

6	Political and Cultural History of Chhattisgarh Part--I	20	80	100
7	History of Archaeology Part--I	20	80	100

एम0ए0 (तृतीय सेमेस्टर)
अनिवार्य प्रश्न–पत्र
मुद्राशास्त्र Numesmetics

Unit-1

01. इतिहास के स्रोत के रूप में मुद्राओं का महत्व.
Importance of Coins as a source of history.
02. मुद्रा की उत्पत्ति एवं प्राचीनता
Origin and antiquity of Coinage.
03. मुद्रा प्रचलन का अधिकार
Rights of issuing coins.

Unit-2

01. मुद्रा निर्माण पद्वति
Techniques of menting the coins.
02. आहत मुद्राऍ एवं वर्गीकरण
Classification of Punchmark coins.

Unit-3

01 जनपदीय मुद्राऍ पांचाल, कौशबी,मथुरा,उज्जैनी,तक्षशिला
Regional coins-- Kausambi, Mathura, Ujjani and Taxila.

Unit-4

01. नगर राज्य एवं निगम के मुद्राऍ
Coins of City, state and Nigam
02. गणराज्यों के मुद्राऍ :– मालव, यौधेय,अर्जुनायन, औदुम्बर.
Republican state coins—Malav, yavdhaye,arjunayan and audumbar.

Unit-5

01. इंडोग्रीक Indogreek coins
02. सीथियन और पार्थियन Sythian and Persian Coins.

Books Recommended:-

Cunningham, A— Coins Of Ancient India.
Altekar, A.S. -- Ancient Indin Coins. Catlogs of Indian coins.
Gupta ,P.L.— Mudrayen
Chakravarty, S.K. -- Ancient Indian Numismatics
Narayan , A.K.—The Indo Greek coins.
Sarkar, D.C.—Study of the Indian Coins.

एम0ए0 (तृतीय सेमेस्टर)
अनिवार्य प्रश्न–पत्र द्वितीय
अभिलेख एवं पुरालिपि शास्त्र
Epigraphy & Paliography

Unit-1

01. इतिहास के स्रोत के रूप में अभिलेखों का महत्व.
Importance of the Inscriptions as a source of History.
02. प्राचीन भारत में लेखन कला का उद्भव एवं विकास.
Origin and development of Ancient writing techniques.

Unit-2

01. प्राचीन भारतीय अभिलेखों का माध्यम एवं प्रकार.
Types and Medium of Ancient Indian Epigraphy.
02. अशोक कालीन ब्राह्मी लिपि का स्वरूप.
Form of Ashokan Brahmi Script.
03. गुप्तकालीन ब्राह्मी लिपि का स्वरूप.
Form of Guptas Brahmi Script.

Unit-3

निम्न अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन.
Historical and cultural study of the following inscriptions.

01. अशोक के 12 वॉ शिलालेख 12^{th} Rock Edict of Ashoka.
02. अशोक के 13 वॉ शिलालेख 13^{th} Rock Edict of Ashoka.
03. अशोक के 7 वॉ लघु शिलालेख 7^{th} Pillar inscription of Ashoka.

Unit-4

निम्न अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन. .
Historical and cultural study of the following inscriptions.

01. बेसनगर का गरूड स्तंभ अभिलेख Basenagar Pillar Inscription.
02. कनिष्क द्वारा 41 राज्य वर्ष में जारी आरा अभिलेख Aara Inscriptions of Kaniskha in 41^{st} Year.
03. मिनांडर का शिनकोट अस्थि मंजूषा अभिलेख Sinkoh Gasket Inscription of Minander.

Unit-5

निम्न अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन.
Historical and cultural study of the following inscriptions.

01. खारवेल का हाथी गुफा अभिलेख Hathigumpha inscription of Kharwell.
02. रूद्रदामन का जूनागढ अभिलेख Junagarh Inscription of Rudradaman./
03. गोतमी बलश्री का नामिक अभिलेख Nasik Inscription of Gootamibalshri.

Books Recommended:-

Ojha, G H.—Prachin bharti Lipi maala.
Rajbali pandey— Indian Paleography.
Hultzsch, E. --- Cospus inscription Indicarum. Vol-1
Upadhayay Vasudev—Prachin Bhartiya Abhileekh Ka Adhyan.
Vajpayee K.D. –EtihassikBhartiya abhilekh.
Parhar, Dinesh Nandini—Madhya Bhart ka Leekhan evam utkirnan Takneek ka udbhv evam vikas.

अनिवार्य प्रश्न–पत्र, तृतीय
इतिहास लेखन की विधि एवं अवधारणाएं
Histography, Concept and Methods

Unit :1

Meaning and Scope of History.
What is history? Collection and selection of Data (Literature, Oral tradition, Contemporary tradition etc.)

इतिहास का अर्थ एवं कार्यक्षेत्र
इतिहास क्या है? तथ्यों का संग्रह या चुनाव (साहित्य, पुरातत्व एवं समकालीन मौखीक परंपराएं)

Unit:2

History and other disciplenes: Archaeology ,Geography, Sociology, Economics, Philosophy, Anthropology
इतिहास का संबंध : पुरातत्व, भूगोल, समाजशास्त्र, अर्थशास्त्र, दर्शनशास्त्र एवं मानव विज्ञान

Unit:3

Traditions of historical writing: Greco-Roman, Chinese, ancient Indian, Arabic.
इतिहास लेखन की परंपरा : भारतीय, यूनानी–रोमन, चीनी एवं अरबी

Unit:4

Approaches to History: Orientalist, Imperialist, Nationalist, Subaltern, Marxist.
इतिहास लेखन की धारा : प्राच्यविद्, राष्ट्रवादी, मार्क्सवादी, साम्राज्यवादी एवं अफसरशाही

Unit:5

Major theories of History: Materialistic, Cynical, Theory of Toynbee, Theory of Spenglar.
इतिहास के मुख्य सिद्धांत : भौतिकवादी, चक्रिय, ट्रयनबी का सिद्धांत एवं स्पेंग्लर का सिद्धांत

Bookd Recommended:-

Carr E.H. – What is History.
Collingwood - The idea of History.
Reiaier, G.I. – History its Puruose and Methods.
Gardiner - Theories of History.
Thompson - History of Historical Thinking Social Reasearch Council Monographs: Theory and Practicle in Historical Study.
Pandey, G.C. – Itihasa, Svarupa Evam Siddhanta.
Pathak, V.S. – Ancient Historeans of India.

GROUP C
OPTIONAL PAPER
सेमेस्टर तृतीय प्रश्न–पत्र चतुर्थ
संग्रहालय विज्ञान, Museology
Part-I

Unit-1

संग्रहालय का परिचय Introduction to Museum.

(1) संग्रहालय का अर्थ एवं परिभाषा Meaning and Definition of Museum.

(2) संग्रहालय के प्रकार Types of Museum.

Unit-2

संग्रहालय का इतिहास एवं विकास History and development of Museums.

(1) प्रारंभिक चरण के संग्रहालय (1798–1898 ई.) Early Museum.(1798-1898)

(2) द्वितीय चरण के संग्रहालय (1899–1947 ई.)
Second phase of Museum.(1899-1947)

(3) तृतीय चरण के संग्रहालय (1947–2010 ई.)
Third Phase Museums(1947-2010)

Unit-3

संग्रहालय का वर्गीकरण Classification of Museums.

(1) प्रशासनिक आधार Administrative Basis.

(2) संग्रह की प्रकृति के आधार पर Antiquity Basis.

Unit-4

संग्रहालय के कार्य Funtion of Museums.

(1) प्रारंभिक कार्य (संग्रहण, पंजीकरण, अभिलेखीकरण)
Primary Work.(Collection, Registration, Documentation.)

(2) द्वितीयक कार्य (प्रबंधन, सुरक्षा, प्रकाशन)
Secondary Work (Management, security and Publication)

Unit-5

संग्रहालय की सुरक्षा एवं परिरक्षा Security and Precaution of Museums.

(1) सुरक्षा (चोरी से बचाव, आग से बचाव, वस्तुओं के स्थानांनतरण में सावधानियाँ) Security(safety from theft, fire, shifting.)

(2) परिरक्षा (आपेक्षित आर्द्रता, पर्यावरण, प्रकाश, कीडे मकोड़ों से बचाव) Precaution(Humidity, Environment,Light, Insects)

Books Recommended:-

Ghosh, D.P.—Studies in Museums and Museology in India.
Kaunwall S.S. – Technical studies in the field of Museums and Fine arts.
Kaunwal S.S. – Protection and conservation of Museum collections.
Chaudhary Rai A.D. ,Rai Neelima—sangrahalaya anusheelan

तृतीय सेमेस्टर प्रश्न–पत्र पंचम
पर्यटन, Tourism
Part-I

Unit-1

1. पर्यटन का उद्भव और विकास
(Origin & Development of Tourism in India)
2. पर्यटन की परिभाषा, उद्देश्य एवं अवधारणा
(Definition, Object and Concept of Tourism in India.)
3. पर्यटन के प्रकार (Types of Tourism)

Unit-2

1. भारत पर्यटन संगठन (Tourism organization of India)
2. अन्तराष्ट्रीय पर्यटन संगठन (International Tourism Organization)

Unit-3

1 टूर आपरेटर और उसकी कार्यप्रणाली (Tour operator and its functions)
2. ट्रेवल एजेंसी का गठन और कार्यप्रणाली (Travel Agency and itfunctions)
3. यात्राक्रम और उसका महत्व (Itinerary and its importance)

Unit-4

1. अन्तराष्ट्रीय पर्यटन सम्बंधी औपचारीकताएँ
(Formalities for International Tourism)
2. पासपोर्ट, वीसा, विदेशी मुद्रा, बीमा
(Passport, Visa, Foreign Currency Insurance

Unit-5

1. पर्यटन में आवास व्यवस्था का महत्व
(Importance of Accommodation in Tourism)
2. पर्यटन–आवास का उद्भव एवं विकास
(Origine and Development of Tourism Accommodation)
3. विभिन्न प्रकार के आवास (Types of ACC)
4. होटल और उसके वर्गीकरण (Hotels and its Classification)

GROUP D

एम0ए0 (तृतीय सेमेस्टर)

वैकल्पिक प्रश्न–पत्र- चतुर्थ

छत्तीसगढ का राजनीतिक एवं सांस्कृतिक इतिहास

Political and Cultural History of Chhattisgarh

Part-I

Unit-1

01. छत्तीसगढ का भूतात्विक संरचना एवं भौगोलिक स्थिति
Geological condition and Geographical location of Chhattisgarh region.

02. छत्तीसगढ क्षेत्र का परिचय एवं नामकरण
Name and introduction of Chhattisgarh region.

Unit-2

छत्तीसगढ के इतिहास के स्रोत– साहित्य,अभिलेख,सिक्कें,एवं मुद्रायें,स्मारक एवं मूर्तियॉ.
Sources if History in Chhattisgarh region- Literature, Epigraphs,Coins, Monuments and Sculptures.

Unit-3

01. प्राग् एवं आद्य इतिहासः– महत्वपूर्ण स्थल, शैलचित्रकला एवं महापाषाणीय स्मारक,
Pre and Proto History- Important Rock Paintings & Megaliths

02. वैदिक काल से चौंथी शताब्दी ई. तक का इतिहास
History of Chhattisgarh from Vedic period to 4th C B.C.

Unit-4

01. गुप्त और वाकाटक वंश का छत्तीसगढ से संबंध एवं प्रभाव
Impacts and Relations of Gupa- Vakataka Dynasty in Chhattisgarh region

02. नल वंश एवं राजर्षि तुल्य कुल का इतिहास एवं वंशक्रम
History and Geneology of Nals and Rajahashi tulya kul dynasty.

Unit-5

शरभपुरीय राजवंश का उद्भव,विकास एवं पतन,तथा छत्तीसगढ के इतिहास में उनका स्थान
Origin, development and fall of Sharabhpuriya clan and its place in the history of Chhattisgarh.

Books Recommended:-

Goyal, Shriram—Gupta kaleen Bharat.
Mirashi,V.V.—Corpus indicarum Vol-4 Part-1&2
Mirashi,V.V.— Kalchuri naresh evam unka kaal.
Neema,S.R.—Political History of Surya wanshi and South koshal and Orrisa.
Pyarelaal Gupa—Prachin Chhattisgarh.
Parihar,Dinesh Nandini,-- Dakshin Koshall ka itihaas,
Parihar,Dinesh Nandini,-- Prachin Chhattisgarh ka samajik evam arthik itihas.
Singhdev, J.P.—Cultural Profile of South koshal.
Jain, V.C. –Utkeerna leekh.
Pandey,Shyam Kumar—Dakshin Koshal ka Itihas.
Nigam, L.S. –Dakshin kosal ka itihas

एम0ए0 तृतीय सेमेस्टर
वैकल्पिक प्रश्न–पत्र पंचम
पुरातत्व का इतिहास
(History of Archeaology)

Unit-1

1 पुरातत्व की परिभाषा एवं क्षेत्र Definition and scope of archaeology.

2 प्रारंभिक खोजे Early Discoveries.

3 वैज्ञानिक दृष्टि से पुरातत्व के अध्ययन एवं विकास में परिवर्तन
Changes in attitude and development of Scientific temper.

Unit-2

1 भारतीय पुरातत्व का इतिहास History of Indian Archeaology.

2 भारत में पुरातत्व की अद्यतन प्रवृत्तियाँ एवं प्रयोग
Recent trends and their application in India.

3 स्तर विन्यास, स्तरों के निर्माण के कारक एवं प्रक्रिया
Stratigraphy , factor and process of formation of layers.

4 स्तरों की पहचान एवं उनका अभिलेखीकरण तथा सांस्कृतिक क्रम का पुर्ननिर्धारण, Identification and documentation of various layers and recording of the cultural sequence.

Unit-3

1 सर्वेक्षण का उद्देश्य एवं विधियाँ Aims and method of the exploration.

2 उत्खनन का उद्देश्य एवं विधियाँ Aims and method of excavation.

3 बहुसांस्कृतिक बसाहट–ग्रामीण बसाहट, नगरीय बसाहट
Multicultural settlement, village settlement and city settlements.

Unit-4

1 समुद्री पुरातत्व अध्ययन की पद्धति एवं महत्व
Underwater archaeology- method and importance.

2 उत्खनन से प्राप्त सामग्रियों का अभिलेखीकरण
Method of recording of excavated findings.

Unit-5

1 तिथि निर्धारण की सापेक्ष पद्धतियाँ Dating Methods- traditional

2 तिथि निर्धारण की वैज्ञानिक पद्धतियाँ – रेडियों कार्बन विधि, थर्मोल्युमिसेश, पोटेशियम आर्गन विधि, Scientific Dating methods—Radio carbon dating, thermo-lumisence method, Potassium argon method.

Books Recommended:-

Pandey,J.N. Puratatva vimarsha
Sakalya, H.D.—Indian Archeaology Today.
Sakalya, H.D—Prehistory and Protohistory of India and Pakistan.1974
Sakalya, H.D—Prehistory of India 1977.
Subbarao,B.—The Prehistory of India.
Kenyan, K.M.—Field Archeaology.

Semester - IV

No.	Name of the Paper	Internel	Theroy	Total
	Compulsory Papers			
1	Numismatics Part--II	20	80	100
2	Epigraphy & Palaeography Part--II	20	80	100
3	Survey and Field Work			100

Optional Paper (Any Two Paper GROUP C or D)

GROUP C

4	Tourism Part--II	20	80	100
5	Museology Part--II	20	80	100

GROUP D

4	Political and Cultural History of Chhattisgarh Part--II	20	80	100
5	History of Archaeology Part--II	20	80	100

एम0ए0 चतुर्थ सेमेस्टर
अनिवार्य प्रश्न–पत्र –I
मुद्राशास्त्र, Numismatics
Part-II

Unit-1

01. कुषाण मुद्राएँ की सामान्य विशेषताएँ, General Importance of Kushan coins.
02. कनिष्क के पूर्व की मुद्राएँ Pre-Kaniskha coins.
03. कनिष्क की मुद्राएँ Kaniskha coins.
04. कनिष्क के पाश्चात की मुद्राएँ Post- Kaniskha coins.

Unit-2

01 सातवाहन मुद्राएँ Satavahana coins.
02 शक मुद्राएँ Shakha coins.
03 पश्चिम भारत के शक–शत्रपों के मुद्राएँ, Coins of western shaka Satrapa
04 नाग मुद्राएँ Naag coins

Unit-3

01. गुप्त मुद्राओं की सामान्य विशेषताएँ General Importance of Gupta coins.
02. चंद्रगुप्त कुमारदेवी शैली की मुद्राएँ Coins of Chandragupta (Kumaradevi).
03. कॉच की मुद्रा और समस्या Problems with Kach coins.
04. समुद्रगुप्त Coins of Samudragupta.

Unit-4

01. रामगुप्त की मुद्राएँ . Coins of Ramgupta
02. चुद्रगुप्त द्वितीय की मुद्राएँ . Coins of Samudragupta-II
03. कुमारगुप्त प्रथम की मुद्राएँ Coins of Kumargupta-I
04. स्कंदगुप्त की मुद्राएँ . Coins of Skandagupta

Unit-5

01. स्कंदगुप्त के पश्चात गुप्त शासकों की मुद्राएँ Post-Gupta Coins after Skandagupta.
02. गुप्तवंश की चॉदी की मुद्राएँ Gupta Silver Coins.
03. गुप्तवंश की तांबे की मुद्राएँ Gupta copper Coins.

Books Recommended:-

Cunningham, A— Coins Of Ancient India.
Altekar, A.S. -- Ancient Indin Coins. Catlogs of Indian coins.
Gupta ,P.L.— Mudrayen
Chakravarty, S.K. -- Ancient Indian Numismatics
Narayan , A.K.—The Indo Greek coins.
Sarkar, D.C.—Study of the Indian Coins.

एम0ए0 चतुर्थ सेमेस्टर
अनिवार्य प्रश्न–पत्र II
अभिलेख एवं पुरालिपि शास्त्र. Epigraphy & Paliography
Part-II

Unit-1

निम्नलिखित अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन
Historical and cultural study of the following inscriptions:-

01. समुद्रगुप्त का प्रयाग स्तम्भ लेख
Samudragupta's Allahabad pillar inscription.
02. चन्द्र का मेहरौली लौह स्तंभ लेख
Chandra's Iron pillar inscription at Mehrauli.
03. प्रभावती गुप्ता का पूना ताम्र पत्र
Prabhavati Gupta's copperplate at Poona.

Unit-2

निम्नलिखित अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन
Historical and cultural study of the following inscriptions:-

01. कुमारगुप्त एवं बन्धुवर्मन का मंदसौर अभिलेख
Kumargupta and Bandhu varman's inscription at mandsaur.
02. स्कंदगुप्त का भितरी अभिलेख
Skandagupta's inscription at Bhitari
03. हर्ष का बंशखेरा ताम्रपत्र
Harsha's copperplate at Banshakhera.

Unit-3

निम्नलिखित अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन
Historical and cultural study of the following inscriptions:-

01. पुलकेशीन द्वितीय का ऐहोल अभिलेख Aihole inscription of Pulkeshin II.
02. अमोघवर्ष का संजान ताम्रपत्र Sanjaan copperplate of Amoghvarsha.
03. नन्न का भांदक अभिलेख Bhandak inscription of Nanna.

Unit-4

निम्नलिखित अभिलेखों का ऐतिहासिक एवं सांस्कृतिक अध्ययन
Historical and cultural study of the following inscriptions:-

01. महारानी वासटा का सिरपुर लक्ष्मण मंदिर अभिलेख
Queen Vaasata's Lakshmantemple inscription at Sirpur.
02. धंग का खजुराहों अभिलेख Khajuraho Inscription of Dhanga.
03. धर्मपाल का खलिमपुर अभिलेख Khalimpur Inscription of Dharmapaal.

Unit-5

01. भोज का ग्वालियर प्रशस्ति लेख Gwalior inscription of Bhooj.
02. युवराज देव द्वितीय का बिलहरी अभिलेख
Bilhari inscription of Yuvaraaj dev-II.
03. जाजल्लदेव प्रथम का रतनपुर शिलालेख Ratanpur inscription of Jaajaldev-I

Books Recommended:-

Hultzsch, E. --- Cospus inscription Indicarum. Vol-1
Upadhayay Vasudev—Prachin Bhartiya Abhileekh Ka Adhyan.
Vajpayee K.D. –EtihassikBhartiya abhilekh.
Parhar, Dinesh Nandini—Madhya Bhart ka Leekhan evam utkirnan Takneek ka udbhv evam vikas.
Jain V.C.—Utkiirn Lekh.
Vajpyee K.D.—Etihaasik Bhartiya Abhilekh.

COMPULSORY PAPER-III
SURVEY AND FIELD WORK- REPORTS & VIVA
OPTIONAL PAPER GROUP C
वैकल्पिक प्रश्न–पत्र IV
संग्रहालय विज्ञान, Museology
Part-II

Unit-1

संग्रहालय योजना एवं प्रशासन Administration and planning of Museums

(1) भवन, आरक्षित संग्रह का भण्डार Buildings, Reservation and Storage.

(2) प्रशासन (बजट, बीमा, व्यवसायिक आचार संहिता)
Administration (Budget,Insurance, commercial Etiquettes)

Unit-2

भारतीय पुरा सम्पदा अधिनियम Indian Antiquity Act.

(1) प्राचीन स्मारक संरक्षक अधिनियम Ancient Monument Preservation act.

(2) पुरानिखात अधिनियम Antiquity Act.

(3) पुरानियति नियंत्रण अधिनियम Antiquity control Act.

Unit-3

देश के प्रमुख संग्रहालय Important Indian Museums.

(1) राष्ट्रीय संग्रहालय जनपथ, नई दिल्ली
National Museum, Janpath Newdelhi.

(2) प्रिंस आफ वेल्स म्यूजियम मुम्बई Prince of Whales Museum Mumbai.

(3) भारतीय संग्रहालय, कलकत्ता Indian Museum Kolkata.

(4) मानव संग्रहालय, भोपाल Man Museum Bhopal.

Unit-4

छत्तीसगढ़ के संग्रहालय Museums of Chhattisgarh.

(1) छत्तीसगढ़ के संग्रहालयों का इतिहास एवं प्रकार
History and types of Museums of Chhattisgarh

(2) छत्तीसगढ़ के प्रमुख संग्रहालय – महंत घासीदास स्मारक संग्रहालय, रायपुर, जिला संग्रहालय, बिलासपुर, जगदलपुर अन्य संग्रहालय इन्दिरा कला संगीत वि.वि. संग्रहालय, खैरागढ़ जिला पुरातत्व सघ के संग्रहालय, स्थल संग्रहालय (पुरातात्विक संग्रहालय)

Main Museums in Chhattisgarh—Mahant Ghasidas Museum, Raipur, District Museum, Bilaspur& Jagdalpur; Indira kala sangeet viswavidyalaya Khairagarh, Puratatva sangh museum of khairagarh, Site museum (Archeological Museum)

Unit-5

संग्रहालय शिक्षा Museum Education.

(i) दर्शक Visitor (ii) प्रदर्शनी Exhibitions (iii) प्रकाशन Publications

(iv) शोध Research.

Books Recommended:-

Ghosh, D.P.—Studies in Museums and Museology in India.
Kaunwall S.S. – Technical studies in the field of Museums and Fine arts.
Kaunwal S.S. – Protection and conservation of Museum collections.
Chaudhary Rai A.D. ,Rai Neelima—sangrahalaya anusheelan

Paper- v
Tourism, पर्यटन

Unit-1

पर्यटन का अर्थ एवं परिकल्पना नये क्षेत्र में.
(साहसिक पर्यटन, सतत् एवं पारिस्थितिकी पर्यटन)
New Thrust areas of Tourism:- Definition and Concept
(AdventureTourism, Ecotourism and Sustainable Tourism.)

Unit-2

संचार के साधन, टिकिटिंग, रिजर्वेशन सुविधाएं.
Means of Communication, Ticketing and Reservation Facilities.

Unit-3

अंतर्राष्ट्रीय पर्यटक : कानून प्रबंधन, पासपोर्ट, वीसा, इमिग्रेशन एंड कस्टम
International Tourist: - Provisions of Law regarding passport, visa, immigration and customs.

Unit-4

भारत के प्रमुख पर्यटन जोन से संबंधित स्मारकों से संबंधित सूचना (जयपुर, आगरा, खुजराहो,
सांची, भूवनेश्वर, महाबलिपुरम, तंजौर, हम्पी)
Brief information about Main Historical Monuments of Tourist importance with special reference to various zones as divided by the department of Tourism, Government of India.(Jaipur, Agra, Khajuraho,Sanchi, Bhubaneswar, Mahablipuram, Tanjor, Hampi.)

Unit-5

छत्तीसगढ़ के प्रमुख पर्यटन केंद्र.
01 Main centers of tourist intrest in Chhattisgarh .
छत्तीसगढ़ के प्रमुख मेला, त्यौहार एवं खरीददारी.
02. Fairs, Festivals and shopping in Chhattisgarh.

Books Recommended:-

Acharya, Ram: - Tourism in India.
Acharya, Ram: - Tourism and Cultural heritage of India.
Bhatia, A.K.:- Tourism, Development Principles and Practices.
Krishnalal & Gupta, S.P.:-Tourism Museums
Robinson-- A Geography of Tourism
Publicity Brouchers published by the Department of Tourism, Government Of India. And Government of Madhya Pradesh.

GROUP-D
एम0ए0 (चतुर्थ सेमेस्टर)
प्रश्न–पत्र चतुर्थ

छत्तीसगढ का राजनीतिक एवं सांस्कृतिक इतिहास (6वीं शता.से 13 वीं शता. ई.तक)
Political and Cultural History of Chhattisgarh (6th C to 13th C)
Part II

Unit-1

01. मेकल का पाण्ड्य वंश. Pandu Dynasty of Maikal.
02. दक्षिण कोसल के पाण्डुवंश Pandu Dynasty of Koshal.

Unit-2

01. छत्तीसगढ के कलचुरि वंश का उद्भव.
Origin of Kalchuri Dynasti of Chhattisgarh.
02. रतनपुर के कलचुरि शासक Kalchuri Rulers of Ratanpur.

Unit-3

01. बस्तर के छिन्दक नाग वंशीय शासक Chindaknaag Dynasty of Bastar.
02. कवर्धा के फणीनागवंशीय शासक Phaninaag rulers of Kawardha.
03. कांकेर के सोमवंशीय शासक Soomvanshi rulers of Kanker.

Unit-4

छत्तीसगढ के धार्मिक, सामाजिक एवं आर्थिक इतिहास.
Social, Economic and Religious History of Chhattisgarh

Unit-5

छत्तीसगढ़ की स्थापत्य एवं मूर्तिकला Art and Achitecture of Chhattisgarh.

Books Recommended:-

Goyal, Shriram—Gupta kaleen Bharat.
Mirashi,V.V.—Corpus indicarum Vol-4 Part-1&2
Mirashi,V.V.— Kalchuri naresh evam unka kaal.
Neema,S.R.—Political History of Surya wanshi and South koshal and Orrisa.
Pyarelaal Gupa—Prachin Chhattisgarh.
Parihar,Dinesh Nandini,-- Dakshin Koshall ka itihaas,
Parihar,Dinesh Nandini,-- Prachin Chhattisgarh ka samajik evam arthik itihas.
Singhdev, J.P.—Cultural Profile of South koshal.
Jain, V.C. –Utkeerna leekh.
Pandey,Shyam Kumar—Dakshin Koshal ka Itihas.

एम0 ए0 चतुर्थ सेमेस्टर
वैकल्पिक प्रश्न–पत्र पंचम
पुरातत्व का इतिहास, History of Archaeology

Unit-1

(1) पुरातत्व के प्रौद्योगिक सौपान – पाषाणिक, कास्ययुग, लौहयुग Tool tecniques of Archeaology—Paleolithic age, Mesolithic and Neolithic.

(2) आर्थिक – प्रौद्योगिक सौपान पुरापाषाण, मध्य पाषाण, नवपाषाण Economic development of prehistoric period- Paleolithic age, Mesolithic and Neolithic, chalcolithic

Unit-2

(1) पुरातात्विक तकनीक क परिभाषिक शब्दावली Archeaological Tecniques and technical terminology.

(2) सांस्कृतिक क्रम का पुर्ननिर्धारण cultural sequence

Unit-3

(1) पुरातत्व के प्रति जागरूकता Awareness of archaeology.

(2) स्मारकों का धार्मिक, सार्वजनिक महत्व एवं उनके प्रति दृष्टिकोण General awareness of historical and religious monuments.

Unit-4

(1) उत्खनित स्थलों का संरक्षण की विभिन्न पद्धतियाँ Preservation techniques of excavated sites.

(2) संरक्षण की रासायनिक एवं अन्य पद्धतियाँ chemical preservation techniques.

Unit-5

(1) प्राचीन स्मारक संरक्षण अधिनियम Ancient Monument preservation act.

(2) पुरानिखात अधिनियम Treasure Trove Act

(3) पुरानियति नियंत्रण अधिनियम

(4) पुरावशेष एवं बहुमूल्य कलाकृति अधिनियम Antiquity and Precious artifact act.

Books Recommended:-

Pandey,J.N. Puratatva vimarsha
Sakalya, H.D.—Indian Archeaology Today.
Sakalya, H.D—Prehistory and Protohistory of India and Pakistan.1974
Sakalya, H.D—Prehistory of India 1977.
Subbarao,B.—The Prehistory of India.
Kenyan, K.M.—Field Archeaology.

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
SESSION 2017-18

POST GRADUATE DIPLOMA IN TOURISM AND HOTEL MANAGEMENT
SCHEME OF THE EXAMINATION FOR THE ACADEMICYEAR
2016-2017

Paper No. Name of the Papers Max. Marks
1. Tourism : Concept, Policy & Planning 100
2. Tourism Products of India 100
3. Travel Agency, Tour Operation & Marketing for Hospitality & Tourism 100
4. Hotel Management 100
Project Report 100
Viva-Voce 50
Professional Training 50
Total 600

(Dr. Dinesh Nandini Parihar)
DIRECTOR

PAPER-I
TOURISM: CONCEPT, POLICY AND PLANNING

UNIT-I

Concepts, Definitions, Growth & Development of Tourism. Types of Tourists. Forms of Tourism. Tourism System- Nature and Characteristics. Components of Tourism Industry.

UNIT-II

Travel Motivators. Demand for Tourism. Charscteristics of Supply. Life Cycle Stages. Tourism Impacts- Costs and Benefits of Tourism.

UNIT-III

New thrust areas of Tourism:- Adventure Tourism, Eco-Tourism, Sustainable Tourism, Heritage Tourism, MICE, Role of ITDC, ASI, Ministries of Railways & Civil Aviation in the Promotion of Tourism. Organization and Working of Chhattisgarh Tourism Board. An Overview of Organizations and Associations like- IATO, TAAI, WTO, ICAO & IATA.

UNIT-IV

Concept Need and Objective of Public Tourism Policy. An outline of L.K. Jha Committee-1963. National Tourism Policy-1982. National Committee Report-1988. National Action Plan on Tourism-1992.

UNIT-V

Tourism Planning:- Background, Approach and Process. Tourism Planning at National, Regional, State and Local levels. An important feature of Five Year Tourism Plans in India. Destination Life Cycle, Concept of Carrying Capacity, Sustainable and Eco-tourism. Eco-Tourism & Community participation in Tourism Planning.

PAPER-II
TOURISM PRODUCTS OF INDIA

UNIT-I

Tourism Products, Concepts and Classifications. Typology of Attractions. Glimpses of India's Cultural Heritage.

UNIT-II

Indian Architecture: - Hindu, Buddist, Jain and Indo-Islamic. Indian Painting:- Important Schools and Types.

UNIT-III

Performing Arts of India: - Classical and Folk Dances. Indian Music:- Prominient Schools of Indian classical music, Folk Music and Important Instruments.

UNIT-IV

Important World Heritage Sites in India. Places of Tourist Interest in Chhattisgarh State. Important Wildlife Santuaries and National Parks. Adventure and Eco- Tourism Destinations. Yoga and Meditation as a tourism products.

UNIT-V

Handicrafts:- Important objects and centers connected therein, craft melas. Fairs and Festivals of Tourist significance. Indian Cusine.

PAPER-III
TRAVEL AGENCY, TOUR OPERATION & MARKETING FOR HOSPITALITY & TOURISM

UNIT-I

History and growth of Travel agency business. Definitions of Travel Agent and Tour Operator. Differentiations & interrelationships of TA & TO, Future prospects.

UNIT-II

Itinerary preparation:- Important Considerations, Costing, Packaging & Promotion. Definition of Tour Package. Types and Forms of Package Tours, Designing, Preparation and Costing of Tour Packages.

UNIT-III

Passport, Visa, Health, Customs and Currency Regulations. Baggage Rules and Travel Insurance. An overview of CRS and Ticketing. Types of Tours available in India. Indrail Passes etc.

UNIT-IV

Definition Concept and Scope of Marketing. Service Marketing and its Special Features. Tourism and Hospitality Marketing:- its Uniqness.

UNIT-V

Market Segmentation. Identifying Market Segments and Selecting Target Markets. Marketing Mix vis-à-vis Hospitality and Tourism.

PAPER-IV
HOTEL MANAGEMENT

UNIT-I

HOTEL INDUSTRY AND ITS GROWTH

1.1 Introduction.

1.2 Evolution of Hotel.

1.3 Growth and Development.

1.4 Importance of Hotel and Tourism in India.

UNIT-II

FOOD AND BEVERAGE SERVICE

2.1 Introduction

2.2 Restaurant: - Types of Restaurant, Restaurant Brigade, The Hostess, Etiquettes of Restaurant Staff, Points while waiting at the table.

2.3 Equipments:

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

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2.1 Introduction
2.2 Restaurant: - Types of Restaurant, Restaurant Brigade, The Hostess, Etiquettes of Restaurant Staff, Points while waiting at the table.
2.3 Equipments: - Measurement, Sideboard, Mise-en-Place, Mise-en-scene, Service, Equipment and use, Bar Equipment.
2.4 Menu and Food Service: - Classes of Menu, Taking an Order, Type of Food Service, Breakfast Service (English and Continental).
2.5 Beverages: - Beverages Chart, Types of wine, Food and wine chart, Spirit.
2.6 Banquets: - Types of Banquets, Outdoor Catering.

UNIT-III

3.1 Information: - Types of Hotel, Classification of Hotel, Basis of Charging a guest, Reception terms, Job Description, Co-ordination and other department.
3.2 Reception: - Art of Reception, Arrival and Departure, Register, Rules for F.O. Staff, Room Status System, Rooming Procedure, Black List, Wake calls, G-H Card. Scanty Baggage and Left Luggage
3.3 Reservation: - Modes of Reservation, Reservation forms, Guest- Registration, Welcome Slip.
3.4 Cashier: - Credit in Hotel, Credit Cards, Traveler's cheque, Handling guest valuables.

UNIT-IV

HOUSEKEEPING

4.1 Introduction.
4.2 House Keeping: - Layout of Housekeeping Department, Layout Organisation of Housekeeping Department.
4.3 Housekeeping Staff:- Job Description, Qualities of Housekeeping Staff, Co-Ordination with other Departments.
4.4 Linen and Uniform:- Types of uniform used, Types of Linens used, Parstock, Exchange of Linen and Uniforms.
4.5 Housekeeping Activities:- Public area Cleaning, Housekeeping Supply room, Key control, Lost and Found Procedure, Inventory Control.

UNIT-V

FOOD AND BEVERAGE PRODUCTION

5.1 Introduction and Popular cuisine.
5.2 Preparation of Ingredients.
5.3 Cooking Methods.
5.4 Kitchen chart and Duties of Kitchen Staff.

पाठ्यकम /Syllabus

एम.फिल. प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व

एम. फिल. पाठ्यकम एक शैक्षणिक वर्ष का है। एम.फिल. परीक्षा की योजना निम्नानुसार होगी।

वर्ष 2015–16

क0	प्रश्न पत्र	अंको का विवरण वार्षिक परीक्षा	सेमिनार	पूर्णांक
01	प्रा.भा.इति.सं. एवं पुरातत्व का स्रोत एवं शोध प्रविधि	80	20	100
02	इतिहास लेखन प्रविधि (हिस्टोग्राफी)	80	20	100
03	छत्तीसगढ़ क्षेत्र के इतिहास संस्कृति एवं पुरातत्व	80	20	100
04	लघु शोध प्रबंध	लेखन क्षेत्र सर्वेक्षण मौखिक	200 60 40	300

प्रथम प्रश्न पत्र

प्राचीन भारतीय इतिहास, संस्कृति एवं पुरातत्व के स्रोत एवं शोध प्रविधि

इकाई 01.

01 पारंपरिक इतिहास – वेद, महाकाव्य, एवं पुराण
02 बौद्ध साहित्य
03 जैन साहित्य
04 विदेशी लेखकों का विवरण

इकाई 02.

01 कौटिल्य का अर्थशास्त्र
02 बाणभट्ट का हर्षचरित
03 कल्हण की राजतरंगिणि
04 पद्मगुप्त परिमल का नवसहशांक चरित
05 संगम साहित्य

इकाई 03.

01 प्राचीन भारतीय इतिहास के स्रोत के रूप में अभिलेख
02 प्राचीन भारतीय इतिहास के स्रोत के रूप में सिक्कें एवं मुहरें
03 प्राचीन भारतीय इतिहास के स्रोत के रूप में स्मारक, मूर्तियां तथा चित्र
04 प्राग् ऐतिहासिक काल के औजार एवं मृद्भांड अवशेष

इकाई 04.

01 शोध कार्य का प्रकृति एवं उद्देश्य
02 शोध कार्य का विषय एवं प्रारूप निर्धारण
03 शोध सामग्री का संकलन
04 शोध प्रबंध का प्रारूप
05 अध्यायों का वर्गीकरण
06 संदर्भो का लेखन का प्रारूप
07 मानचित्र, रेखाचित्र एवं फोटोग्राफ
08 संदर्भ ग्रंथ सूची
09 टायपिंग एवं बाईडिंग

प्रथम प्रश्न द्वितीय

प्राचीन भारतीय इतिहास, लखन विधि

इकाई 01.

- 01 इतिहास का अर्थ एवं प्रकृति
- 02 इतिहास बोध
- 03 इतिहास का उद्देश्य एवं महत्व
- 04 इतिहास के उपकरण

इकाई 02.

- 01 प्राचीन भारत में इतिहास बोध
- 02 प्राचीन भारतीय साहित्य में वर्णित भारत का भूगोल
- 03 भारतीय साहित्य के संदर्भ में भारत वर्ष संबंधी अवधारणा

इकाई 03. प्राचीन भारतीय इतिहास के आधुनिक लेखन

- 01 वी. ए. स्मिथ
- 02 आर. जी. भंडारकर
- 03 आर. सी. मजूमदार
- 04 एच. सी. रायचौधरी
- 05 डी. डी. कौशाम्बी
- 06 आर. एस. शर्मा

इकाई 04.

- 01 तक्षशिला
- 02 हस्तिनापुर
- 03 ब्रम्हगिरी
- 04 कौशाम्बो
- 05 सिरपुर

प्रथम प्रश्न पत्र

छत्तीसगढ क्षेत्र के प्राचीन इतिहास एवं संस्कृति तथा पुरातत्व

इकाई 01. स्रोत प्राचीन छत्तीसगढ़ क्षेत्र के

- 01 साहित्य
- 02 पुरातत्व – सिक्के, अभिलेख, स्मारक , प्रतिमा, गुहा चित्र
- 03 ह्वेनसांग का यात्रा विवरण
  1. छत्तीसगढ़ क्षेत्र का प्राचीन नाम एवं सीमांए
  2. छत्तीसगढ़ क्षेत्र के प्राग् ऐतिहासिक संस्कृति

इकाई 02. छत्तीसगढ़ क्षेत्र का राजनैतिक एवं सांस्कृतिक इतिहास(600 ई.पू.–450 ई.पू. तक)

- 01 महाजनपदकाल
- 02 मौर्यकाल
- 03 सातवाहन एवं महामधवाहन (खारवेल)
- 04 गुप्त वाकाटक काल

इकाई 03. छत्तीसगढ़ क्षेत्र का राजनैतिक एवं सांस्कृतिक इतिहास(450 ई.पू.–800 ई.पू. तक)

- 01 नलवंश
- 02 राजर्षितुल्यकुल
- 03 शरभपुरीय राजवंश
- 04 पाण्डुवंशीय राजवंश

इकाई 04 छत्तीसगढ क्षेत्र का राजनैतिक एवं सांस्कृतिक इतिहास(800 ई.पू.–1300ई.पू. तक)

- 01 रतनपुर के कलचुरी शासकों के पूर्व के राजनैतिक स्थिति
- 02 रतनपुर के कलचुरियों का राजनैतिक सांस्कृतिक स्थिति
- 03 रतनपुर के कलचुरि शासकों के समकालीन अन्य राजवंश
  1. छिंदक नागवंश शासक
  2. फणिनागवंश शासक
  3. कांकेर के सोमवंशी

SCHOOL OF STUDIES IN ANCIENT INDIAN HISTORY, CULTURE & ARCHAEOLOGY

Pt. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

COURSE WORK FOR Ph. D. IN Effective from 2017-18

S. No.	PAPERS	MARKS
1	Methodological aspects of Research in AIHCA	100
2	Practical a. Review of related Literature b. Seminar c. Project Report/ Dissertation	100
TOTAL MARKS		200

Paper – I
Methodological Aspects of Research in Ancient Indian History, Culture & Archaeology

M.M. – 100

Unit – I

1. Research – Meaning, Aims and Importance.
2. Stages of Synopsis preparation – Selection of topic, Review of related literature.
3. Hypothesis formation – meaning, aims & kind.
4. Selection of Research Methodology, Chapterisation & Citation/Bibliography.

Unit – II

Literary sources -

a. Religious Literatures – Brahminical, Buddhist & Jaina.
b. Secular Literature.
c. Account of the foreign travelers.

Unit - III

1. Survey of Historical sites.
2. Pre-historic Sources - Pre-historic Tools, Pottery & Rock Paintings.
3. Dating & Chronological Sequences.

Unit – IV

Proto-Historic Sources –

a. Epigraphy.
b. Numismatics.
c. Art & Architecture.

Unit – V

1. Cross Examination of sources and Interpretation..
2. Stages of Thesis Writing – Test of Hypothesis, Conclusion.
3. Refrencing, Citation & Bibliography.
4. Writing of Research Paper, Project Report and Book Review.

Paper – II (Practical)

A : Review of Related Literature

The Candidate shall review a minimum number of 20 research articles from journals or book related to the subject of research. After reviewing the above mentioned works the candidate shall submit a summary; composed chronologically developing the arguments within two months from the beginning of the course. On the basis of the review of literature the candidate shall prepare a synopsis including:

a. Research Topic.
b. Importance of the Problem.
c. Objectives.
d. Review of Literature or works earlier done.
e. Gaps in Earlier Studies.
f. Hypotheses.
g. Methodology.
h. Plan of the Study.
i. Chapterisation.
j. Bibliography.

B. Seminar

The Candidate shall present a seminar on the synopsis. On the basis of the suggestions made in the seminar, the candidate shall prepare a project report/ Dissertation. Final Examination will be conducted with the help of an external examiner in the presence of the internal examiners.

c. Project Report/ Dissertation- Viva

Pt. Ravishankar Shukla University, Raipur

M.A./M.Sc. ANTHROPOLOGY

Semester -1

July 2017-December 2017

M.A. / M.Sc. ANTHROPOLOGY
SEMESTER-I
PAPER I - Fundamentals of Social/ Cultural Anthropology

MAX. Marks- 80
MIN. Marks – 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit- I

Meaning and scope of Anthropology.

Divisions of Anthropology.

Scope of Social-Cultural Anthropology

Social-Cultural Anthropology and relations with other social sciences, life sciences, medical sciences and humanities

Theory of culture: attributes of culture, culture trait, culture complex, culture area, integration of culture, paradoxes of culture

Some basic concept: Civilization, Society, Social structure, Social Organization, Community, Social Institutions, Groups , Status & Role

Unit-II

Social organisation:

Family: typology, residence, functions,

Marriage: typology, mate selection: cross-cousin, sororate etc. dowry and bride price.

Kinship: kin: consanguine, affinal

Tribe, Class, Moiety, Phratry

Kinship terminology: classificatory and descriptive, terms of reference and address

Kinship behaviour: Joking and avoidance relationship

Social stratification, Status and role, Status of woman (Gender)

3/12/16 3.12.16 3/12/16

Unit-III

Economic organisation: Property: individual and collective

Property: concept of primitive communism

Concept of value in primitive economy

Stages of economy: collection, hunting, fishing, pastoralism, cultivation: shifting and settled Subsistence, surplus, and market economy

Systems of trade-exchange: reciprocity, redistribution, barters and markets

Political organization: Law and social control: concept of authority and leadership

Types of political organisation: band, tribe, state

Kingship and chiefdom Primitive law and Justice

Types of punishment

Ethnicity and nationality

Unit-IV

Religion and magic: anthropological approaches to the study of religion- evolutionary, psychological and functional

Primitive religion: animism, animatism, bongaism, totemism

Magic: functions and types

Magico-religious functionaries: shaman, priest, medicine man, sorcerer, witch.

Symbolism in religion and rituals

Religion, magic and science

Art and aesthetics: Forms of music, dance forms, musical instruments

Paintings: ritualistic and symbolic,

Artifacts: carvings, mould, masks etc

Origin and evolution of human language

Language, culture and society

3/12/16

3.12.16

3/12/16

8

Recommended Readings:

1. Barnouw, V. 1979. Anthropology: A General Introduction, The Dorsey Press, Illinois.
2. Holmes, L. D. Anthropology: An Introduction, The Ronald Press Company, New York.
3. Sharma and Sharma. 1997. Anthropology, Atlantic Publishers and Distributors, New Delhi.
4. Hunter & Whitten. The Study of Cultural Anthropology, Harper & row Publishers, New York.
5. Moore, A. 1978. Cultural Anthropology, Harper & row Publishers, New York.
6. Kaplan, D. & Manners, R. A. Culture Theory, Prentice Hall of India Private Ltd., New Delhi.
7. Herskovitz, M. J. Cultural Anthropology, Oxford & IBH Publishing Co., New Delhi.
8. Mair, L. 1965. An Introduction to Social Anthropology, Clarendon Press, Oxford.
9. Majumdar, D.N. & Madan, T. 1986. An Introduction to Social Anthropology, National Publishing House, New Delhi.
10. Mishra, U. S. Samajik Sanskritik Manavshastra, Palka Prakashan, Delhi.
11. Shrivastava, A. R. N. Samajik Manav Vigyan Vivechan (in Hindi), Madhya Pradesh Hindi Granth Academy, Bhopal.
12. Evans-Pritchard, Social Anthropology.
13. Honnigmann, J. Handbook of Social and Cultural Anthropology.
14. Fox, Robin. Kinship and Marriage.
15. Sahlins & Service. Evolution and Culture. The University of Michigan Press, Ann Arbor.
16. Barth, F. Ethnic Group and Boundaries.
17. Barnet, H.G. Innovation. The Basis of Culture Change.
18. Rogers E.M. & Schmacher, F.F. Communication of Innovation.
19. Rogers, E.M. Diffusion of Innovation.
20. Rad-cliffe Brown, A.R. Structure and Function in Primitive Society.
21. Harris, Marvin. Cultural Anthropology.
22. Malinowsky, B.K. Scientific Theory of Culture and Other Essay.
23. Foster, G.M. Tradition, Cultures and Impact of Technological Change.
24. Dalton, George. Tribal and Peasant Economies: Readings in Economic Anthropology.
25. Kluckhohn, C. Mirror for Man.
26. Herskovits, M.J. Man and His Works.
27. Ember and Ember. Anthropology
28. Nas, Manning. Primitive and Peasant Economic Systems
29. Bohannan, Paul. Social Anthropology
30. Jacob, Awsrern. General Anthropology
31. Levi Strauss, Elements of Kinship
32. Schumachr, E.F. Small is Beautiful
33. Evans- Pritchrd, E.E. Primitive Religion
34. Norbeck. Primitive Religion
35. Lowie, R.H. Primitive Social Organisation
36. Lowie, R.H. Social Organisation

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-I
Paper II- Fundamentals of Physical/ Biological Anthropology

MAX. Marks- 80
MIN.Marks – 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT-I

History, Definition, Meaning and Scope of Physical Anthropology.
Relationship of Physical Anthropology with Physical, Biological and Medical Sciences.
History and Development of Physical Anthropology in India.
New Physical Anthropology.

UNIT-II

Theories of Organic Evolution: Lamarckism, Darwinism, Synthetic Theory.
Man's place in Animal Kingdom.
Primate behavior. (With reference to Higher Primates)

UNIT-III

Comparative anatomy of Man and Apes.
Hominid Evolution.
Erect posture and bipedalism.
Evolution of Teeth, Chin, Foot and Pelvis.

UNIT-IV

Human Diversity,Concept of Race,, Race formation. Criteria of Racial classification-skin,Hair and eye colour,Stature,Eyes,Lips and Ears,Face and lower jaw,Blood groups Dermatoglyphics.
Distribution and characteristics-Caucasoid,Negroid,Mongoloid.
Racial classification of Indian populations – Risley and Guha.
Causes of human variation

Recommended Readings:

1. Comas, J. 1960. Manual of Physical Anthropology. Springfield. Charles C. Thomas.
2. Sarkar, R. M. 1976. Fundamentals of Physical Anthropology. Blackie (India).
3. Das, B. M. 1985. Outlines of Physical Anthropology. Kitab Mahal, New Delhi.
4. Shrivastav, A. R. N. 1994. Sharirik Manav Vigyan (in Hindi), Gyandeep Prakashan. Allahabad.

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5. Barnouw, V. 1979. Anthropology: A General Introduction, The Dorsey Press. Illinois.
6. Hooton. E. A. Up from the Ape, The Macmillan Co., New York.
7. Lasker, G.B. and Tyzzer, R.N. Physical Anthropology, Holt Rinechart & Winston, New York.
8. Shukla, B.R.K. and Rastogi, S. Physical Anthropology and Human Genetics: An Introduction. Palka Prakashan, Delhi.
9. Buettner-Janusch, J. Origins of Man, Wiley Eastern Pvt. Ltd. New Delhi.
10. Montagu, M.F.A. The Concept of Race, The Free Press, New York.
11. Montagu, M.F.A. An Introduction to Physical Anthropology, Charles C Thomas, Springfield Illinois.
12. Harrison, G.A., Weiner, J.S., Tanner, J.M. and Barnicot, N.A. Human Biology: An Introduction to Human Evolution, Variation And Growth, Clarenden Press, Oxford.
13. Ashley, Montague. Concept of Race.
14. Backer, P.T. & Weiner (eds.). Biology of Human Adaptability.
15. M. Ember and Ember. Anthropology.
16. Harrison, G.A. and Boyce, J. The Structure of Human Population.
17. Sarkar S.S. Aboriginal races of India.
18. Sahlins and Service. Evolution and Culture.
19. Simpson, G.G. The Meaning of Evolution.
20. Williams B.J. Evolution and Human Origin

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M.A. / M.Sc. ANTHROPOLOGY
SEMESTER-I
Paper III - Prehistoric Archaeology and Palaeo-Anthropology

MAX. Marks- 80
MIN.Marks - 27

Important Note: Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT – I

Introduction: Definition, Subject matter, Branches, Aims and Applications.
Framework of Archaeological Cultures.
Relationship with Other Branches of Anthropology, Earth Sciences, Physical sciences. Life Sciences and Social Sciences.

UNIT – II

Geological Time Scale.
Pleistocene Epoch: Glacial-interglacial; Pluvial-Inter-Pluvial Climatic Cycles, Impact on Cultural Development.
Climatic Markers: Moraines, Terraces, Sea-level Changes, loess, Soil, Dune & Fossils.
Tool Technology: Flaking (Primary & Secondary), Grinding and Polishing Techniques used during Stone Age.
Dating Techniques:
(a) Relative Dating: Stratigraphy, River Terraces, Raised Sea-Beaches, Typo-technology, Fluorine Dating, Pollen Dating.
(b) Absolute dating: Radio-active Carbon, Potassium-Argon, Uranium- Thorium, Dendrochronology, Thermoluminescence, Fission-Track & Obsidian Hydration.

UNIT – III

Lower Palaeolothic of Europe: Distribution, Chronology, Stratigraphy, Assemblage, Abbevillian, Acheulian, Associated Human Fossils .
Middle Palaeolithic of Europe: Distribution, Chronology, Stratigraphy, Assemblage, Traditions, Associated Human Fossils .
Upper Palaeolithic of Europe: Perigordian, Auregnasian, Solutrean, Magdalenian; Prehistoric Art (Home Art and Cave Art).
Mesolithic Culture of Europe: Azilian, Tardenoisean, Austerian, Maglamosean, Kitchen Midden, Campegnian.

UNIT – IV

Australopithecus Species: Discoveries, Distribution, Chronology, Salient features, Phylogeny.
Homo erectus: Discoveries, Distribution, Chronology, Salient features, Phylogeny.
Homo sapiens neanderthalensis: Discoveries, Distribution, Chronology, Salient features, Phylogeny.

Homo sapiens sapiens (Cro-Magnon, Chancelade, Grimaldi): Discoveries, Distribution, Chronology,Salient features, Phylogeny.

Recommended Readings:

1. Agrawal, D.P. & M.G. Yadava. 1995. Dating the human past.
2. Bhattacharya, D.K. 1977. Palaeolithic Europe.
3. Bordes,F. 1968. The Old Stone age. Weidenfeld and Nicolson.
4. Burkitt, M.C. 1969. Old Stone Age: Study of Palaeolithic Times.
5. Campbell, B. C. 1979. Humankind emerging, II edition.
6. Clark, W. E. L. 1964. The Fossil Evidence for Human Evolution, The University of Chicago Press, Chicago.
7. Coles, J. M. & E. S. Higgs. The Archaeology of early man. Faber and Faber.
8. Grazioli, P. Paleolithic Art.
9. Howell, W. Mankind in the making.
10. Johanson, D & E. Maitland. 1981. Lucy- The beginnings of humankind.
11. Knudson, S.J. 1978. Culture in retrospect: An introduction to Archaeology.
12. Oakley, K.P. 1972. Man the tool maker
13. Roe, Derek 1970. Prehistory: An introduction.
14. Sankalia, H.D. 1964, Stone age tools: their techniques, names and probable functions, Pune. Deccan College.
15. Sankalia, H.D. 1974. Prehistory and Protohistory of Early India and Pakistan.
16. Allchin and Allchin, 1982. The rise of civilization in India and Pakistan, Select Book Service Syndicate, New Delhi.
17. Zeuner, F.E. Pleistocene Period.
18. Agrawal, D.P. The Archaeology of India, Curzon Press.
19. Ashley, Montague. Physical Anthropology and Archaeology.
20. Barmown, Victor. Physical Anthropology and Archaeology. Illinois, The Dorse Press Home Wood.
21. Banerjee. Iron Age in India. Munshiram Manoharlal.
22. Brothwell D. & Higgs E. (ed.). Science in Archaeology. Thames and Hudson.
23. Budtzer, K.W. Environment and Archaeology.
24. Clark, D.L. Analytical Archaeology. Methuen and Co. Ltd.
25. Das, B.M. Outlines of Physical Anthropology. Kitab Mahal.
26. James, J. Hester, Introduction to Archaeology. Holt, Rinehart and Winston.
27. Michel, J.W., Dating Method in Archaeology. Seminar Press.
28. Sakalia, H.D., New Archaeology – Its Scope and Application to India. Ethnographic and Folk Culture Society.
29. Zeuner, F.E. Pleistocene Period. Hutchinson.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-I

Paper IV- Research Methods in Anthropology

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT – I

Field work tradition in Anthropology: covering all branches of Anthropology to gain holistic perspective.
Social research and Social survey.
Hypothesis: Sources, characteristics, importance and types of hypothesis.
Methods: Logical, Historical and Scientific methods
Ethnographic method.
Type of research
Report writing: Dissertation and scientific papers

UNIT – II

Research design: review of literature, aims & objectives, hypotheses, research questions, conceptual model, types of research design, evaluation research
Techniques of data collection- Primary data collection: Observation, Questionnaire, Interview, Schedule, Case study, Audio-visual recording, Genealogy.
Secondary Data collection: Census, National Sample Survey, Models and Paradigms.
Data collection: Choice of Suitable Technique.
RRA, PRA, RAP,

UNIT – III

Data: Definition and characteristics.
Types of Data: Geographical, Chronological, Qualitative and Quantitative, Nominal, Ordinal, Ratio and Interval.
Sources of Data: Primary and Secondary sources.
Tabulation: General, Special purpose & Machine tabulation.
Analysis and Interpretation of data.
Preparation of report,
Graphic and Diagrammatic presentation of data.

UNIT – IV

Scope, utility and importance of statistics in Anthropology.
Sampling: Random and Non random sampling

Measures of Central Tendency- Mean, Mode and Median.
Variables, Univariate, Bivariate and Multivariate analysis
Scaling techniques

Recommended Readings:

1. Goode & Hatt. Methods in Social Research.
2. Young, P. V. Scientific Social Surveys and Research.
3. Danda, Ajit. Research Methodology in Anthropology. Inter- India, New Delhi.
4. Gupta, S. P. Statiatics Methods.
5. Elhance, D. N. Practical Problems in Statistics, Kitab Mahal, Allahabad.
6. Levin, J. Elementary Statistics in Social Research.
7. Sarin, S.S. and Balchandani,M.K. Fundamentals of Statistics. Ratan Prakashan Mandir, Agra.
8. Fernandes & Tondon, Participatory Research.
9. Fisher, Michael. Application in Computing for Social Anthropologists, London, Routledge.
10. H. Russel. Bernard, Handbook of Methods in Cultural Anthropology, Altamira Press.
11. Kaplan, Abraham. The Conduct of Enquiry: Methodology for Behavioural Sciences.
12. Kassam & Mustafa. Participatory Research.
13. Madrigal, Lorena. Statistics for Anthropology.
14. Mukherjee, Neela. Participatory Rural Appraisal and Questionnaire Survey.
15. Pelto P.S. & Pelto G.H. Anthropological Research: the structure of inquiry. London. Cambridge University Press.
16. Renfrew, C. (ed.). The Explanation of Culture Change: Models in Prehistory. Duckworth.
17. Sankalia. H.D. Stone Age Tolls, Families and Techniques. Pune. Deccan College.
18. Triger, B.G. Beyond History the Methods of Prehistory. Holt, Rinehard and Winston.
19. Young, Pauline. Scientific Social Survey and Research.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-I

Lab Course I -Practicals in Craniology and Craniometry

MAX. Marks- 80
MIN.Marks - 27

Description of Human Skull and its importance in biological anthropology.
Craniology and Forensic science.
Following Craniometric measurements are to be taken on atleast 2 skulls.

Measurements

Maximum cranial length
Glabella-inion length
Nasion-inion length
Glabella-lambda length
Length of foramen magnum
Maximum Cranial breadth
Minimum frontal breadth
Maximum frontal breadth
Bi-auricular breadth
Greatest occipital breadth
Bi- mastoid breadth
Minimum breadth of skull
Breadth of foramen magnum
Basion bregma height
Auriculo bregmatic height
Calvarial height
Occipital chord
Outer bi-orbital breadth
Inner bi-orbital breadth
Bi-orbital breadth
Bizygomatic breadth
Bimaxillary breadth
Morphological facial height
Upper facial height
Inter orbital breadth
Orbital breadth, Orbital height
Nasal breadth
Nasal height
Length of nasal bone
Maxillo-alveolar length
Maxillo alveolar breadth
Palatal length
Palatal breadth
Palatal height
Bi-condylar breadth

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Bigonial breadth
Symphysial height
Height of ramus.

Angles

Total profile angle
Nasal profile angle
Profile angle of nasal roof
Metopic angle, inclination angle of foramen magnum
Calvarial base angle
Bregma angle of Schwalbe
Mandibular angle.

Index

Cranial index
Facial index
Nasal index

Measurement on Craniograph

(At least on 2 skulls)
Calvarial height
Lambda calvarial height
Frontal perpendicular
Parietal perpendicular
Occipital perpendicular.

Recommended Readings:

1) Singh, S.P. Kinanthropometry
2) Ashley Montagu, M.F.A. Hand Book of Anthropometry. Charles. C. Thomas. Illinois.
3) Singh. I.P. Bhasin, M.K. Anthropometry. Bharti Bhawan, New Delhi.
4) Weiner, J.S. & Lourie. J.A. Human Biology: A Guide to Field Methods. I.B.P. Hand Book No. 9 Blackwell Scientific Publication, Oxford.
5) Mitra, M. 1990. Prayogik Manav Vigyan- Bhag –2. Madhya Pradesh Hindi Granth Academy (in Hindi).
6) Mitra, M. & Chaube, R. 2004. Prayogik Manav Vigyan (Sharirik) Bhag –2. Madhya Pradesh Hindi Granth Academy (in Hindi).

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-I

Lab Course II– Practicals in Osteology and Osteometry

MAX. Marks- 80
MIN.Marks - 27

Description of IIuman skeletal bones and its importance in biological anthropology, Osteology and forensic science.
Following **Osteometric** measurements are to be taken on bones.

CLAVICLE
Measurements
Maximum length
Vertical diameter in the middle
Sagittal diameter in middle
Girth in the middle
Breadths of curvature of shaft
Angles
Inner and outer
Indices
Caliber index
Cross section index
SCAPULA
Measurements
Anatomical breadth
Anatomical length
Length of Cranial border
Length of axillary border
Projective length of spine
Anatomical breadth of supra-spinous fossa
Anatomical breadth of infraspinous fossa
Length of Glenoid fossa
Breadth of glenoid fossa
Projective breadth of supraspinous fossa
Projective breadth of infraspinous fossa
Angles
Supraspinous angle
Infraspinous angle
Breadth-Length angle
Axillo-Spinal angle
Vertebral border angle

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Indices
Scapular index
Supra spinal index
Infra spinal index
Marginal index
Length breadth index of glenoid fossa
HUMERUS
Measurements
Maximum length
Breadth of proximal epiphysis
Breadth of distal epiphysis
Least girth of shaft
Maximum transverse diameter of head
Maximum Vertical diameter of Head
Maximum Diameter in middle
Girth in middle of shaft
Minimum diameter in middle
Angles
Torsion angle
Capito-diaphysial angle
Condylo-diaphysial angle
Indices
Caliber index
Cross-section index of shaft
Cross-section index of head
RADIUS
Measurements
Maximum length
Physiological length
Least girth of shaft
Transverse diameter of shaft
Sagittal diameter of shaft
Angles
Collo-diaphysial angle
Torsion angle
Indices
Caliber index
Cross section index of shaft
Curvature index
ULNA
Measurements
Maximum length
Physiological length
Least girth of shaft
Breadth of olecranon

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Height of olecranon

Angles

Olecranon- coronoid angle

Joint axis angle

Indices

Caliber index

Cross-section index of shaft

Curvature index

FEMUR

Measurements

Maximum length

Trochanteric length

Sagittal diameter of middle of shaft

Physiological length

Transverse diameter of middle shaft

Girth of middle of shaft

Angles

Torsion angle.

Collo-diaphysial angle

Condylo diaphysial angle

Recommended Readings:

1) Singh, S.P. Kinanthropometry

2) Ashley Montagu, M.F.A. Hand Book of Anthropometry. Charles. C. Thomas. Illinois.

3) Singh, I.P. Bhasin, M.K. Anthropometry. Bharti Bhawan, New Delhi.

4) Weiner, J.S. & Lourie. J.A. Human Biology: A Guide to Field Methods. I.B.P. Hand Book No. 9 Blackwell Scientific Publication, Oxford.

5) Mitra, M. 1990. Prayogik Manav Vigyan- Bhag –2. Madhya Pradesh Hindi Granth Academy (in Hindi).

6) Mitra, M. & Chaube, R. 2004. Prayogik Manav Vigyan (Sharirik) Bhag –2. Madhya Pradesh Hindi Granth Academy (in Hindi).

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Pt. Ravishankar Shukla University, Raipur

M.A./M.Sc. ANTHROPOLOGY

Semester – II

January 2018-June 2018

M.A./M.Sc. ANTHROPOLOGY
SEMESTER-II
Paper I – Indian Archaeology

MAX. Marks- 80
MIN.Marks - 27

Important Note: Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT-I

Historical development of Prehistoric Archeology.
Framework of Archaeological Cultures
Terminology Issues
Expoloration and Excavation Techniques.

UNIT-II

Lower Paleaeolithic cultures of India: Distribution, Stratigraphy, Chronology, Tool Kit, Soanian & Madrasian Traditions, Development & Associated fossils.
Middle Paleolithic Cultures of India: Distribution, Stratigraphy, Chronology, Tool Kit, Development & Associated fossils.
Upper Paleolithic Cultures of India: Distribution, Chronology, Assemblage, Art (Rock Art & Cave Art), Development

UNIT-III

Mesolithic Cultures of India: Discoveries, Chronology, Tool kit, Stratigraphy, Development, Lifeways,Burial Practices, Associated Flora and Fauna.

Neolithic Cultures of India: Neolithic Revolution, Discoveries, Chronology, Assemblage, Emergenceof Human settlements, Regional Variations.

UNIT-IV

Chalcolithic Cultures of India: Distribution, Chronology, Assemblage, Traditions, Lifeways

Indus Civilization: Discoveries, Distribution, Chronology, Town-planning, Religion, Trade, Origin &Decay Theories.

Megalithic Culture of India: Distribution, Chronology, Assemblage, Types, Living Megalithic Traditions.

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Recommended Readings:

1. Agrawal, D.P. The Archeology of India.
2. Allchin and Allchin, 1982. The Rise of Civilization in India and Pakistan, Select Book Service Syndicate. New Delhi.
3. Bhattacharya, D.K. 1987. Pre-historic Archaeology: A comparative study of human succession.
4. Bhattacharya, D.K. 1994. Outline of Indian Prehistory.
5. Pandey, J. N. 2000. Puratatva Vimarsh (in Hindi)
6. Misra, V. N. & M. S. Mate 1995. Indian Prehistory; 1964.
7. Choubey, R. Puratatvik Manavvigyan (in Hindi)
8. Sankalia, H. D. 1974. Pre and Protohistory of India and Pakistan.
9. Varma, R.K. & N. Varma, 2001. Puratatva Anushilan
10. Wheeler, R.E.M. 1959. Early India & Pakistan.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-II
Paper II - Fundamentals of Human Genetics

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT-I

History, Definition and Scope of Human Genetics.
Branches of Human Genetics.
Concept of Gene.
Elementary principles of Genetics.
Structure and function of DNA, RNA and Proteins.
Genetic code.

UNIT-II

Cell Division- Mitosis and Meiosis.
Mendelism. Application of Mendel"s theory in man.
Methods of studying human heredity: Pedigree method, Twin method. Linkage Studies.

UNIT-III

Multiple alleles and blood groups
Inheritance of ABO, MN and Rh blood groups.
Compatible and Incompatible mating.
Concept of gene frequencies.

UNIT-IV

Autosomal Dominant and Recessive inheritance.
Sex-linked, Sex-limited and Sex-influenced inheritance.
Polygenic inheritance.

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Recommended Readings:

1. Curt Stern. 1968. Principles of Human Genetics. Eurasia Publishing House (Pvt.) Ltd., Ram Nagar, New Delhi-1
(India).
2. Winchester, A. M. 1967. Genetics, Oxford & IBH Publishing Co.
3. Bhasin, V. 1994. People, Health and Disease: The Indian Scenario, Kamla- Raj Enterprises, Delhi.
4. Bhasin, M., K., Walter, H. and Danker-Hopfe, H. 1992. The Distribution of Genetical, Morphological and behavioural
Traits among the Peoples of Indian Region, Kamla- Raj Enterprises, Delhi.
5. Bhamrah and Chaturvedi, A Text Book of Genetics.
6. Mange and Mange, Basic Human Genetics.
7. Rothwell, N.V., Human Genetics.
8. Harrison et al. Human Biology.
9. Ashley Montagu, Concept of Race.
10. Shukla, B.R.K. & Rastogi, S., Physical Anthropology and human Genetics.
11. Dalela and Verma, T Text Book of Genetics.
12. Bodmer & Cavalli Sfroza, Genetics, Evolution and Man.
13. King and Stansfield, A Dictionary of Genetics.
14. Brudette, W.J., Methodology in Human Genetics.
15. Yunis, J.J. (Ed.), Biochemical Methods in Red Cell Genetics.
16. Harris, H., Human Biochemical Genetics.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-II
Paper III - Medical Anthropology

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): 8 questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): 8 questions(two from each unit) of 3 marks each(word limit: 75words)
iv) Section-D(Very Long Questions): 4 questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT – I

Meaning and scope, changing concepts of health and disease, culture and lifestyle in relation to health and disease
Ethno medicine, magico-religious practices, indigenous medical systems and medical practitioner ethnobotany
Ethnopharmacology,
Ethnobiology,
Ethnography of tribal medical system with special reference to tribes of central India
Ressurgence of traditional medical systems in the west and India

UNIT- II

Epidemiology basic principles: epidemiology of common communicable and non communicable diseases, Malaria.
T.B., Leprosy, STD, Diabeties, Cancer and Cardiovascular diseases, mental health,
National disease control programmes)
Plural systems of medicine traditional system as part of culture and life style Ayurved,
Unani Naturopathy, Tibetan,
Chinese basic principles.

UNIT –III

Medical statistics measurement of morbidity and mortality rates incidence and other statistics.
Health promotion and health programmes, nutrition, RCH , family welfare, health education ageing (Peoples perspectives
to be focused)
Health and environmental water pollution, air pollution, noise pollution.
International health: WHO,UNICEF,USAID, Food Foundation etc.

UNIT –IV

National health policy, historical review, Health care delivery in india rural and urban,
Response of the people.
Voluntary efforts in community health and development. Some case studies of community participation.

Anthropological approaches to health system research

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Uses of anthropological research method in health system research

Evaluation of health system research through judicious mix of qualitative and quantitative research metho

Recommended Readings:

1. Medical Anthropology: Foster, George
2. Handbook of Medical Anthropology: Freeman, H.E. et al
3. Culture, Disease and Healing: Landy, D.
4. Culture, Health and Illness: Helman Cecil, Wright Bristol, 1985
5. Folk illness and Ethnomedicine: Banerjee B.G. and R. Jalota
6. Applied Anthropology in Medicine: Coudil, W.
7. Social Anthropology and Medicine: Loudon, J.B. (ASA Monograph)
8. Doctors and Society: Madan T.N.
9. Forensic Anthropology: Steward T.D.
10. Crime and Detection: Symans, J.
11. Methods in Forensic Anthropology: Nicoles
12. Forensic Science and laboratory: Turner
13. Practical Finger printing: Bridges
14. Finger, Palm and Sole Prints: Chatterjee
15. Methods in Forensic Science: Lundguist, F. and A.S. Curry
16. Modern Trends in Forensic Medicine: Ment
17. Anthropology Part-I: Jha and Baranwal
18. Harold Cummins and Charles Midlo. 1961. Finger Prints, Palms and Soles: An Intoduction to Dermatoglyphics, Dover Publications, New York.
19. Medicine, Magic and Religion, Rivers, W.H.R.
20. The Cultural Frontiers of Health, Hasan, K.
21. Traditional Medicine and Health Care Coverage (WHO), Bannermann et al.
22. Folk and Modern Medicine, Kakar, D.N.
23. Asian Medical System, Leslie, C. (Ed.).
24. People"s Health in People"s Hand, Anti, A.H. & Bhatia
25. Women"s Autonomy, Education and Reproductive Health, Jajeebhoy, S.
26. Ministry of Health and Family Welfare, National Health Policy
27. W.H.O., World Health Reports.
28. National Institute of Health & Family Welfare, Maternal and Child Welfare
29. Health, Culture and Community, Paul, B.D.
30. Cultural Patterns and Technological Change, Mead. M.
31. Culture, Health and Disease, Read, M.
32. Dash, J., Patra, P.K. and Sathpathy, K.C. Dimensions of Healthcare practices, SSDN Publishers, New Delhi.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-II
Paper IV - Biostatistics and Computer Applications

MAX. Marks- 80

MIN.Marks - 27

Important Note: Each Paper will have 40 **compulsory** questions, divisible into 4 sections.

i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.

ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)

iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)

iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT-I

Measures of Dispersion: Range, Variance, Standard Deviation, Standard Errors, Skewness and Kurtosis.

Correlation: Simple correlation, Grouped and ungrouped data, Karl Pearson's Coefficient of Correlation.

UNIT-II

Test of Significance: Non- parametric Tests: Chi-square Test, Goodness of fit.

Parametric Test: t-test, Z-test.

Regression analysis.

UNIT-III

Population Study: Vital Statistics, Fertility and Fertility rates.

Mortality and Mortality rates, Infant Mortality and Infant Mortality rates.

Morbidity and Morbidity rates and Migration and Migration rates.

UNIT-IV

Introduction to Computer: History, Types of Computers, Computer hardware and software.

Windows: Features

MS Office: Word, Excel, Power Point,

Internet

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Recommended Readings:

1. Gupta, S.P., Statistical Methods.
2. Sarin, S.S. and Balchandani,M.K., Fundamentals of Statistics. Ratan Prakashan Mandir, Agra.
3. Summar, M., Computers: Concepts and Uses.
4. Wardlaw, A.C. ,Practical Statisticals for experimental biologists.
5. Zar, J.H., Biostatistical Analysis.
6. Elhance, D. N., Practical Problems in Statistics, Kitab Mahal, Allahabad.
7. Sarin, S.S. and Balchandani,M.K. ,Fundamentals of Statistics. Ratan Prakashan Mandir, Agra.
8. Fernandes & Tondon, Participatory Research.
9. Fisher, Michael. ,Application in Computing for Social Anthropologists, London, Routledge.
10. H. Russel. Bernard, Handbook of Methods in Cultural Anthropology, Altamira Press.
11. Kaplan, Abraham, The Conduct of Enquiry: Methodology for Behavioural Sciences.
12. Madrigal, Lorena, Statistics for Anthropology.
13. Pradhan, Ashok, Janjatiya Janankiki

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-II
Lab Course I – Practicals in Archaeology

MAX. Marks- 80
MIN.Marks - 27

1) Tools: Typology, Functions & Technology.
2) Sketching and description of representative Prehistoric tools:
(a) Stone tools
(b) Bone tools
(c) Pottery
3) Site Types: Kill sites, Habitation sites, Industry sites, Querry sites, Burial sites.
4) Visit to Museum, Excavation Site.
5) Conservation & Preservation of Antiquities.

Recommended Readings:

1. Mitra, Mitashree & Ramesh Choubey. Prayogik Manavvigyan (in Hindi).
2. Oakley, K.P. 1972. Man the Tool Maker.
3. Reddy, Rami. Tool techniques in Prehistory.
4. Sankalia, H. D. 1964. Stone age tools: Their techniques, names & probable functions.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-II
Lab. Course II- Compulsory Fieldwork

MAX. Marks- 80
MIN.Marks - 27

The course is designed to make the student carry out field work in the planning of project proposal, data collection, data analysis and report writing under the guidance of teacher assigned by the Head of the department using conventional and scientific methods at various stages of the field dissertation. The course aims at capacity building of the student in taking up independent research programmes. The students are required to work with the community for a period of 7-10 days in the village.

1. Field work tradition in anthropology.
2. Preparation for fieldwork: physical, psychological and academic.
3. Rapport building - initial contact.
4. Review of data collection methods (as per Research method).

Two typed copies of analyzed data is to be submitted in the department in the form of a Field work Report

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Pt. Ravishankar Shukla University, Raipur

M.A./M.Sc. ANTHROPOLOGY

Semester – III

(Group A: Physical Anthropology)

July 2017-December 2017

M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III

Paper I - Applied Anthropology (Group - A & - B)

MAX. Marks- 80
MIN. Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT- I

Meaning and Scope of Applied Biological Anthropology.
Anthropology of Sports.
Nutritional Anthropology.
Designing of defence equipments.
Defence Services.

UNIT- II

Applications of Human Genetics: Medico - Legal cases. Eugenics.
Genetic screening, Genetic counseling, Genetic engineering.
Human Genomics & its applications.

UNIT –III

Meaning & Scope of Applied Social Anthropology.
Applied & Action anthropology.
Applications of Anthropological theory and methodology in the field of tribal development.

UNIT- IV

Applied anthropology in industry.
Applied anthropology in education.
Applied anthropology in public health
National health Mission.

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Recommended Readings:

1. Kroeber. Anthropology Today.
2. Curt Stern. 1968. Principles of Human Genetics. Eurasia Publishing House (Pvt.) Ltd., Ram Nagar, New Delhi-1(India).
3. Steine. Biosocial Genetics.
4. Karp, E. Genetic Engineering.
5. Bodmer and Cavalli-Sforza. Genetics of Human Populations.
6. Backer, PT and Weiner (Eds). The Biology of Human Adaptability.
7. Beal, Virginia, Nutrition and the Life Span
8. Craig, Human Development
10. Eveleth, PB and Tanner, JM Worldwide Variation in Human Growth
11. Forbes, GB, Human Body Composition
12. Sodhi, HS, Sports Anthropology
13. Willigt, JV, Applied Anthropology: An Introduction
14. Stern, C., Principles of Human Genetics.
15. Shukla, B.R.K. & Rastogi, S., Physical Anthropology and Human Genetics An Introduction.
16. McKusick, V.A., Human Genetics.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - A : PHYSICAL ANTHROPOLOGY
Paper II - Advanced Human Biology

MAX. Marks- 80
MIN. Marks-27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit-1

Gene expressivity: Lethal genes. Sub-lethal genes, modifying genes, Co-dominance, Suppressor genes,Variable Penetrance in man.Sex determination in man.
Dermatoglyphics-Identification,Topography,Finger prints pattern-identification,pattern intensity,Furuhata and dankmeijer's index
Palmar Dermatoglyphics-Configurational areas,Main line formula and index

Unit-2

Probability.
Hardy-Weinberg law, Testing Equilibrium.Applications of Hardy Weinberg Law in Human Population Genetics
Genetic Polymorphism:Concept, Transient and Balanced.
Concept of Gene Pool and Gene Frequency.

Unit-3

Identification of Human Chromosomes, Chromosome Karyotype and nomenclature, Banding Techniques.
Numerical-Turners Syndrome,Klinefilter syndrome,Triple X,Down Syndrome Patau's Syndrome,Edward's Syndrome
Structural Chromosomal abnormalities-Deletion,Duplication ,Inversion.Translocation
Inborn errors of Metabolism: G6PD Deficiency, PKU, Alkaptonuria

Unit-4

Occurrence of Mutation: Mutation Rate- Direct and Indirect Method.
Selection in Human Population, Selection Relaxation,Selection Leading to Changes in Gene Frequency and Selection leading to change in Genetic Equilibrium
Inbreeding : Definition and Concept. Inbreeding with Pedigree
Coefficient of Inbreeding, Genetic Consequences of inbreeding in Human Population
Genetic hazards of radiation

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Recommended Readings:

1. Crow &Kimura. 1970. An Introduction to Population Genetics Theory, Harper & Row Publishers. New York.
2. Curt Stern. 1968. Principle of Human Genetics, Eurasia Publishing House (Pvt.) Ltd., Ram Nagar, New Delhi-1
(India).
3. Li, C. C. Population Genetics, Chicago University Press, Chicago.
4. Baker, P.T. &Weiner (Eds.), The Biology of Human Adaptability.
5. Beal, Virgina, Nutrition and the Life Span.
6. Beutler, E., Red Cell Metabolism: A Manual of Biochemical Methods.
7. Bouge, D., Principles of Demography.
8. Brock and Mayo, The Biochemical Genetics of Man.
9. Burdette, W.J., Methodology of Human Genetics.
10. Craig, Human Development.
11. Dixit, M., Human Nutrition Principles and Applications in India.
12. Emery A.E.H., Elements of Medical Genetics.
13. Eveleth, P.B. & Tanner, J.M., Worldwide variations in Human Growth.
14. Giblett, E.R., Genetics Markers in Human Blood.
15. Li, C.C., Human Genetics
16. Malhotra, K.C. & ISI IG, Calcutta. Statistical Methods in Human Population Genetics. IBRAD, ISI
17. Wright, S., Evolution and Genetics of Population
18. Stanfield, W.D., Theory and Problems of Genetics.
19. Burdette, WJ. Methodology in Human Genetics
20. Crow, J.F. & Kimura, M., An Introduction to Population Genetic Theory
21. Rothwell, N.V., Human Genetics.
22. Mange, J.E. & Mange, A.P., Basic Human Genetics.
23. Bhamarh, H.S. & Chaturvedi, C.M., A Textbook of Genetics.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER -III
GROUP - A : PHYSICAL ANTHROPOLOGY
Paper III – Human Growth and Nutrition

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT – I

Human growth and development: Pre-natal and Post-natal growth, infancy, Childhood, adolescence, adulthood, senility.
Human growth curves.
Basic methods of growth studies - Cross-sectional, Longitudinal, Mixed Longitudinal.

UNIT – II

Factors affecting growth: Heredity, Environment & hormonal.
Concept of age- chronological, skeletal, dental, morphological.

UNIT – III

Nutrition: Basic terms and concepts.
Concept of Balanced Diet, malnutrition, under nutrition, overnutrition, obesity etc.
Special problems related to growth and nutrition growth at risk: infants, pregnant and lactating mothers, old age problems,
birth weight variations; abnormal growth failure.
Evaluation of nutritional status through Anthropometric and Clinical signs of malnutrition.

UNIT – IV

Growth programmes ANP, ICDS, SNP, Mid-day meal programme: Vitamin-A prophylaxis programme, Anemia
prophylaxis programme, Goiter control programme, Nutritional deficiency diseases: Nicotinic acid deficiency, Vitamin-C,
Vitamin-D deficiency.
Problem of Malnutrition, morbidity and mortality in India.
IMR, Role of maternal education, Immunization programme in India

Recommended Readings:

1. Tanner, J. M. 1962. Growth at Adolescence, Blackwell Scientific Publications, Oxford.
2. Lowrey, G. H. 1978. Growth & development of children, Year book Medical Publishers, Chicago – London.
3. Swaminathan, M. 1985. Essentials of Food and Nutrition, The Banglore Printing and Publishing Co. ltd.

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4. Gopalan, C., Rama Sastri, B., V. & Balasubremanian, S., C. 2002. Nutritive value of Indian foods, National Institute of Nutrition, ICMR, Hyderabad.
5. Parasmani dasgupta and Roland Hauspie , 2001. Perspectives in Human Growth, Development and Maturation, Kluwer Academic Publishers, London.
6. Marshall, W. A. 1977. Human Growth and its Disorders. Academic Press, Lomdon.
7. Harrison, G.A., Weiner, J.S., Tanner, J.M. and Barnicot, N.A. Human Biology: An Introduction to Human Evolution, Variation and Growth, Clarenden Press, Oxford.
8. Tanner, J.M., Fetus into Man.
9. Jelliff, D.B., Community Nutritional Assessment with Special Reference to Less Developed Countries.
10. Dixit, Human Nutrition: Principles and Applications in India.
11. Shanti, G. Nutrition and Child Care: A Practical Guide.
12. B. Srilaxmi, Nutrition Science.
13. Margart Schay, Nutrition.
14. Rao, V.K.R.V. Food Nutrition and Poverty.
15. Nelson, A Text Book of Pediatrics
16. Garrow, J.S. and James, W.P.T: Human Nutrition and Dietetics.
17. Swaminathan, M., Essentials of Food and Nutrition: Applied Aspect.
18. Eveleth, PB and Tanner, JM Worldwide Variation in Human Growth
19. Forbes, GB. Human Body Composition

M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - A : PHYSICAL ANTHROPOLOGY
Paper- IV Human Molecular Genetics

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT –I

Definition and scope of Molecular Genetics.Nucleic acid structure, Chemical and physical properties of nucleic acids, spectroscopic and thermal properties of nucleic acids.

DNA organization in chromosomes.: DNA structure, DNA replications.

RNA structure. Gene transcription in eukaryotes.,.

UNIT-II

Techniques in Molecular Genetics, Recombinant DNA technology: Restriction enzymes, Nucleic acid hybridization, DNA cloning, DNA sequencing, Polymerase chain reaction (PCR), Southern blot, Northern and Western blot. In situ hybridization. Labelling nucleic acid probes. Transgenic organisms.

UNIT-III

DNA Poymorphism DNA mutation and repair, Repetitive DNA, Gene mapping, Physical mapping, Genomic imprinting.. Expression of eukaryoteic protein-coding genes. Genetic code and Protein synthesis. DNA Sequencing and fingerprinting

UNIT-IV

Application of Genomic Technology: RFLP (Restriction fragment length polymorphism). VNTR (Variable number tandem repeat), Microsatellite repair polymorphism, Application in forensic sciences. Human genome project, Prenatal diagnosis and Genetic Counselling of molecular disorders.

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Recommended Readings:

1. Strachan, T. and Read, A.P. 1999. Human Molecular Genetics. BIOS Scientific Publishers Ltd, Oxford. (574.8732, STT H, 84237).
2. Jackson, M., Strachan, T. and Dover, G. 1996. Human genome Evolution. BIOS Scientific Publishers Ltd., Oxford. (573.2, JAM H, 79134).
3. Levis,R.2003. Human Genetics Concepts and Application.4th ed. Dubuque, IA: McGraw-Hill.
4. Koolman, J and Roehm, K.H. 2005.Color Atlas of Biochemistry. 2nd ed. Thieme Stuttgart. New York.
5. Lewin.2003. Genes VIII. 1st ed. Prentice Hall.
6. Mc Kusick, V.A. Human Genetics.
7. Rieger, R. et al., Glossary of Genetics – Classical and Molecular
8. Brock and Mayo, The Biochemical Genetics of Man
9. Winchester, A.M., Human Genetics.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - A : PHYSICAL ANTHROPOLOGY
Lab Course I – Practicals in Applied Biological Anthropology

MAX. Marks- 80
MIN. Marks- 27

1. Collection of blood specimens.
2 Preparation of Hemolysates and serum & their storage.
3. Preparation & identification of Heme in Crystals.
4. Laboratory examination of blood and blood stains for criminal detection: Preliminary test, confirmatory test: Tiechmann test, Takayama test.
5. Teachniques of blood grouping: ABO blood group system Rh. blood group system & MN blood group system. Personal Identification by blood grouping.
Calculation of gene frequencies.
6. Test of ABH saliva secretion.
7. Test of Hemoglobin determination in human blood.
8. Test for Sickle cell hemoglobin.
9. Test for Colour blindness P.T.C. taste sensitivity.
10. Examination of R.B.C. in Human Blood.
11. Examination W.B.C. in Human Blood.
12. Dermatoglyphics:Analysis of finger,palm,sole and toe prints
13 Isolation of DNA from human blood and personal identification by DNA markers.

.NOTE: Five specimens to be analyzed by each student in the above-mentioned traits unless stated otherwise.

Recommended Readings:

1. Race, R. R. & Sanger, R. 1968. Blood group in man. Blackwell Scientific Publications, Oxford. (612.11825, RAR).
2. Kathleen E. Boormen and Barbara E. Dodd. An Introduction to Blood group Serology (612.11825, BOK).
3. Bhasin, M. K. and Chahal, S. M. S. 1996 . A Laboratory Manual for Human blood Analysis. Kamla Raj Enterprises, Delhi.
4. Shrivastava, B. K. 1983. A Manual of Practical Physiology. Samit Medical Publications, Patna.
5. Dacie, J. V. and Lewis, S. M. 1991. Practical haematology, 5th edition. J. and A. Churchill. Livingstone.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - A : PHYSICAL ANTHROPOLOGY
Lab Course II - Practical in Human Growth, Nutrition & Physiology

MAX. Marks- 80
MIN. MARKS-80

Human Growth :
Techniques of taking skinfold measurement: Biceps, Triceps, Sub-scapular, Supra-illiac.
Body Proportions.
Body Composition
Somatotyping
Nutrition:
Detection of nutritional status on the basis of body measurements
Nutritional Anthropometry: Ht/Age, Wt/Age/Wt/Ht.
Body Mass Index (BMI)
Waist/Hip Ratio
Physiology:
Examination of Pulse Rate
Determination of Blood Pressure
Determination of Vital Capacity
Hand Grip

Recommended Readings:

1. Jelliffee. D. B. & Jelliffee. E. F. B. Nutrition & Growth, New York, Plenum.
2. Swaminathan, M. 1985. Essentials of Food and Nutrition, The Banglore Printing and Publishing Co. ltd.
3. Gopalan, C., Rama Sastri. B., V. & Balasubramanian, S. C. 2002. Nutritive value of Indian foods, NationalInstitute of Nutrition, ICMR, Hyderabad.
4. Falkner, F. & Tanner, J. M. Human Growth. Vols. I, II & III. Plenum Press, New York.
5. Jelliffee, D. B. The Assessment of the nutritional status of the community. WHO, Geneva.

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M.A./M.Sc. ANTHROPOLOGY

SEMESTER-III

Group-B : Social-Cultural Anthropology

(July2017-December 2017)

M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III

Paper I - Applied Anthropology (Group A & B)

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit I

Meaning and Scope of Applied Biological Anthropology.
Anthropology of Sports.
Nutritional Anthropology.
Designing of defence equipments.
Defence Services.

Unit II

Applications of Human Genetics: Medico - Legal genetics, Eugenics, Forensic applications.
Genetic screening, Genetic counseling, Genetic engineering.
Human Genomics & its applications.

UNIT III

Meaning & Scope of Applied Social Anthropology.
Applied & Action anthropology.
Application of Anthropological theory and methodology in the field of tribal development.

UNIT IV

Applied anthropology in industry.
Applied anthropology in education.
Applied anthropology in public health.
National health programmes.

Recommended Readings:

1. Kroeber. Anthropology Today.
2. Curt Stern. 1968. Principles of Human Genetics. Eurasia Publishing House (Pvt.) Ltd., Ram Nagar, New Delhi-1(India).
3. Steine. Biosocial Genetics.
4. Karp, E. Genetic Engineering.

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10. Eveleth, PB and Tanner, JM Worldwide Variation in Human Growth
11. Forbes, GB. Human Body Composition
12. Sodhi, HS. Sports Anthropology
13. Willigt, JV. Applied Anthropology: An Introduction
14. Stern. C., Principles of Human Genetics.
15. Shukla, B.R.K. & Rastogi, S., Physical Anthropology and Human Genetics An Introduction.
16. McKusick, V.A., Human Genetics.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - B : SOCIAL ANTHROPOLOGY

Paper II – Theory and Methods in Social-Cultural Anthropology

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit- I

History of Anthropological Thought: classical school

Pioneers in Anthropology

Evolutionism: Spencer, Morgan, Tylor, James Frazer

Neo-evolutionlism: Leslie White, Julian Steward, Sahlin

Diffusionism: Perry , Elliot Smith, Graebner, Freidrich Ratzel

Historical Particularism: Boas, Wissler, Kroebar

Unit-II

Functionalism: Malinowski, Merton

Structural-functionlism: Rad-Cliffe Brown, Evans Pritchard, Fortes, Raymond Firth, Nadel

Structuralism: Levi strauss, Leach

Psychological Anthropology

Culture and personality studies: Kardiner, Linton, Benedict, Cora-du-Bois, Margaret Mead, Spiro, Mary Douglas, A Kleinman, AFC Wallace, Stephen Taylor

Unit-III

Philosophical anthropology: Concept of Value, Cultural Relativism, Value and human rights: Herskovits

Cognitive Anthropology

Historical and Dialectical Materialism: Hegel, Marx and Engels

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Symbolic and Interpretative Anthropology: Turner, Schneider, Geertz

Post Modernism: Marcus, Fischer

Unit-IV

"Primitive" as a conceptual; model in Anthropological research.

Emic-Etic and Synchronic- Diachronic paradiams.

Ethnographic method for policy planning and intervention.

Synthesizing micro and macro paradiams, Indective and deductive approaches.

Dilemma of "We" and "They" in research.

Efficacy of qualitative method and its application as an additive tool to quantification

Autonomous nature of Anthropology: Integration of scientific and humanistic approaches Anthropologist as scientist, citizen and humanist

Recommended Readings:

1. Jha, M. Manavshastriya vichardhara- Ek Parichaya. (in Hindi).
2. Shrivastava. A.R.N. Sanskritik Manav vigyan – Siddhanta aur Uplabdhiyan ((in Hindi).
3. Harskovitz. M.J. Sanskriti ki pristhabhumi (in Hindi).
4. Muthal, S. Samajik Manav Vigyan- Saidthantik Vyavahar (in Hindi).
5. Harris, M. Rise of Anthropological Theory. Routlege and Kegan Paul. London.
6. Malinowski, B. Scientific theory of culture and other essays.
7. Evans-Pritchard. A History of Anthropological Thought.
8. Bidney. David. Theoretical Anthropology. New York. Colombia University press.
9. Erickson, Paul. Anthropological Lives: Biographies of Eminent Anthropologists. New Delhi. Reliance.
10. Sahlins & Service, Evolutions and Culture.
11. Schneider et al., Symbolic Anthropology: A Reader in the Study of Symbols and Meanings.
12. Turner, Roy, Ethnomethodology.
13. Douglas, Marry, Cultural Bias.
14. Gerrtaz, Clifford, The Interpretation of Culture.
15. Ingram, John. Psychological Anthropology Reconsidered.
16. Manganaro. Marc. Modernist Anthropology: From Fieldwork to Text.
17. Nadel, S.F., The Foundations of Social Anthropology
18. Manners, R.A. & David Kaplan (Eds.). Theory in Anthropology.
19. Levis-Strauss. Structural Anthropology.
20. Malinowsky. Scientific Theory of Culture and Other Essay.
21. Redfield. R., Human Nature and the Study of Society.
22. Tyler, Stephen (Ed.). Cognitive Anthropology.

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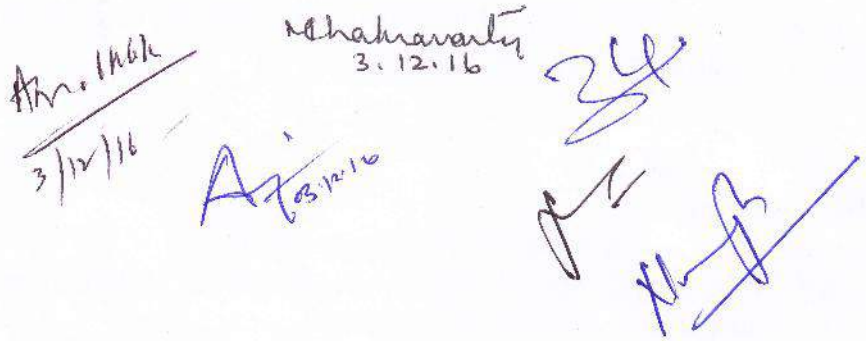
23. Redfield, Robert, Peasant Society and Culture.
24. Steward, Julian H., Contemporary Change in Traditional Society.
25. Moore, The Future of Anthropological Knowledge.
26. Hastrup, A Passage to Anthropology.
27. Schneider, Turner and Douglas, Symbolic and Interpretative Anthropology
28. Tylor, E.B. Studies in Cognitive Anthropology
29. Upadhyay and Pandey. History of Anthropological thought
30. Upadhyay and Pandey. Tribal Development in India.



M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - B : SOCIAL ANTHROPOLOGY
Paper III - Indian Anthropology and Museology

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): 20 questions of 1 mark each.
ii) Section-B(Short Questions): 8 questions(two from each unit) of 2 marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): 8 questions(two from each unit) of 3 marks each(word limit: 75words)
iv) Section-D(Very Long Questions): 4 questions(one from each unit) of 5 marks each(word limit: 150 words)

Unit- I

Approaches to the study of Indian society, culture and civilisation: Indological, Anthropological, historical, etc.

Ancient culture: Vedic and later vedic age

Indian people: racial, ethnic, linguistic and religious elements (composition) and distribution of people. Autochthons, peopling of India: migration, hypergamy, hypogamy, DNA explanations.

Unity and diversity in Indian society and culture: linguistic, political, ethnic, communal and religious tensions and conflicts; national integration

Basis of traditional Indian social structure and life cycle: varnashram dharma, purushartha, impact of Buddhism, Jainism, Islam and Christianity

Unit-II

Social Structure: caste system -definition and criteria of caste system, varna and caste, caste among non-Hindus, caste outside India; dominant caste, caste-mobility-fusion, lack of fusion and fission. Backward castes and scheduled castes: statutory provisions, caste and tribe, caste in democracy

Indian village: a myth or reality; village: a part society: Jajmani system: impact of new technology and urbanisation — changing agrarian social structure; peasant movements. Importance of village studies.

Growth of anthropology in India: contributions of the following anthropologists, scholar administrators in 19th and 20th century in the understanding of tribal, caste and village communities and Indian social structure and civilisation. List is illustrative: Hutton, Mortimer Wheeler, Grierson, A.L. Basham, Haimendorf, V. Elwin, Milton Singer, S.C.

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Roy, G.S. Ghurye, L.A.K. Aiyar, N.K. Bose, D.N. Majumdar, I. Karve, M.N. Srinivas, S.C. Dube, L.P. Vidyarthi,.

Unit-III

History and development of Museum Movement: Meaning and definition of museum,A short history of museum movement in India,Classification of Museum in India

National Museum, State Museum, University Museum, Specialized Museum in India

Museum Administration, Acquisition and Arrangement of specimens: Museum Administration,

Planning of Museum Building, Planning of Museum Gallery, Principle of Display, Lighting of Museum Galleries, Mode and ways of Acquisition of Museum specimens, Arrangement in Museum

Unit-IV

Documentation and lables in Museum: Need for Documentation, Method of Documentation, Safeguards of Records, Development of computer based Documentation, Documentation of Ethnographic specimens, Museum Labels, Dioramas, Models and charts, Museum Photography

Conservation of Museum: Causes of decay and determination of Museum objects, Care and handling of Museum objects, Packing of Museum objects, Cleaning and repairing, Preservation of organic objects, Preservation of Inorganic objects

Recommended Readings:

1. Allchin, B. & Allchin, R. The Rise of civilization in India and Pakistan, Cambridge University Press
2. Karve, Iravati. Hindu Society- An interpretation.
3. Mandel boum, D. Society in India.
4. Marriott, M.Village India – Studies in the Little Community.
5. Singh, K. People of India – An Introduction. Anthropological Survey of India.
6. Leach, E.R. Aspects of caste in South India, Ceylon and North- West Pakistan.
7. Singer, M. When a Great Tradition Modernizes.
8. Srinivas M. N. Social change in modern India.
9. Nadeem Hasnain. Indian Anthropology.
10. Jha and Baranwal. Indian Anthropology.
11. Karve, Iravati. Kinship organization in India.
12. Vidyarthi, L.P. Sacred Complex of Kashi. A Microcosm of Indian Civilization. New Delhi. Concept Publication.
13. Haimendorf, C., Tribes of India. the Struggle for Survival.
14. Singh, K.S., Tribal Society in India.
15. Dube, S.C., India"s Changing Villages.

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16. Basu. T. M. Indian Museum Movement. A. K. Banerjee 89. Mahatma Gandhi Road, Calcutta – 7.
17. Zcheer M. Museum Management, Ram Advani BooK.
18. Aiyppan, A. & Satyamurthy, S. T. Handbook of Museum Technique, Govt. of Madras Publication, Gupta Brothers Vishakhapatnam.
19. Markham, S. F. & Hargreaves, H. The Museum of India.
20. Ghosh, D. P. Problems & Trends in Museology
21. Choudhary, J. The Ethnographical collection & their display.
22. Blanderleith, N. J. The Conservation & Antiquities of works and Art.
23. UNESCO (Pub.) A Quaterly Review, Ministry of Education & Social welfare Museum.
24.Bijay K. Behera and Subodha K. Mohanty: Museology and Museum management in India. Mayur Publication:Bhubneshwar
25. Agnihotri, V. 2003. Manav aur uski. Bhotik Sanskriti (in Hindi), K.K. Publications, Allahabad.
26. Singh, Y. Modernization in Indian Tradition.
27. Cohn, B.S. Social Anthropology of Indian Civilization.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - B : SOCIAL ANTHROPOLOGY
Paper IV – Tribal Development

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): 4 questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit- I

Definition of tribe and Scheduled Tribe. Distribution of Scheduled Tribes. Demographic trends. Classification and characteristics of tribal regions. Racial and linguistic classification of Scheduled Tribes. Social structure. Tribal economy (stages of economy). Tribal religions.

Tribal Policy: Tribal Policy, regulatory and development measures during British India. Indian Constitution — safeguards and provisions for Scheduled Tribes: socio-cultural, economic, educational, political, services, etc. History of regulatory and developmental measures in pre-Independence period. Administration of Scheduled Areas (Fifth Schedule to the Constitution), Tribal Areas (Sixth Schedule to the Constitution) and tribal majority States. Important Regulations promulgated by Governors in Scheduled Areas.

PESA: 73rd Amendement

Unit-II

Tribal Economy: Forests - shifting cultivation - Forest department - its policy, Acts and regulations; Joint forest management; tribal agriculture - land holdings - land rights - land tenures and land reforms - adoption of modern agricultural technology; allied economics - fishing and hunting; pastoralism; village and cottage industries; distribution: consumption, savings and investments; tribal markets. Anthropology

International and National funding for tribal schemes.

Land alienation, Indebtedness, Bonded labour and forms of tribal exploitation: Role of cooperation, cooperatives and other financial institutions; Tribal and non-tribal interaction patterns. Impact of Acts and Regulations against land alienation and debt redemption measures.

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Unit-III

Tribal Education: Literacy and educational levels; educational programmes: formal, non-formal and vocational; problems in the promotion of tribal education and of female education.

House and Health: housing conditions and housing programmes; health, sickness and disease - drinking water, ethno-medicine and modern medical systems; roads and communications - status and issues.

Impact of industrialisation and urbanisation. Displacement of tribals as a result of land acquisition for projects and their rehabilitation

Unit-IV

Tribal unrest and revolts; Religious movements; Political movements.

Basic issues in transition: Loss of languages and traditions, identity crisis and problems of integration

Planning and development: Scheduled Tribes in Five Year Plans; Tribal development through SMPT Blocks, TD Blocks and Tribal Sub-Plans; Voluntary efforts and role of tribal leadership. Resource-rich regions and resource-depleted regions. Poverty alleviation programmes. Dispersed tribals. Primitive groups. Oceanic communities

History of tribal movement in India with special reference to Chhattisgarh.

Recommended Readings

1. Bhanage, N.P. Tribal Commissions and Committees in India
2. Bhudhury, Tribal Development in India Bhudadeb (Ed.)
3. Elwin, V. A Philosophy for NEFA
4. Govt of India. Report of the Scheduled Areas and Scheduled Tribes Commission. 1960
5. Haimendorf. The Tribes of India: The Struggle for Survival
6. Sharma, B.D. Basic Issues in Tribal Development
7. Singh, K.S. Tribal Movements in India, Vols I & II
8. Singh, K.S.(Ed.) Tribal Situation in India

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - B : SOCIAL ANTHROPOLOGY
Lab Course-I : Practicals in Museology

MAX. Marks- 80
MIN. Marks – 27

Classification of Museums
Techniques of display of artifacts in Museum.
Techniques of Preservation and Conservation of Various Museum specimens/ cultural implements.

Recommended Readings:

1. Basu, T. M. Indian Museum Movement, A. K. Banerjee 89, Mahatma Gandhi Road, Calcutta7
2. Zeheer M. Museum Management, Ram Advani Book.
3. Aiyppan, A. & Satyamurthy. S. T. Handbook of Museum Technique, Govt. of Madras Publication, Gupta Brothers Vishakhapatnam.
4. Markham, S. F. & Hargreaves, H. The Museum of India.
5. Ghosh, D. P. Problems & Trends in Museology
6. Choudhary, J. The Ethnographical collection & their display.
7. Blanderleith, N. J. The Conservation & Antiquities of works and Art.
8. UNESCO (Pub.) A Quaterly Review, Ministry of Education & Social welfare Museum.
9. Bijay K. Behera and Subodha K. Mohanty: Museology and Museum management in India. Mayur Publication:Bhubneshwar
10. Agnihotri, V. 2003. Manav aur uski Bhotik Sanskriti (in Hindi), K.K. Publications, Allahabad.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-III
GROUP - B : SOCIAL ANTHROPOLOGY
Lab Course-II : Ethno-Museological Fieldwork Based Report and Seminar.

MAX. Marks- 80
MIN.Marks - 27

Draw and describe the measurement of any two from each category of Ethno-Museological Specimen in the Museum of S.O.S. in Anthropology.
A student has to present seminar along with submission of brief report containing characteristic features of material objects collected by him / her during field-work in one of the tribal groups of the Chhattisgarh on any one of the following categories.

A) Housing patterns
B) Agricultural implements
C) Fishing, Hunting, Fire Appliances.
D) Costumes and dress
E) Ornaments
F) Musical instruments
G) Masks
H) Any Other

Recommended Readings:

1. Basu, T. M. Indian Museum Movement, A. K. Banerjee 89, Mahatma Gandhi Road, Calcutta7
2. Zcheer M. Museum Management, Ram Advani Book.
3. Aiyyppan, A. & Satyamurthy, S. T. Handbook of Museum Technique, Govt. of Madras Publication, Gupta Brothers Vishakhapatnam.
4. Markham, S. F. & Hargreaves, H. The Museum of India.
5. Ghosh, D. P. Problems & Trends in Museology
6. Choudhary, J. The Ethnographical collection & their display.
7. Blanderleith, N. J. The Conservation & Antiquities of works and Art.
8. UNESCO (Pub.) A Quaterly Review, Ministry of Education & Social welfare Museum.
9. Bijay K. Behera and Subodha K. Mohanty: Museology and Museum management in India. Mayur Publication:Bhubneshwar
10. Agnihotri, V. 2003. Manav aur uski Bhotik Sanskriti (in Hindi), K.K. Publications, Allahabad.

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M.A./M.Sc. ANTHROPOLOGY

Semester – IV
Group-A : Physical Anthropology

January 2018-June 2018

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-IV
GROUP - A: PHYSICAL ANTHROPOLOGY
Paper- I Medical Genetics

MAX. Marks- 80
MIN.Marks – 27

Each Paper will have 40 **compulsory** questions. divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT I

Medical Genetics: Meaning and scope: Application of Genetics in medicine. Causation of Genetic diseases/Syndrome defects/disorders. Methods in identification of Genetic Diseases: Pedigree method, Twin Method.

UNIT II

Skin- Ichthyosis, Baldness, Epiloia, the Porphyrias.
The skeletal system – Marfan's Syndrome, Nail Patella Syndrome, Brachydactyly, Syndactyly, Polydactyly, Ankylosing Spondylitis, Rheumatoid arthritis.

UNIT III

Spinabifida and anencephaly.
Osteogenesis imperfecta. Muscle – Muscular dystrophies.
Eye – Glaucoma, cataract, retinoblastoma. Jaws – Hare lip and palate.
Ears - Deafness. Alimentary system : Gastric and Duodenal Ulcers, Peptic Ulcers. Cirrhosis of liver

UNIT IV

Respiratory system – Cystic fibrosis.
Cardio Vascular System – Congenital Heart Disease, Coronary Heart Diseases and Hypertension
Kidney and Urino-Genital Tract – Polycystic Kidney Disease. Endocrine system – Cretinism, Goiter, Diabetes.

Recommended Readings:

1. Strachan, T. and Read, A.P. 1999. Human Molecular Genetics. BIOS Scientific Publishers Ltd.Oxford. (574.8732, STT H, 84237).
2. Human Genetics by A.G. Motulsky and F. Vogel
3. Medical Genetics by Lynn B. Jorde et al
4. Genetic counseling by Fuhrman and F. Vogel
5. Text book of Human Genetics by Fraser and Mayo
6. Molecular structure of Human Chromosome by J J Y
7. Emery, AEH, Elements of Medical Genetics

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-IV
GROUP - A : PHYSICAL ANTHROPOLOGY
Paper- II FORENSIC ANTHROPOLOGY

MAX. Marks- 80
MIN.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of 1 mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

UNIT I

Definition, Aims and scope of Forensic Anthropology. Collection and preservation of skeletal remains from crime scene, Assessment of time and cause of Death. Role of Forensic Anthropologist as Expert witness in court.

UNIT II

Establishment of Identity through skeletal remains. Anatomy of Human bones. Determination of Age, sex and ethnic.
Attribution of sex and reconstruction of stature from skeletal remains, human dentition for determination of sex, age and ethnic group.

UNIT III

Determination in Forensic Anthropology, Identification of finger and sole prints, details of ridge and crease character , analysis of Dermatoglyphic indices. Dermatoglyphic significance in Forensic Science.

UNIT IV

Personal Identification through somatometric and somatoscopic observation. Identification through hair, blood stains. Identification through blood, semen, urine and saliva in disputed paternity cases.

Recommended Readings:

1. Introduction to Forensic Anthropology-Surider Nath
2. Action area in Anthropology-A.K.Kalla
3. Bass, W. M. Human Osteology: A Laboratory and Field Manual of the Human Skeleton. 4 the Human Skeleton.Missouri Archaeological Society, 1995.
4. Blau, Soren, and Douglas Ubelaker. Handbook of Forensic Archaeology and Anthropology. Left Coast Press, 2009.
5. Boddington, A., Garland, A. N., and Janaway, R. Death, Decay, and Reconstruction: Approaches to Archaeology and Forensic Science. Manchester University Press, c.1987.
6. Byers, Steven N. Introduction to Forensic Anthropology. 4th ed. Prentice Hall. 2010.

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7. Haglund, William D., Marcella H. Sorg, and Diane L. France. Human Remains: Recognition, Documentation, Recovery, and Preservation. CRC Press, c. 2002.
8. Haglund, William D., and Marcella H. Sorg. Advances in Forensic Taphonomy: Method, Theory, and Archaeological Perspectives. CRC Press, c. 2002.
9. Iscan, Mehmet Yasar, and Kennedy, K. A. R. Reconstruction of Life from the Skeleton. Alan Liss, 1989.
10. Komar, Debra, and Jane Buikstra. Forensic Anthropology: Contemporary Theory and Practice. Oxford University Press, 2007.
11. Krogman, Wilton Marion, and Iscan, Mehmet Yasar. The Human Skeleton in Forensic Medicine. Charles C. Thomas, 1986.
12. Steele, D. Gentry, and Bramblett, Claude A. The Anatomy and Biology of the Human Skeleton. 1st ed. Texas A&M University Press, c.1988.
13. Stewart, Thomas Dale. Essentials of Forensic Anthropology. Forward by Ellis R. Kerley. Charles C. Thomas,c1979.
14. Taylor, Karen. Forensic Art and Illustration. CRC Press, 2001.
15.Ubelaker, Douglas H. Human Skeletal Remains: Excavation, Analysis, and Interpretation. 2nd ed. Taraxacum, 1989.
16. White, Tom D., and Pieter A. Folkens. The Human Bone Manual. Academic Press, 2005.

M.A./M.Sc. ANTHROPOLOGY
SEMESTER-IV
GROUP – A and B
Dissertation/ Project work

MM-400

In Semester IV (Group-A and Group-B) students are required to undertake a Dissertation/Project work consisting of approximately one-month preparatory work, approximately three –fourth weeks of field investigation, approximately two months for Lab work and / or data analysis and completion of the Dissertation/Project work.

The Dissertation will be selected in consultation with the faculty members decided by Head of the department, according to their specialization. Dissertations/Project work will typically be a document of about 100-150 pages with sections in the following sequence: Introduction, Objectives, Hypothesis (if necessary), Research design/ Methodology, Results, Discussion, Conclusion and Suggestions, Literature cited etc.

Presentation and Viva-Voce of the Dissertation/Project work will be in the presence of External examiner and faculty of the department.

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M.A./M.Sc. ANTHROPOLOGY
SEMESTER-IV
GROUP - B : SOCIAL ANTHROPOLOGY

PAPER-I Disaster Management, Displacement & Rehabilitation

Max. Marks- 80
Min. Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of **3** marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit-I

Definition of disaster, Nature of disaster, Anthropological prospective on disaster: Natural and man made disaster. Natural disaster: Causes and classification. People"s perception of disaster. Folklore of disaster.

Unit-II

Natural situation of displacement: Floods, Epidemics, Famines, Earthquakes, Fire, Cyclones. Manmade: Chemical and nuclear leaks,Wars: Terrorism in India, ethnic conflicts: Naxalism/Maoism.

Unit-III

Development and Displacement: Dams, Roads and Railways, Development of cities, Establishment of industries, National Parks and Sanctuaries, Defence projects.

Unit-IV

Rehabilitation policies of disaster management, Human factor and rehabilitation: Anthropological prospective, Group coordination for relocating/ reorganization of religious places, Restoration of families and organizing help for shelter, food and medical treatment.

Recommended Readings

1. Bose,B.P.C. Disaster Policies and Administration: A Study of Three Andhra Disasters
2.Cohen,Stephen P.and C.V.Raghavulu : The Andhra Cyclone of 1977.Individual and Institutional Responses to Mass Death
3. Ferandes, Walter and Enakshi Ganduli Development,Displacement and Rehabilitation.

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M.A. / M.Sc. Anthropology
Semester-IV-Group-B:
SOCIAL ANTHROPOLOGY
Paper II – Development Anthropology

Max. Marks- 80
Max.Marks - 27

Each Paper will have 40 **compulsory** questions, divisible into 4 sections.
i) Section-A(Multi-Choice Questions): **20** questions of **1** mark each.
ii) Section-B(Short Questions): **8** questions(two from each unit) of **2** marks each(word limit: 2-3 lines)
iii) Section-C(Long Questions): **8** questions(two from each unit) of 3 marks each(word limit: 75words)
iv) Section-D(Very Long Questions): **4** questions(one from each unit) of **5** marks each(word limit: 150 words)

Unit- I

Development: Meaning and evolution of the concept:.

Indices and measurements of development.

Development theories and Models.

Contributions of Anthropology to development studies,

Development studies' contribution to anthropological thought and method.

Moral / Ethical issues and limitations of development Anthropology.

Unit-II

Policy and Planning: Concept of planning, formulation of policy and plan strategy - phases, targets, regions, resources and people; Participatory Approach in development, Anthropological perspectives and data in development planning. Conflict in people centred and programme centred paradigms.

Agencies for development: Governmental and non-governmental, approaches, models, administration, training man power, peoples participation

Unit-III

Evaluation and Impact: Indices and measures; anthropological approaches — assessment of social impact, evaluation of development programmes. Gender issues in development.

Role of values and institutions in development: Caste, religion and culture - Weber, Bailey, Epstein, Milton Singer and Madan

Rural Development in India: Historical background; special programmes and poverty alleviation programmes. Land reforms; Panchayati Raj; community based organisations

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Unit-IV

Development of Scheduled Castes: Special component plans. Development of Scheduled caste: Constitutional provisions and safeguards, protective legislation; structure of tribal development

Sustainable development: Environment, natural resources, people' concerns and needs.

Case Studies in Development , NGO case studies in different regions. Success stories in cooperative management.

Recommended Readings:

1.Zamora, D. Mario. Perspective on cultural change and Development.
2.Vorhies et al. The Polities of Hunger
3. Rogers Everll, Communication and Development: Critical Perspectives
4. Chambers Robert. Rural Development.
5. Kapoor& Singh. Rural Development Through NGOs
6. Cochrane. Development Anthropology
7.Dalton.George (Ed). Economic Development and Social change
8. Foster.G.M. Traditional Cultures and Impact of Technological change
9.Chansarkar, B.A. Models for Planning in India
10.Krishnamachari, V.T. Community Development in India
11. Tax Sol Anthropology
12.Vidyarthi L.P. (Ed). Applied Anthropology in India
13. Upadhyay,V.S. &Pandey Gaya. VikasatmakManavvigyan (in Hindi), Madhya Pradesh Hindi Granth Academy, Bhopal
14. Schumachr, E. F. Small is Beautiful

M.A./M.Sc. ANTHROPOLOGY
SEMESTER-IV
GROUP – A and B
Dissertation/ Project work

MM-400

In Semester IV (Group-A and Group-B) students are required to undertake a Dissertation/Project work consisting of approximately one-month preparatory work, approximately three-four weeks of field investigation, approximately two months for Lab work and / or data analysis and completion of the Dissertation/Project work.

The Dissertation will be selected in consultation with the faculty members decided by Head of the department, according to their specialization. Dissertations/Project work will typically be a document of about 100-150 pages with sections in the following sequence: Introduction, Objectives, Hypothesis (if necessary), Research design/ Methodology, Results, Discussion, Conclusion and Suggestions, Literature cited etc. Presentation and Viva-Voce of the Dissertation/Project work will be in the presence of External examiner and faculty of the department .

Three typed copies of analyzed data is to be submitted in the department in the form of a Dissertation/ Project Report

P.G. Diploma in Criminology and Forensic Science

Semester I

July2017- December-2017

Pt. Ravishankar Shukla University, Raipur

PG Diploma in Criminology and Forensic Science [Credit System]

Scheme of Examination

July 2017-December 2017					
FIRST Semester	Paper No.	Title of Papers	Marks (External)	Marks (Internal)**	Credit
	I	Fundamentals of Forensic Science and Physical Evidence	80	20	8
	II	Fundamentals of Criminology	80	20	8
	LC-I	Lab Course-I	80	20	4
	Total		**300**		**20**
January 2018-June 2018					
SECOND Semester	Paper No.	Title of Papers	Marks (External)	Marks (Internal)**	Credit
	I	Toxicology, Forensic Chemistry and Forensic Biology	80	20	8
	II	Fundamentals of Police Science	80	20	8
	LC-II	Lab Course-II	80	20	4
	Total		**300**		**20**

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Semester- I

Paper-1:Fundamentals of Forensic Science and Physical Evidence

MAX. Marks- 80
MIN.Marks - 27

UNIT -I

Definition, History, Development and Scope of Forensic Science.
Scene of Crime and Collection of Physical Evidences, Packing and sending for analysis.
Sketching of Crime Scene Spot.
Introduction of Forensic Photography, Role of Photography in Forensic Science.
Camera: Its parts and functioning, Enlarger and other Equipments used in Photography.
Developing and Printing methods.

UNIT- II

Forensic Science and Jurisprudence, Medical Jurispredence.
Forensic Examination in Burning, Firearms, Poisoning, Railway cutting,
Stabbing explosion, Sexual offences
Death: Cause of Death, Death from Asphyxia: Drowning, Hanging, Strangulation, Throttling.
Procedure in Court as per Criminal Procedure Code
Indian Evidence Act- 45, Sections 59-73 and Sections 137 & 138.

UNIT- III

Introduction and Classification of Questioned Documents.
Examination of Documents.
Basis of Handwriting Identification – Individuality of Handwriting
Various Writing Features and Their Estimation.
Examination of Signatures.
Examination of Alterations, Erasers, Over Writing, Additions and Obliterations.

UNIT -IV

Dermatoglyphics in Criminology & Forensic Science
History of Dermatoglyphic Prints developments
Personal identification from Finger prints
Types and Classification of Finger Prints (Henry's Classification)
Battley's Single Print Classification
Development and Lifting of Latent Finger Prints
Finger prints problems, Foot print, Palmar, Sole & Toe Prints, Tool marks, Lip prints.

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References:

1. R. Safferstin: Hand book of forensic science
2. Ohara & Osterburn : Criminalistics
3. P.L.Krik : Criminalistics
4. B.R. Sharma: Forensic Science in criminal investigation & crime
5. C.R. Parikh: Parikh"sTextbook of Medical Jurisprudence & Toxicology
6. J.V.P. Conway: Evidential Documents
7. S. Goldblatt: Document Evidence & Identification
8. C.Cummins & R. Midlo: Introduction to Dermatographics: Finger, Sole & Toe.
9. Albert Osborn Questioned documents.
10. Chales. C. Thomas Type writing identification
11. Hardless. H.R. Disputed document. handwriting and thumbs print identification.
12. Wilson. R. Harrison Suspended documents – their scientific examination
13. Hilton Scientific Examination of questioned documents
14. R.A. Goegory Scientific identification of disputed documents. Finger Prints &
15. W.R. Harris Suspected Documents

Semester I

Paper-11: Fundamentals of Criminology

Max. Marks- 80
Min.Marks - 27

UNIT -I

Definition, aims, nature and scope of Criminology.
History and Development of Criminology.
Role of Criminology in Forensic Science.
Relationship of Criminology with other sciences: Forensic science, Psychology, Anthropology, Sociology and Law.
Schools of Criminology and its Concept.
Pre-classical School: Demonological, School of Freewill, Classical School, Neo- Classical School, Geographical School, Socialistic School, Italian School, Psychological School, Multifactor Theory

UNIT-II

The Characteristics and Relationship of Concept of Crime.
The Concept of Crime and its Socio-Legal Aspects.
The Causes of Crime, its level and General Description
The Differentiation approach to the assessment of Cause of Crime
The inter connections of Social and Biological in the Cause of Crime.
Biological problems in the complex of Anti Social Behavior

UNIT -III

Criminal Psychology
Prevention of crime
The concept of Social Prevention and limits of its functioning
The basic principle of the Legal regulation of Social Prevention
Juvenile Court, Rehabilitation Homes, Reformatories

UNIT -IV

Objects of Punishment and its Critical Analysis
Modern concept of Penology
Capital Punishment
Prison System
Modern Concept of Prison
Reformation in Judicial System

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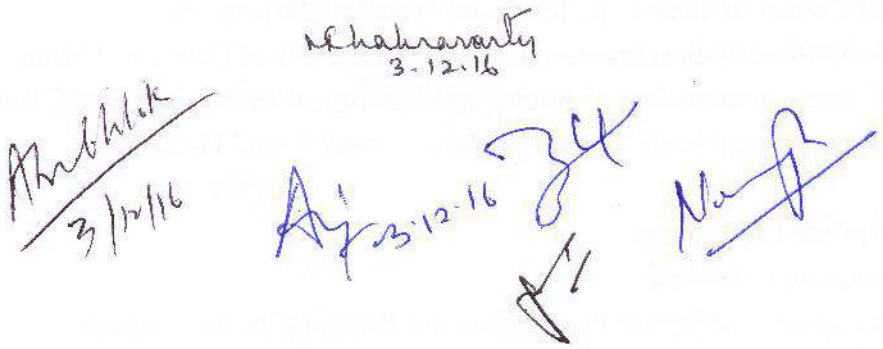
Recommended Books:

1. Barns & Teeters: New Horizon in Criminology
2. Conkin: Criminology
3. Suderland and cressy: The Principals of Criminology
4. Siegel Laary, J: Criminology
5. Singh Shyamdhar: Essentials of Criminology (Hindi)



Semester I

Lab Course - I

Max. Marks- 80
Min.Marks - 27

1. Over view of instruments.
2. Sketching of Crime scene spot and collection of Physical evidences.
3. Its Packing, Preservation and Sending.
4. Recording, Identification & Classifications of Dermatoglyphic Prints.
5. Development of Latent finger prints on glass, paper, wall, polished surface etc.
6. Photography of Latent Finger Prints, Casting of Foot prints.
7. Photographic Techniques.
8. Preliminary Examination of Questioned Documents.
9. Examination of Ink by Thin Layer Chromatography (TLC).
10. Classification of Fingerprints by Henry"s Ten Digit Classification.
11. Examination of Tool marks using Comparison Microscope.
12. Classification of Lip prints: Suzuki and Tuschihasi classification.

References:

1. R. Safferstin: Handbook of forensic science
2. Ohara &Osterburn: Criminalistics
3. P.L.Krik: Criminalistics
4. B.R. Sharma: Forensic Science in criminal investigation & crime
5. C.R. Parikh: Parikh"sTextbook of Medical Jurisprudence &Toxicology
6. J.V.P. Conway: Evidential Documents
7. S. Goldblatt: Document Evidence & Identification
8. C.Cummins & R. Midlo: Introduction to Dermatographics: Finger, Sole &Toe.
9. Albert Osborn Questioned documents.
10. Chales. C. Thomas Type writing identification
11. Hardless. H.R. Disputed document, handwriting and thumbs print identification.

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P.G. Diploma in Criminology and Forensic Science

Semester II

January 2018- June 2018

Semester II

Paper:1: Toxicology, Forensic Chemistry and Forensic Biology

MAX. Marks- 80
MIN.Marks - 27

UNIT- I

Toxicology: Definition.
Classification of Poisons.
Various types of Plant Poisons.
Study of Insecticides and Pesticides.
Examination of Poisons in Viscera, Blood and Urine.

UNIT -II

Introduction to Narcotic Drugs and Psychotropic Substances (NDPS) Act 1985.
General Study of Narcotic Drugs and Psychotropic Substances.
Examination of Narcotic Drugs.
Adulteration in Jwelleries, Petroleum Products.
Examination of Inflammable Liquids like Kerosene, Petrol, Diesel.

UNIT -III

Introduction to Forensic Biology
Study of Body Fluids and Biological Materials: Blood, Urine, Saliva, Semen, Vaginal Swab, Vomit, Hair and Fibres, DNA.
Role of DNA in Paternal and Maternal Disputes.
DNA Fingerprinting and personal identification.
Forensic Examination of Body Fluids and Biological Materials.
Wildlife Forensics: Its role and Importance.

UNIT -IV

Introduction to Forensic Anthropology
Identification of Bone – Morphological, Anatomical Characteristics, Determination of Age, Sex, Race, Stature.
Forensic Odontology: Definition, Pattern, Type and Structure of Teeth, Age determination Identity of Person
Study of Bite Marks and their Forensic Significance.
Role in mass disaster, Dieses of teeth and their significance in personal identification.

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References:

1. R. Safferstin: Handbook of Forensic Science
2. Ohara &Osterburn : Criminalistics
3. P.L.Krik : Criminalistics
4. B.R. Sharma: Forensic Science in Criminal Investigation & Crime
5. C.R. Parikh: Parikh's Textbook of Medical Jurisprudence & Toxicology
6. Surinder Nath Forensic Anthropology
7. Forensic Toxicology Manual, Ministry of Home Affairs, DFS

Semester II

Paper-11: Fundamentals of Police Science

MAX. Marks- 80
MIN.Marks - 27

UNIT- I

History and Development of Police System.
Reformation of Police System.
Application of Police in maintenance the Law and Order.
Limitations of Police System with reference to Human Rights

UNIT- II

Investigation of the following cases:
1. Murder
2. Theft and Burglary
3. Road, Railway and Air Accidents
4. Arson
5. Sting Operation

UNIT- III

First Information Report, Search, Seizure, Arrest
Interrogation, Final Crime Theory, Preparation of Charge sheet.
Procedure in Court as per Criminal Procedure Court
Simons Trial, Warrant Trial, Case Diary.

UNIT- IV

Role of Community in Police Corruption.
Use of Criminal Profiling in Crime Investigation.
Police System in India and its various organizations
Modernization of Police System with reference to Control system and Modern equipment

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Semester II

Lab Course – II

Max. Marks- 80
Max.Marks - 27

1. Determination of height of an individual by the long bones.
2. Determination of Sex of an individual by the Skull. Pelvic, Girdles and Long bones.
3. Determination of age of an individual by the skull and Long bones.
4. Identification of Drugs, Pesticides by Thin Layer Chromatography (TLC).
5. Preliminary and Confirmatory Examination of Blood.
6. Examination of Saliva.
7. Isolation of DNA from Blood, Saliva, Hair root.
8. Personal identification through DNA markers
9. Morphological & Microscopic examination of hair and fibers.
10. Examination of Inflammable liquids.
11. Analysis and Study of Bite Marks.

References:

1. R. Safferstin: Handbook of Forensic Science
2. Ohara & Osterburn : Criminalistics.
3. P.L.Krik : Criminalistics
4. B.R. Sharma: Forensic Science in Criminal Investigation & Crime
5. C.R. Parikh: Parikh"sTextbook of Medical Jurisprudence & Toxicology
6. Surinder Nath: Forensic Anthropology
7. Forensic Toxicology Manual, Ministry of Home Affairs, DFS

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Syllabus

Of

M.Phil. Anthropology

2017-2018

Pt.Ravishankar Shukla University

Raipur (C.G.)

M. Phil Anthropology

M. Phil Anthropology course would be run in Annual Pattern. A student having M. Phil degree in Anthropology should have basic knowledge of all the branches of Anthropology. The Scheme of examination is as under.

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination of M. Phil Anthropology [Credit System]

July 2017- June 2018

Paper No.	Title of Papers	Marks		Credit
		(External)	(Internal)**	
I	Research Methodology, Quantitative Techniques & computer application	80	20	4
II	Advance Anthropology	80	20	4
III	Dissertation Report	150		6
IV	Dissertation based Presentation	50	50	3
V	Theory based Seminar		50	1
LC	Practicals in Applied Anthropology.	80	20	2
Total		**600**		**20**

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M. Phil. Anthropology

PAPER-I : RESEARCH METHODOLOGY: QUANTITATIVE TECHNIQUES & COMPUTER APPLICATION

Max. Marks- 80
Min.Marks - 38

The course is designed to examine theories of research methods in Anthropology.
This part will be done through lectures, assigned reading, class discussions and individual consociation. Students will not only learn various techniques for collecting and analyzing informations but its appropriate use and limitations. A variety of tools will be addressed to. It also includes problems of access, reports and ethics in conducting research; data gathering through interviewing, participant observation, personal documents, photos, tapes; data collection; computer applications; and analysis and interpretation in context of theory. It deals with theory and methodology of research.

UNIT-I

Field work tradition in Anthropology.
Social survey and social research.
Elements of research : Deductive and inductive logic, theory and law.
Hypothesis : Source, character, importance and types.
Research Methods : Logical, historical, comparative and scientific.
Ethnographic method.

UNIT-II

Review of literature: Use of secondary sources, role of history and historical records.
Sampling Method : Random and non random sampling
Techniques of primary data(Qualitative and quantitative data) collection. . Focused group interview:
Scaling techniques, RRA, PRA, RAP, audiovisual recording.
Report writing

UNIT-III

Mean, Median, Standard deviation and Standard errors.
Correlation : Simple and Multiple Correlation
Test of significance : Chi-square test, t-test, ANOVA
Estimation of gene frequencies from pedigrees and concept of Mendelian population.
Pedigree method: Analysis of pedigrees with some rare inherited disorders.

UNIT-IV

Bibliography and References: Styles and types
Thesis, Project Report and Research Paper Writing
Online Scientific data bases
Computer Application : MS Office (Word, Excel, Power Point), SPSS

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Recommended Readings:

1. Danda, Ajit. Research Methodology in Anthropology, Inter- India, New Delhi.
2. Elhance, D. N. Practical Problems in Statistics, Kitab Mahal, Allahabad.
3. Fernandes & Tondon, Participatory Research.
4. Fisher, Michael. Application in Computing for Social Anthropologists, London, Routledge.
5. Goode & Hatt. Methods in Social Research.
6. Gupta, S. P. Statiatics Methods.
7. Kaplan, Abraham. The Conduct of Enquiry: Methodology for Behavioural Sciences.
8. Kassam & Mustafa. Participatory Research.
9. Levin, J. Elementary Statistics in Social Research.
10. Madrigal. Lorena. Statistics for Anthropology.
11. Mukherjee, Neela. Participatory Rural Appraisal and Questionnaire Survey.
12. Pelto and Pelto: Anthropological Research: The structural enquiry, Qualitative data analysis.
13. Pelto P.S. & Pelto G.H. Anthropological Research: the structure of inquiry. London, Cambridge
14. Renfrew, C. (ed.). The Explanation of Culture Change: Models in Prehistory. Duckworth.
15. Sarin, S.S. and Balchandani,M.K. Fundamentals of Statistics. Ratan Prakashan Mandir, Agra.

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M. Phil Anthropology

PAPER-II: ADVANCE ANTHROPOLOGY

Max. Marks- 80
Min.Marks - 38

UNIT-I

Application of Biological Anthropology in the Service of Mankind.
Medical Genetics: Meaning and Scope; Application of Genetics in Medicine.
Genetic Epidemiology with special reference to Non-Communicable Diseases: Haemoglobinopathies, Diabetes, Cancer and Cardiovascular Diseases.
Prenatal Diagnosis and Genetic Counseling.

UNIT-II

Recent Advance in Human Genetics: An Overview.
Cytogenetics & its application in identification of Chromosomal Aberration : Autosomal and Sex Chromosomal Polymorphism
PCR, Recombinant DNA techniques and Genetic Engineering.
DNA Fingerprinting etc.

UNIT-III

Evolutionism: A Critical Assessment of Classical Evolutionalism - L.H.Morgan and Neo-Evolutionism : Julian Steward, Structuralism of British and French Tradition, Neo-Structuralismm of E.R. Leach
Diffusionism: A critique on Diffusionistic Thoughts.
Historical Particularism.
Post Structuralism and Post Modernism in Anthropology.

UNIT-IV

Anthropological Concept of Development.
Tribal Development in India: An Outline.
Planning: Micro and Macro.

UNIT-V

Bio-Cultural Evolution of Man in Africa with reference to Lower Palaeolithic, Middle Palaeolithic, Upper Palaeolithic & Mesolithic Cultures (Origin, Chronology Distribution, Traditions and Development).

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Recommended Readings:

1. Strachan, T. and Read, A.P. 1999. Human Molecular Genetics. BIOS Scientific Publishers Ltd. Oxford. (574.8732,STT H, 84237).
2. Jha, M. Manavshastriya vichardhara- Ek Parichaya. (In Hindi).
3. Shrivastava, A.R.N. Sanskritik Manav Vigyan- Siddhanta aur Uplabdhiyan (In Hindi)
4. Herskovitz, M.J. Sankriti ki pristhabhumi (In Hindi)
5. Muthal, S. Samajik Manav Vigyan- Saidthantik Vyavahar (In Hindi)
6. Harris, M. Rise of Anthropological Theory, Routlege and Kegan Paul, London.
7. Malinowski, B. Scientific theory of culture and other essays.
8. Evans-Pritchard. A History of Anthropological Thought.
9. Clark, J.D. African Prehistory.
10. Bernard, Alan. History of Anthropological Theories.

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PAPER- III

M. Phil Anthropology

Dissertation Report

Max. Marks-150
Min.Marks-72

The course is designed to make the student carry out independent research in the planning of the projects proposals, data collections, data analysis and report writing under the guidance of teacher assigned by the Head of the department in respective specialization of the student. The course aims at capacity building of the student in taking up independent research programme

Dissertation will be based on field work/ secondary source of data/ laboratory work on the topic allotted by the Head of the department. The students would be given one month time to complete data collectrion under supervision of their re4spectiive research guide.

Students are required to present their research work in form of dissertatiion. Three copies of which are to be submitted at the department within two weeks after last theory paper.

PAPER-IV

M. Phil Anthropology

Dissertation Based Presentation

Max. Marks- 100(50(Ext.) +50(Int.)
Min. Marks- 48

Students are required to give PPT presentatiion of their dissertation topic. They will be judged for their depth and clarity in the choosen research topic by external and internal examiners.

PAPER-V

M. Phil Anthropology

Theory Based Seminar

Max. Marks-50
Min. Marks-24

Students are required to give three seminars on theory topics, allotted to them by the M .Phil. committee. Of these, best 2(two) will be considered for internal marks.

Lab.Course(LC)

PRACTICAL IN APPLIED ANTHROPOLOGY

Max. Marks-80
Min.Marks - 38

Laboratory Techniques:

I. Forensic Anthropology: Scene of Crime.
II. Collection and preservation of Physical evidences.
III. Use of dermatoglyphics in personal identification and criminal detection.
IV. Conservation and preservation of archaeological/ museum objects.
V. Collection of biological sample & isolation of human DNA, PCR technique, Electrophoresis.
VI. Estimation of nutrient intake from diet consumed.
VII. Use of Computer in anthropological data analysis.

NOTE: Five specimens to be analyzed by each student in the above-mentioned traits unless stated otherwise.

Practical in Applied Anthropology: Total Marks-80

Distribution of Marks are as under:

Practical- 60
Viva-voce- 10
Practical Record- 10

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COURSE WORK FOR Ph. D. IN ANTHROPOLOGY
Session 2017-18

All eligible candidates for Ph.D., after being qualified in the Ph.D. entrance examination shall required to undertake course work for a minimum period of one semester. The candidat possessing M.Phil. Degree from a recognized university shall be exempted from the Ph.D. Cour work as per the revised Ordinance No. 45.

On the recommendation of the supervisor(s), the course work may be carried out by t candidates in sister schools/departments/institutes either within or outside the university.

The candidate failing to pass the course with 50% marks shall have to reappear at t examination within the next twelve months.

The scheme of course work for Ph.D. is as under:

S.No.	Course No.	Title of the Paper	Marks
1	I	*Research Methodology and Computer Applications*	100
2	II	**Review of Concerned Literature, Seminar and Project Work**	100
Total			200

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COURSE WORK FOR Ph. D. IN ANTHROPOLOGY

Session 2017-18

Course No. I: Research Methodology and Computer Applications

Maximum Marks: 1(

The course is designed to examine theories of research methods in Anthropology. This part will be done through lectures, assigned reading, class discussions and individual consociation. Students wil not only learn various techniques for collecting and analyzing information but its appropriate use an limitations. A variety of tools will be addressed to. It also includes problems of access, reports and ethics in conducting research; data gathering through interviewing, participant observation, persona documents, photos, tapes; data collection; computer applications; and analysis and interpretation in context of theory. It deals with theory and methodology of research.

Unit 1. Research Process: An Overview

a. Field work, Survey, investigation

b. Inductive and Deductive reasoning

c. Reality, Observable Universe, Theory and Fact

d. Hypothesis

e. Research Design.

Unit 2. Recent Approaches

a. Participatory Research

b. Action Research

c. Operations Research

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d. Public-Private Partnership

Unit 3. Quantitative Methods

a. Basic Statistical Concepts: Measures of Central Tendency, Measures of dispersion
b. Parametric test-t Test, ANOVA
c. Non Parametric test-Chi-squre test
d. Correlation, Pearson's (grouped and ungrouped)
e. Multivariable Statistics: Multiple regressions, Factor analysis

Unit 4. Qualitative Methods

a. Philosophy of Qualitative research
b. Research Methods
c. Tools and Techniques
d. Management of data
e. Qualitative data analysis
f. Mixed Methods
g. Software's – a. SPSS b. Microsoft office

Unit 5.Scientific writing skills

a. Thesis, Report, Scientific Papers in journals and Book Chapters
b. Writing and scientific research proposal

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c. Bibliographies, citation: Different citation styles

d. Online Scientific databases: Journals, Achieves, JSTOR, UGC- Infonet and others,

Census of India, NFHS and DHS databases, Secondary data its use in Anthropological

research

REFERENCES:

Natasha Mack, Cynthia Woodsong, Kathleen M. Macqueen, Greg Guest, Emily Namey,2005; Qualitative Research Methods: A Data Collector's Field Guide, Family Health International, North Carolina, USA.

K. / Lincoln, Yvonna S: Competing paradigms in qualitative research, in: Denzin, Norman Theories and issues 2nd edition, Sage, London, 2003.

Silverman, David: Interpreting qualitative data. Methods for analyzing talk text and interaction, Sage London, 1993.

Keohane, Robert O. / King, Gary / Verba, Sidney: Designing social inquiry –Scientific inference in qualitative research, Princeton 1994.

Creswell, John W.: Qualitative, quantitative and mixed methods approaches, Sage, London, 2003.

C. Frankfort-Nachmias, & Nachmias, D 1996 'Research Methods in Social Sciences', Arnold, London.

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Danda Ajit1992 'Research Methodology in Anthropology', Inter-India, New Delhi.

Pelto, P.S. & Pelto, G.H. 1979 'Anthropological Research', Cambridge University Press, London.

Wilkinson, T.S. & Bhandarkar, P.L.1994 'Methodology and Techniques of Social Research', Himalaya Publishing House, Bombay.

W. Laurence Neuman 1997 'Social Research Methods', Allyn & Bacon.

Fetterman David 1989 'Ethnography Step by Step', Sage publication.

Hammersley, M1983' Ethnography Principles in Practice Tavistock Publication

Royal Anthropological Inst. Of G. Britain & Ireland 1967 'Notes and Queries on Anthropology', Routledge and Kegan Paul Ltd. London.

COURSE WORK FOR Ph. D. IN ANTHROPOLOGY

Session 2017-18

Course No. II: Review of Concerned Literature, Seminar and Project Work

Maximum Marks: 100

The course aims at capacity building of the student in taking up independent research programme. The students are required to submit 3 copies of the synopsis based on literature review and pilot study in community/Laboratory as per nature of proposed research topic.

Standard methods of citation of references of bibliography, as applicable in Anthropology, to be followed. Three typed copies of proposed research work will be presented in the form of synopsis / Pilot Proposed report.

Distribution of Marks		
1.	Review of relevant literature	20
2.	Seminar	20
3.	Synopsis / Pilot Project Report	60
Total		100

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Choice Based Paper for Student of Other Disciplines
Session: 2017-18

Credit: 3

MAX. Marks- 80
MIN.Marks – 27

PAPER-1: Basics in Anthropology

Unit-1:

Anthropology: Definition, Branches
Man's Place among Primates
Primate: Definition, Evolutionary trends
Blood Groups: Types, Distribution, Inheritance.

Unit-2:

Archaeology: Definition, Branches, Objectives
Outline of Indian Archaeological Cultures
Tool Technology

Unit-3:

Tribe: Definition & Characteristic Features
Culture: Meaning, Definition & Characteristics
Ethnographic Methods.

Recommended Readings:

1. Sharma and Sharma. 1997. Anthropology. Atlantic Publishers and Distributors, New Delhi
2. Herskovitz, M. J. Cultural Anthropology, Oxford & IBH Publishing Co., New Delhi.
3. Mair, Lucy 1965. An Introduction to Social Anthropology. Clarendon Press, Oxford.
4. Majumdar, D.N. & Madan, T. 1986. An Introduction to Social Anthropology, National Publishing House, New Delhi.
5. Shukla, B.R.K. and Rastogi, S. Physical Anthropology and Human Genetics: An Introduction, Palka
6. Montagu, M.F.A. An Introduction to Physical Anthropology. Charles C Thomas, Springfield Illinois.
7. Sankalia, H.D. 1964. Stone age tools: their techniques, names and probable functions, Pune, Deccan College
8.Nadeem Hasnain 2002. Janjatiya Bharat, Jawahar Printers and Distribution. New Delhi.(In Hindi)
9.Nadeem Hasnain 2002.Samkalin Bhartiya Samaj : Ek Samajshastriya Paridrishya. Tarun Ofset , New Delhi.(In Hindi)
10. Pandey J.N. Puratatvik Vimarsha.(In Hindi)
10. Young, P. V. Scientific Social Surveys and Research
11. H. Russel. Bernard, Handbook of Methods in Cultural Anthropology. Altamira Press.

Session: 2017-18

Credit: 03

MAX. Marks- 80
MIN.Marks – 27

Paper-II: Applications of Anthropology

Unit:1

Applied Biological Anthroplogy,

Applications of Human Genetics

Unit:2

Nutritional Anthropology,

Anthropology of Sports,

Unit:3

Applied Social Anthropology

Action Anthropology

Recommended Books

1. Kroeber: Anthropology Today

2.Curt Stern, 1968: Principles of Human Genetics. Eurasia Publishing House (Pvt.) Ltd., Ram Nagar, New-Delhi

3. Karp, E.: Genetic Engineering

4. Sodhi, H.S.: Sports Anthropology

5. Willigt, J.V.: Applied Anthropology: An Introduction

6. Vidyarthi, L.P.: Applied Anthropology

7. Shukla, B.R.K. & Rastogi, S . : Physical Anthropology and Human Genetics: An Introduction

8. Surinder Nath: Introduction to Forensic Anthropology

9. Krogman, Wilton Marion & Iscan, Mehmet Yasar (1986): The Human Skeleton in Forensic Medicine

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SCHOOL OF STUDIES IN BIOTECHNOLOGY

Pt. Ravishankar Shukla University
Raipur-492 010

Syllabus

BIOTECHNOLOGY

M. Sc.
(Semester System)

Session

2017-2018
2018-2019

SCHME OF SEMESTER EXAMINATION FOR SESSION 2017-19

SCHOOL OF STUDIES IN BIOTECHNOLOGY
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
M. Sc. BIOTECHNOLOGY (Semester I to IV)

July 2017 – December 2017

First Semester	Paper	Title of Paper	Marks (External)	Marks (Internal)**
	1*	Cell Biology	80	20
	2	Genetics	80	20
	3	Microbial Physiology	80	20
	4	Bio-molecules	80	20
	LC-1	Lab Course 1 (Based on paper 1 & 2)	80	20
	LC-2	Lab Course 2 (Based on paper 3 & 4)	80	20
		Total	600	

January 2018 – June 2018

Second Semester	Paper	Title of Paper	(External)	(Internal)
	5	Biostatistics & Computer Applications in Biotechnology	80	20
	6	Molecular Biology	80	20
	7	Plant Biotechnology	80	20
	8	Macromolecules & Enzymology	80	20
	LC-3	Lab Course 3 (Based on paper 5 & 6)	80	20
	LC-4	Lab Course 4 (Based on paper 7 & 8)	80	20
		Total	600	

July 2018 – December 2018

Third Semester	Paper	Title of Paper	(External)	(Internal)
	9	Genetic Engineering	80	20
	10	Biology of Immune System	80	20
	11	Bioprocess Engineering & Technology	80	20
	12	Environmental Biotechnology	80	20
	LC-5	Lab Course 5 (Based on paper 9 & 10)	80	20
	LC-6	Lab Course 6 (Based on paper 11 & 12)	80	20
		Total	600	

January 2019 – June 2019

Fourth Semester	Paper	Title of Paper	(External)	(Internal)
	13	Basic Concept of Bioinformatics & Nanobiotechnology	80	20
	14	Advanced techniques in Biotechnology	80	20
	15	Animal Biotechnology	80	20
	16	Functional Genomics & Proteomics	80	20
	LC-7	Lab Course 7 (Based on paper 13 & 14)	80	20
	LC-8	Lab Course 8 (Based on paper 15 & 16)	80	20
		Total	600	
		OR		
		Project Work***	600	
		Dissertation	240	60
		Seminar based on project	160	40
		Viva-voce	80	20
		Grand total [Semester I + II + III + IV]	2400	

**Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) -type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.*

BoS approved syllabus for M.Sc. Biotechnology (Academic session 2017-18 and 2018-19)

23/12/16

***1.Each student will be evaluated continuously throughout the semester.*

2. *There will be a class test based on each theory paper. The full marks will be 10 for each paper.*
3. *There will be a poster/oral presentation based on each theory paper. The full marks will be 10 for each presentation.*
4. *Each student will be required to submit a brief write-up (not more than 20 pages) on his/her poster/oral presentation.*

**** 1. A student of IV semester will have the option to opt for project work in lieu of four theory papers and two lab courses provided he/she secures at-least 65% or more marks in aggregate in semester I and II.*

2. *The project has to be carried out in recognized national laboratories or UGC recognized universities. No student will be allowed to carry out project in private laboratories/ college/ institutions, excluding the colleges recognized as research centers by the RDC of Pt. Ravishankar Shukla University, Raipur.*
3. *The valuation of all the projects will be carried out by the external examiner and HoD of UTD or its nominee at the UTD Centre.*

- M.Sc. Students of Biotechnology have to attend one excursion or visit in one academic year (within or outside Chhattisgarh)

Scheme of M.Sc. (Biotechnology)

Scheme of Examination

Semester I

Paper Code	Title of Theory/Practical Paper	Marks		
		External	Internal	**Total**
1	Cell Biology	80	20	100
2	Genetics	80	20	100
3	Microbial Physiology	80	20	100
4	Bio-molecules	80	20	100
Lab Course 1	Based on Theory papers 1, 2	80	20	100
Lab Course 2	Based on Theory papers 3, 4	80	20	100
	Total Marks			**600**

23/12/16

School of Studies in Biotechnology

Semester I

Paper 1: Cell Biology

M.M.80

Unit I

1. Cell Theory
2. Structure of Prokaryotic and Eukaryotic cells
3. Diversity of cell size and shape. Diversity of Prokaryotic cell and Eukaryotic cell.

Unit II

1. Cellular organelles – Plasma membrane, cell wall, their structural organization; Mitochondria; Chloroplast; Nucleus and other organelles and their organization.
2. Transport of nutrients, ions and macromolecules across membranes.
3. Cell cycle – molecular events and model systems

Unit III

1. Cellular responses to environmental signals in plants and animals – mechanisms of signal transduction.
2. Cell motility – cilia, flagella of eukaryotes and prokaryotes
3. Biology of cancer

Unit IV

1. Biosynthesis of proteins in Eukaryotic cell, Co – and post – translational modifications, intracellular protein traffic.
2. Cellular basis of differentiation and development – mitosis, gametogenesis and fertilization. Development in Drosophila and Arabidopsis; Spatial and temporal regulation of Gene Expression

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

1. Gerald Karp - Cell and Molecular Biology 5th Edition (2007)
2. Geoffrey M. Cooper; Robert E. Hausman - The Cell: A Molecular Approach (2009)
3. E. J. Ambrose and Dorothy M. Easty, Second Edition (1977), Book Society and Nelson.
4. C.B. Powar – Cell Biology Third Edition, reprint (2005), Himalaya Publishing House.
5. Tortora, Funke and Case – Microbiology: An introduction 6th Edition (1998), Binjamin/Cummings Publishing Co.
6. Lewis J. Klein smith and Valerie M. Kish - Principles of cell and molecular biology – Third Edition (2002)
7. P. K. Gupta – Cell and molecular biology, Second Edition (2003), Rastogi publications.
8. Lodish *et al*., Molecular cell Biology, 6th Edition, W.H. Freeman & Company, 2008.

List of Practical's:-

1. To prepare the temporary stained slide of onion bulb peel to study the structure of plant cell.
2. To prepare the temporary stained slide of cheek squamous epithelial cells of mouth of Human Beings.
3. Preparation and Study of slide of mitosis using from onion root tips squash.
4. Schedule for study of mitotic index.
5. To determine the abnormal mitotic index.
6. Preparation and study of slide for meiosis using young anthers of *Allium cepa.*
7. To determine the meiotic index in the flower bud of *Allium cepa.*

School of Studies in Biotechnology

Semester I
Paper 2: Genetics

M.M. 80

Unit I

1. Introduction to genetics; Beginning of genetics as a science. Early studies involving genetics
2. Mendel and genetics; Mendel's laws of genetics; Physical and chemical basis of Heredity, Genetic variation.
3. Gene - Types of genes, Prokaryotic, Eukaryotic and Viral genes
4. Genetics and human affairs.
5. Fine structure of gene, Eukaryotic genome organization (Structure of chromatin, coding and non – coding sequences, satellite DNA); rearrangement in DNA. Central dogma

Unit II

1. Regulation of gene expression in Prokaryotes and Eukaryotes; Attenuation and antitermination; Operon concept; DNA methylation.
2. Gene to Phenotype – Interactions between the Alleles of one gene, interfering gene interaction.
3. Mutation; Types of mutations, Changes in Chromosome number and structure - Euploidy and Aneuploidy, mutagens – UV and chemical mutagens, Ames test; Dosage compensation; Mutational Assay System.
4. Inheritance: Autosomal and sex linked inheritance, Extrachromosomal inheritance, Inheritance pattern. Inheritance of Organelle genes.

Unit III

1. Variation; sources of variation; selection; Heritability of variation, Process of speciation; Origin of new genes. Hardyweinberg genetic equilibrium, genetic polymorphism and selection.
2. Genes and Quantitative traits; Genotypes and Phenotypic Distribution; Heritability of Quantitative Character; Quantifying Heritability; Locating genes.
3. Genetic disorder and syndromes.

Unit IV

1. Bacterial Genetic system: Transformation, Conjugation, Transduction, Recombination, Plasmids and Transposons. Bacterial Genetic map with reference to *E.coli*.
2. Viruses and their Genetic system: Phage I and its life cycle; RNA phases; RNA viruses; Retroviruses
3. Genetic system of Yeast and Neurospora.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

- Genetics; Benjamin Pierce; W. H. Freeman
- Modern Genetic Analysis; Anthony J.F. Griffiths, William M. Gelbart, Richard C. Lewontin and Jeffrey H. Miller; W. H. Freeman
- Principles Of Genetics; Eldon John Gardner, Michael J. Simmons, D. Peter Snustad; Wiley India Pvt Ltd
- Principles of Gene Manipulation and Genomics; SANDY PRIMROSE and RICHARD TWYMAN; Wiley-Blackwell

Practical:

- Experiments for Mendel's experiments
- Studies of prokaryotic & eukaryotic cells
- Karyo-type studies
- Mutation in bacteria
- Plasmid isolation

School of Studies in Biotechnology

Semester I

Paper 3: Microbial Physiology

M.M. 80

Unit I

1. Microbial Evolution, Systematics and Taxonomy.–New approaches to bacterial taxonomy classification including ribotyping; Ribosomal RNA sequencing; Characteristics of primary domains; Nomenclature and Bergey's Manual.
2. Prokaryotic cells: Structure and function – Cell walls of eubacteria (peptidoglycan) and related molecules: Outer – membrane of Gram negative bacteria; Cell wall and cell membrane synthesis; Flagella and motility; Cell inclusions like endospores, gas vesicles.

Unit II

1. Microbial Growth – growth curve, measurement of growth and growth yields; Synchronous growth; Continuous culture; Growth as affected by environmental factors like temperature, acidity, alkalinity, water availability and oxygen.
2. Metabolic Diversity among Microorganisms – Photosynthesis in microorganisms; Calvin cycle; Chemolithotrophy; oxidizing and reducing bacteria; Methanogenesis and acetogenesis, syntrophy, Nitrogen metabolism; Nitrogen fixation.

Unit III

1. Bacteria: Purple and green bacteria; Cyanobacteria; Homoacetogenic bacteria; Acetic acid bacteria; Budding and appendage bacteria; Spirilla; Spirochaetes; Gliding and sheathed bacteria; Pseudomonads; Lactic and propionic acid bacteria; Endospore forming rods and cocci; Mycobacteria; Rickettsia's, Chlamydia's and Mycoplasmas.
2. Archaea: Archaea as earliest life forms; Halophiles; Methonogens; Hyperthermophilic Archaea; Thermoplasma.
3. Algae, Fungi, Slime moulds and Protozoa. Viruses: Bacterial, Plant, Animal and tumor viruses; Discovery, classification and structure of viruses; Lysogeny; DNA viruses; RNA viruses; Replication; Examples of Herpes, Pox, Adenoviruses, Retroviruses.

Unit IV

1. Microbial diseases –Infectious disease transmission; Respiratory infections caused by bacteria and viruses; Tuberculosis; Sexually transmitted diseases including AIDS; Diseases transmitted by animals (rabies, plague), insects and ticks (Rickettsias, Lime disease, malaria)
2. Host – Parasite Relationships – Normal microflora of Skin, Oral cavity, Gastrointestinal tract; Types of toxins (Exo –, Endo -, Entero -) and their structure; Virulence and Pathogenesis.
3. Chemotherapy/Antibiotics – Antibiotics and Antimicrobial agents; Broad-spectrum antibiotics; Antibiotics from prokaryotes; Antifungal antibiotics; Mode of action; Resistance to antibiotics.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

1. General Microbiology, Stainer, R.Y., Ingraham, J.L., Wheelis, M.L. and Painter, P.R. The Macmillanb Press Ltd.
2. Brock Biology of Microorganisms, Madigan, M.T. Martinko, J.M. and Parker, J. Prentice-Hall.
3. Microbiology, Pelczar, M.J. Jr., Chan, E.C.S. and Kreig, N.R. Tata McGraw Hill (2009)
4. Microbial Genetics, Maloy, S.R., Cronan, J.E. Jr. and Freifelder, D. Jones, Bartlett Publishers.
5. Microbiology- a Laboratory Manual, Cappuccino, J.G. and Sherman, N. Addison Wesley.
6. Microbiological Applications, (A Laboratory Manual in General Microbiology) Benson, H.J. WCB: Wm C. Brown Publishers.
7. Microbiology: Lansing Prescott, John Harley, and Donald Klein; McGraw Hil 5th Edition (2001)
8. Microbiology - Tortora, Funke and Case; 10th Edition Pearson Education Benjamin Cummings publishers
9. Microbial Biotechnology: Principles and applications, L Y Kun (2003)
10. Microbiology and Environmental Toxicology, Sharad Saxenda,Published by Manglam Publications.
11. Food Microbiology, Veena Kumari (2012)

Practicals:-

1. Preparation of liquid and solid media for growth of microorganisms.
2. Isolation and maintenance of organisms by plating, streaking and serial dilution methods. Slants and stab cultures. Storage of microorganisms.
3. Isolation of pure culture from soil and water.
4. Growth; Growth curve; Measurement of bacterial population by turbidity and serial dilution methods. Effect of temperature, pH and carbon nitrogen sources on growth.
5. Microscopic examination of bacteria, yeast and molds and study of organisms by Gram stain, Acid fast stain and staining for spores.
6. Study of mutations by Ames test.
7. Assay of antibiotics and demonstration of antibiotics resistance.
8. Analysis of water for portability and determination of MPN.
9. Bacterial transformation.
10. Biochemical characterization of selected microbes.
11. Transduction
12. One step growth curve of bacteria

School of Studies in Biotechnology

Semester I

Paper 4: Bio-molecule

M.M. 80

Unit I

1. Chemical foundations of Biology – pH, pK, acids, bases, buffers, weak bonds, covalent bonds.
2. Principles of thermodynamics.

Unit II

1. **Amino acids and peptides** – classification, chemical reactions and physical properties
2. **Sugars** – classification and reactions
3. Heterocyclic compounds and secondary metabolites in living systems – nucleotides, pigments, isoprenoids.

Unit III

1. **Lipids** – classification, structure and functions.
2. **Proteins** – classification and separation, purification and criteria of homogeneity, end group analysis, hierarchy in structure, Ramachandran map.

Unit IV

1. **Polysaccharides** – types, structural features, methods for compositional analysis
2. Analytical techniques in biochemistry and biophysics for small molecules and macromolecules for quantization.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

a) Nelson and Cox – Principles of Biochemistry, 5th Edition (2009)

b) Albert L. Lehninger – Biochemistry, Second Edition (2005).

c) Todd and Howards Mason – Text book of Biochemistry, Fourth Edition (2004).

d) Jeremy M. Berg, John L. Tymoczko and Lubert Stryer – Biochemistry, 6th Edition (2007)

e) Voet D, Voet JG & Pratt CW, Fundamentals of Biochemistry, 2nd Edition. Wiley 2006

f) Robert K. Murray, David A Bender, Kathleen M. Botham, Peter J. Kennelly, Victor W. Rodwell, P. Anthony Weil - Harper's Illustrated Biochemistry, 28th Edition (2007).

g) Buchanan, Gruissemen & Jones (2015) Biochemistry & Molecular Biology of Plant, 2nd edition.

h) M. Debnath (2011) Tools and Techniques in Biotechnology

List of Practical's:-

- Qualitative test for Carbohydrate. (Molisch's test)
- Qualitative test for Carbohydrate.(Anthrone test)
- Qualitative test for Carbohydrate.(Benedict's test)
- Qualitative analysis of Carbohydrate by Barfoed's test.
- Qualitative test for amino acid by Ninhydrin reaction.
- Qualitative test for amino acid by Xanthoprotic reaction.
- Qualitative test for Proteins using Biuret test.
- Qualitative test for amino acid by Millon's test.

Lab. Course 1

Based on Theory Papers 1 and 2

Time: 6 hrs.	**Total Marks – 100**
Q.1 Experiment based on Theory paper 1 (one major & one minor)	30
Q.2 Experiment based on Theory paper 2. (One major & one minor)	30
Q.3 Spotting based on Theory paper 1 and 2	10
Q.4 *Viva Voce.*	10
Q.5 Sessional	20

Lab. Course 2

Based on Theory Papers 3 and 4

Time: 6 hrs.	**Total Marks – 100**
Q.1 Experiment based on Theory paper 3 (one major & one minor)	30
Q.2 Experiment based on Theory paper 4 (one major & one minor)	30
Q.3 Spotting based on Theory paper 3 and 4	10
Q.4 *Viva Voce.*	10
Q.5 Sessional	20

School of Studies in Biotechnology

Semester II

Scheme of Examination

Paper Code	Title of Theory/Practical Paper	Marks		
		External	Internal	**Total**
5	Biostatistics & Computer Applications in Biotechnology	80	20	100
6	Molecular Biology	80	20	100
7	Plant Biotechnology	80	20	100
8	Macromolecules & Enzymology	80	20	100
Lab Course 3	Lab Course 3 (Based on paper 5 & 6)	80	20	100
Lab Course 4	Lab Course 4 (Based on paper 7 & 8)	80	20	100
	Total Marks			**600**

School of Studies in Biotechnology

Semester II

Paper 5: Biostatistics & Computer Application in Biotechnology

M.M. 80

Unit I

1. Brief description and tabulation of data and its graphical representation.
2. Measures of central tendency and dispersion: mean, median, mode, range, standard deviation, variance. Idea of two types of errors and level of significance.

Unit II

1. Simple linear regression and correlation
2. Tests of significance (F & T test), chi – square test.

Unit III

1. Introduction to digital computers: Organization; low – level and high – level languages; binary number system
2. Flow charts and programming techniques

Unit IV

1. Introduction to programming in Q Basic and C.
2. Introduction to data structures and database concepts, introduction to Internet and its application.
3. Introduction to Word processing, Spreadsheets and presentation software
4. Introduction to Image processing
5. Computer – oriented statistical techniques: Frequency table of single discrete variable, Bubble sort, Computation of mean, variance and standard deviation.
6. Bioinformatics and Biotechnology – An overview.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

1. Animesh K. Dutta: Basic Biostatistics and Its Application. New Central Book Agency (P) Ltd. Kolkata.
2. P.K. Banerjee: Introduction to Biostatistics. S. Chand & Company Ltd.
3. C.S.V. Murthy (2003) Bioinformatics. First Edition, Himalaya Publishing House.
4. S.C. Rastogi, Namita Mendiratta, Parag Rastogi (2003) Bioinformatics: Concepts, Skills and Applications, CBS Publishers and Distributors, New Delhi.
5. C. Subramanian (2004) A Text Book of Bioinformatics. Dominant Publishers and Distributors, New Delhi.
6. David W. Mount (2005) Bioinformatics: sequence and genome analysis. Second edition. CBS Publishers and Distributors, New Delhi, Bangalore (India).

List of Practical's:-

Biostatistics

1. Calculate the mean value of given 20 leaves.
2. Calculate the median of the given sample of 20 leaves.
3. Find out the mode value of given 20 leaves.
4. To complete correlation of leaf length & breadth of a given leaf sample.
5. To perform the t-test for the given data of sample. (Leaves)
6. To perform the Chi- Square test for the given data.
7. To calculate Standard deviation from the data (Sample).

Computer Application

1. Formulation of Basic Programs on Q basic
2. Writing basic programs on C
3. Draw Histogram, Pie, Graph, Line graph.
4. Data management
5. Slide preparation
6. Use of Internet.
7. To perform spreadsheet application.

School of Studies in Biotechnology

Semester II

Paper 6: Molecular Biology

M.M.80

Unit I

1. Introduction to Molecular Biology
2. DNA Replication – Prokaryotic and eukaryotic DNA replication, Mechanics of DNA replication. Enzymes and accessory proteins involved in DNA replication.
3. DNA Repair and Recombination. Homologous recombination – Holiday junction, gene targeting, FLP/FRT and Cre/Lox recombination, RecA and other recombinases.
4. Transcription – Prokaryotic transcription, Eukaryotic transcription, RNA polymerase, General and specific transcription factors, Regulatory elements and mechanisms of transcription regulation. Modification in RNA - 5' – cap formation, Transcription termination, 3' – end processing and polyadenylation, Splicing, Editing, Nuclear export of mRNA, mRNA stability

Unit II

1. Translation – Prokaryotic and Eukaryotic translation, the translation machinery, Mechanisms of initiation, elongation and termination, Regulation of translation, co – and post – translational modifications of proteins.
2. Protein Localization – Synthesis of secretory and membrane proteins, Import into nucleus, mitochondria, chloroplast and peroxisomes, receptor mediated endocytosis.

Unit III

1. Oncogenes and Tumor Suppressor Genes – Viral and cellular Oncogenes, tumor suppressor genes from humans, Structure, Function and mechanism of action of pRB and p53 tumor suppressor proteins.
2. Antisense and Ribozyme technology – Molecular mechanism of Antisense molecules, inhibition of splicing, polyadenylation and translation, disruption of RNA structure and capping, Biochemistry of ribozyme; hammer – head, hairpin and other ribozymes, strategies for designing ribozymes, Applications of Antisense and ribozyme technologies.

Unit IV

1. Molecular Mapping of genome – Genetic and physical maps, physical mapping and map – based cloning, Southern and fluorescence *in situ* hybridization for genome analysis, Chromosome micro dissection and micro cloning.
2. Molecular markers in genome analysis: RFLP, RAPD and AFLP analysis, molecular markers linked to disease resistance genes, Application of RFLP in forensic, disease prognosis, genetic counseling, Pedigree, varietal etc.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

- Gerald Karp - Cell and molecular biology, 5th Edition (2007)
- Lewis J. Klein smith and Valerie M. Kish - Principles of cell and molecular biology – Third Edition (2002)
- Richard M. Twyman-Advanced Molecular Biology, First South Asian Edition (1998),Viva Books Pvt. Ltd.
- Benjamin Lewin, Gene IX, 9th Edition, Jones and Barlett Publishers, 2007.
- J.D. Watson, N.H. Hopkins, J.W Roberts, J. A. Seitz & A.M. Weiner; Molecular Biology of the Gene, 6th Edition, Benjamin Cummings Publishing Company Inc, 2007.
- TA Brown – Genomes 2nd Edition; Bios Scientific Publishers 2002
- Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Matthew P. Scott, Anthony Bretscher, Hidde Ploegh and Paul Matsudaira – Molecular Cell Biology, 6th Edition; WH Freeman 2008.
- Buchanan, Gruissemen & Jones (2015) Biochemistry & Molecular Biology of Plant, 2nd edition.
- M. Debnath (2011) Tools and Techniques in Biotechnology

List of Practical:-

1. Extraction of DNA from plant leaves by CTAB methods.
2. Estimation of plant genomic DNA by Spectrophotometer methods.
3. Separation of plant genomic DNA by Agarose gel electrophoresis.
4. Extraction of DNA from animal cells.
5. Estimation of animal genomic DNA by Spectrophotometer methods.
6. Separation of animal genomic DNA by Agarose gel electrophoresis.
7. Separation of Bacterial proteins by vertical SDS-PAGE electrophoresis.
8. Extraction of RNA from Yeast cells.
9. Estimation of Yeast cellular RNA by Spectrophotometer methods.

28/12/16

24/12/16

School of Studies in Biotechnology

Semester II

Paper 7: Plant Biotechnology

M.M. 80

Unit I

1. Introduction to cell and tissue culture, tissue culture as a technique to produce novel plants and hybrids.
2. Tissue culture media (composition and preparation)
3. Initiation and maintenance of callus and suspension culture; single cell clones.
4. Organogenesis; somatic embryogenesis; transfer and establishment of whole plants in soil
5. Shoot – tip culture: Rapid clonal propagation and production of virus free plant

Unit II

1. Embryo culture and embryo rescue
2. Anther, pollen and ovary culture for production of haploid plants and homozygous lines
3. Protoplast isolation, culture and fusion; selection of hybrid cells and regeneration of hybrid plants; symmetric and asymmetric hybrids, cybrids.
4. Germplasm conservation – Cryopreservation and slow growth cultures

Unit III

1. Plant transformation technology: Basis of tumor formation, Mechanism of DNA transfer, Features of TI and RI plasmids, role of virulence genes, use of Ti and Ri as vectors, binary vectors, markers, use of reporter genes, 35S and other promoters, multiple gene transfers, particle bombardment, electroporation, microinjection.
2. Chloroplast Transformation: Advantages, vectors
3. Application of plant transformation for productivity and performance: herbicide resistance, insect resistance, Bt genes, Non – Bt like protease inhibitors & amylase inhibitors, virus resistance, nucleocapsid gene, disease resistance, PR proteins, nematode resistance, abiotic stress, male sterile lines.

Unit IV

1. Metabolic Engineering and Industrial Products: plant secondary metabolites, control mechanisms and manipulation of phenylpropanoid pathway, shikimate pathway, biodegradable plastics, therapeutic proteins, antibodies, edible vaccines.
2. Molecular Marker –RFLP maps, linkage analysis, RAPD markers, STS, microsatellites, SCAR (Sequence characterized amplified regions), SSCP (Single strand conformational polymorphism), AFLP, map based cloning, molecular marker assisted selection.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

1. Razdan MK – Introduction to Plant Tissue Culture 2nd Edition; Oxford & Ibh Publishing Co. Pvt Ltd 2010
2. Vasil IK – Plant Cell and Tissue Culture; Springer 1994
3. Bhojwani SS and Razdan MK – Plant Tissue Culture; Elsevier
4. TJ Fu, G Singh and WR Curtis (Eds): Plant Cell and Tissue Culture for the production of Food Ingredient. Kluwer Academic/Plenum Press, 1999
5. J Hammond, P McGarvey & V Yusibov (Eds): Plant Biotechnology, Springer Verlag.2000.
6. H.S. Chawla: Biotechnology in Crop Improvement, International Book Distributing Company, 1998.
7. H.S. Chawla: Introduction to plant biotechnology. Oxford & IBH Publishing Co. (P) Ltd.
8. B.D. Singh, (2004) Biotechnology. Expending Horizons. First Edition. Kalyani Publishers, Ludhiana.
9. Buchanan, Gruissemen & Jones (2015) Biochemistry & Molecular Biology of Plant, 2nd edition.
10. M. Debnath (2011) Tools and Techniques in Biotechnology

Practicals:

1. Media preparation
2. Meristem / bud culture, shoot multiplication & rooting
3. Organogenesis
4. Somatic embryogenesis
5. Plantlet acclimatization
6. Embryo culture
7. Anther culture
8. Study of molecular markers
9. Extraction of DNA from plant
10. Estimation of plant DNA by Agarose gel electrophoresis and Spectrophotometer.

School of Studies in Biotechnology
Semester II

Paper 8: Macromolecules and Enzymology

M.M. 80

Unit I

1. Macromolecules and supra molecules assemblies – Types of macromolecules in biological systems, molecular assemblies like membranes, ribosomes, extracellular matrix.

2. Sequencing of proteins and nucleic acids.

Unit II

1. Protein – protein and protein – ligand interactions, physical and chemical methods of study.

2. Conformational properties of polynuleotides and polysaccharides – secondary and tertiary structural features and their analysis – theoretical and experimental; protein folding – biophysical and cellular aspects

Unit III

1. Enzyme catalysis in solution – kinetics and thermodynamic analysis, effects of organic solvents on enzyme catalysis and structural consequences.

2. Physical and chemical methods for immobilization of enzyme.

3. Glyco and lipoproteins – structure and function

Unit IV

1. Organization of macromolecular complexes – chromatin and ribosomes; Protein denaturation

2. Ribozymes and Catalytic antibodies – Functional proteins – structure and drug targets (enzymes and receptors)

3. Nucleic acid hybridization – structural and biological study.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

- Nelson and Cox – Principles of Biochemistry, 5th Edition (2009)
- Albert L. Lehninger – Biochemistry, Second Edition (2005).
- Todd and Howards Mason – Text book of Biochemistry, Fourth Edition (2004).
- Jeremy M. Berg, John L. Tymoczko and Lubert Stryer – Biochemistry, 6th Edition (2007)
- Voet D, Voet JG & Pratt CW, Fundamentals of Biochemistry, 2nd Edition. Wiley 2006
- Robert K. Murray, David A Bender, Kathleen M. Botham, Peter J. Kennelly, Victor W. Rodwell, P. Anthony Weil - Harper's Illustrated Biochemistry, 28th Edition (2007)
- M. Debnath (2011) Tools and Techniques in Biotechnology

List of Practical's:-

- Qualitative assay of Protein by the Biuret method.
- To estimation of Protein Qualitatively by Folin Lowry Method.
- Estimation of cholesterol by the method of Crawford
- Determine the activity of Alkalie Protease.
- Determine the activity of neutral Protease.
- Effect of temperature on the activity of α-amylase.
- Determine the activity of catalase.
- Determine the activity of urease.
- Perform protein isolation by SDS PAGE.
- Enzyme kinetics

Lab. Course 3

Based on Theory Papers 5, 6

Time: 6 hrs. **Total Marks – 100**

Q.1 Experiment based on Theory paper 5 (one major & one minor)	30
Q.2 Experiment based on Theory paper 6 (one major & one minor)	30
Q.3 Spotting based on Theory papers	10
Q.4 *Viva Voce.*	10
Q.5 Sessional	20

Lab. Course 4

Based on Theory Papers 7 and 8

Time: 6 hrs. **Total Marks – 100**

Q.1 Experiment based on Theory paper 7 (one major & one minor)	30
Q.2 Experiment based on Theory paper 8 (one major & one minor)	30
Q.3 Spotting based on Theory papers	10
Q.4 *Viva Voce.*	10
Q.5 Sessional	20

School of Studies in Biotechnology

Semester III

Scheme of Examination

Paper Code	Title of Theory/Practical Paper	Marks		
		External	Internal	Total
9	Genetic Engineering	80	20	100
10	Biology of Immune System	80	20	100
11	Bioprocess Engineering & Technology	80	20	100
12	Environmental Biotechnology	80	20	100
Lab Course 5	Lab Course 5 (Based on paper 9 & 10)	80	20	100
Lab Course 6	Lab Course 6 (Based on paper 11 & 12)	80	20	100
	Total Marks			**600**

School of Studies in Biotechnology

Semester III

Paper 9: Genetic Engineering

M.M. 80

Unit I

1. Scope of Genetic Engineering.
2. Milestones in Genetic Engineering: Isolation of restriction enzymes, DNA sequencing, gene synthesis and mutation, detection and separation, cloning, gene expression. Cloning and patenting of life forms. Genetic engineering guidelines.
3. Molecular tools and their application: Restriction enzymes, modification enzymes, molecular markers.
4. Nucleic acid purification, yield analysis
5. Nucleic acid amplification and its applications

Unit II

1. Gene cloning vectors: Plasmids, bacteriphages, phagemids, cosmids, Artificial chromosomes
2. Restriction Mapping of DNA Fragments and Map Construction, Nucleic acid sequencing.
3. cDNA synthesis and cloning: mRNA enrichment, reverse transcription, DNA primers, linkers, adaptors and their chemical synthesis, Library construction and screening.
4. Alternative strategies of gene cloning: Cloning interacting genes – Two and three hybrid systems. Nucleic acid micro array assay.

Unit III

1. Site – directed mutagenesis and protein engineering.
2. DNA Transfection, Southern blot, Northern blot, Western blot, Primer extension, S1 mapping, RNase protection assay, and reporter assays.
3. Expression Strategies for hetrologous genes: Vector engineering and codon optimization, host engineering; expression in bacteria, expression in Yeast, expression in insects and insect cells, expression in mammalian cells, expression in plants
4. Phage display: Technique and applications

Unit IV

1. Processing of recombinant Proteins: Purification and refolding, characterization of recombinant proteins, stabilization of proteins.
2. T – DNA and transposon tagging: Role of gene tagging in gene analysis, t – DNA and transposon tagging, Identification and isolation of genes through T – DNA or transposon; Targeted gene replacement, Chromosome engineering.
3. Gene therapy: Vector engineering. Strategies of gene delivery – Viral & non-viral, gene knockout, gene augmentation, gene correction / gene editing, gene regulation and silencing

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:

1. Philip M. Gilmaritin – Molecular Plant Biology Edition (2005), Oxford University Press.
2. TA Brown – Gene Cloning and DNA Analysis, 4th Edition (2005).
3. Rusell and Peter – Genetics Edition (2002), Pearson Education, Inc, San Francisco.
4. Old and Primrose –Principles of Gene Manipulation 6th Edition (2001).
5. B.D. Singh – Biotechnology: An Expanding Horizons, 1st Edition (2004).
6. W.H. Elliott and D. C. Elliott – Biochemical and Molecular Biology IInd Edition (2001).
7. Eldon John Gardner, Michael J. Simmons and Peter Snustad – Principles of Genetics Eigth Edition (1991), John Wiley and Sons, INC.
8. Benjamin Lewin – Genes IX, 9th Edition (2007) Pearson Education International.
9. HD Kumar – Modern Concepts of Biotechnology Third repring Edition (2003), Vikas Publishing House. Pvt. Ltd.
10. Brown TA, Genomes, 3rd ed. Garland Science 2006
11. James D Watson, Richard M. Myers, Amy A. Caudy and Jan A. Witkowski - Recombinant DNA: Genes and Genomes 3rd Edition; WH Freeman 2007
12. Sandy Primrose and Richard Twyman - Principles of Gene Manipulation and Genomics 7th Edition; Wiley-Blackwell 2006
13. Buchanan, Gruissemen & Jones (2015) Biochemistry & Molecular Biology of Plant, 2nd edition
14. S Choudhuri, and DB Carlson (2008) Genomics: Fundamentals and applications, 1st edition
15. M. Debnath (2011) Tools and Techniques in Biotechnology

List of Practical's:-

1. Extraction of DNA from *E.coli.* Bacteria.
2. Estimation of bacterial DNA by Spectrophotometer methods.
3. Separation of bacterial genomic DNA by Agarose gel electrophoresis.
4. Hot phenol method for preparation of total cellular RNA from *E.coli.*
5. Estimation of cellular RNA by Spectrophotometer methods.
6. Restriction digestion of DNA with restriction enzymes.
7. Ligation of DNA
8. Isolation of plasmid DNA from *E.coli.*
9. DNA amplification by PCR

School of Studies in Biotechnology

Semester III

Paper 10: Biology of immune system

M.M. 80

Unit I

1. Introduction – Phylogeny of immune system, innate and acquired immunity, Clonal nature of immune response.
2. Organization and structure of lymphoid organs.
3. Nature and biology of antigens and super antigens.
4. Antibody structure and function; antibody engineering
5. Antigen – antibody interactions

Unit II

1. Major histocompatibility complex
2. BCR & TCR, generation of diversity.
3. Complement system.
4. Cells of immune system – Hematopoiesis and differentiation, Lymphocyte trafficking, B – lymphocyte, T – lymphocyte, Macrophages, Dendritic cells, Natural Killer and lymphokine activated killer cells, Eosinophils, Neutrophils and Mast cells.

Unit III

1. Regulation of immune response – Antigen processing and presentation, generation of humoral and cell mediated immune responses; Activation of B – and T – lymphocytes; cytokines and their role in immune regulation; T – cell regulation, MHC restriction; Immunological tolerance.
2. Cell – mediated cytotoxicity: Mechanism of T cell and NK cell mediated lysis, Antibody dependent cell mediated cytotoxicity, and macrophage mediated cytotoxicity.
3. Hypersensitivity, Autoimmunity.

Unit IV

1. Transplantation: General concept and Application
2. Immunity to infectious agents (intracellular parasites, helminthes and viruses), AIDS and other immunodeficiencies.
3. Hybridoma Technology and Monoclonal antibodies

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

1. J. Kuby – Immunology 5th Edition; W.H. Freeman and Company, New York 2003
2. Thomas J. Kindt, Barbara A. Osborne and Richard A. Goldsby – Immunology, 6th Edition; WH Freeman 2007
3. Peter Delves, Seamus Martin, Dennis Burton, Ivan Roitt - Roitt's Essential Immunology, 11th Edition; Wiley-Blackwell 2006
4. H.D. Kumar – Modern Concepts of Biotechnology 3rd Edition (2003), Vikas Publishing House. Pvt. Ltd.
5. K. Banerjee and N. Banerjee –Fundamental of Microbiology and Immunology, First Edition (2006). New Central Book Agency (P) Ltd. Kolkata.
6. Brostoff J, Seaddin JK, Male D, Roitt IM., Clinical Immunology, 6th Edition, Gower Medical publishing, 2002.
7. Abul K. Abbas, Andrew H. Lichtman, & Shiv Pillai; Cellular and Molecular immunology; Elsevier Inc
8. M. Debnath (2011) Tools and Techniques in Biotechnology

List of Practical's:-

1. Enumeration of WBC in blood sample.
2. Preparation of a blood smear and differential blood count.
3. To separate serum from the given blood sample.
4. To determine Albumin Globulin ratio in given serum sample.
5. Estimation of serum protein by Folin Lowry test.
6. Isolation of Immunoglobulin.
7. Separation of serum protein by SDS PAGE.
8. Detection of class specific Antibody by Double Diffusion method.
9. Observe Ag-Ab interaction by Immunoelectrophoresis.
10. Observe Ag-Ab interaction by counter current Immunoelectrophoresis.
11. Study of Agglutination reaction
12. Study of ELISA technique.
13. Immuno diffusion test.
14. Blood group determination by slide agglutination reaction.

School of Studies in Biotechnology

Semester III

Paper 11: Bioprocess Engineering & Technology

M.M. 80

Unit I

1. Introduction to Bioprocess Engineering.
2. Kinetic of microbial growth and death
3. Isolation, Preservation and Maintenance of industrial Microorganisms.
4. Media for industrial fermentation
5. Air and Media Sterilization

Unit II

1. Types of fermentation processes: Bioreactors-Analysis of batch, Fed – batch and continuous bioreactors, stability of microbial reactors, analysis of mixed microbial populations, specialized reactors (pulsed, fluidized, photo bioreactors).
2. Measurement and control of bioprocess parameters.

Unit III

1. Downstream processing: Introduction, Removal of microbial cells and solid matter, foam reparation, precipitation, filtration, centrifugation, cell disruption, liquid – liquid extraction, chromatography, Membrane process, Drying and crystallization, Effluent treatment: D.O.C. and C.O.D. treatment and disposal of effluents.
2. Whole cell Immobilization and their industrial applications.

Unit IV

1. Industrial production of chemicals: Alcohol (ethanol), Acids (citric acetic and gluconic), solvents (glycerol, acetone, butanol), Antibiotics (penicillin, streptomycin, tetracycline), Amino acids (lysine, glutamic acid), Single cell protein. Use of microbes in mineral beneficiation and oil recovery.
2. Introduction to food technology: Elementary idea of canning and packing, Sterilization and pasteurization, of food products, technology of typical food/food products (bread, cheese, idli), Food preservation.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

1. Shuler ML and Kargi F, Bioprocess Engineering: Basic concepts, 2nd Edition, Prentice Hall, Engelwood Cliffs, 2002.
2. Stanbury and Whittaker – Principles of Sterilization techniques, First Indian reprint Edition (1997). Aditya Book (P) Ltd. New Delhi
3. Michael J. Waites - Industrial microbiology: an introduction 7th Edition; Wiley-Blackwell 2008
4. Damien and Devies – Microbial Technology Edition (1994).
5. LE Casida – Industrial Microbiology Edition (1994)
6. H Patel – Industrial Microbiology 4th Edition (2003).
7. KS Bilgrami and AK Pandey – Introduction to Biotechnology Edition 2nd (1998).
8. U Satayanarayan – Biotechnology, First Edition (2005) Books and Allied (P) Ltd. Kolkata.
9. Baily JE and Ollis DF., Biochemical Engineering fundamentals, 2nd Edition, McGraw-Hill Book Co., New York, 1986.
10. Mansi EMTEL, Bryle CFA. Fermentation Microbiology and Biotechnology, 2nd Edition, Taylor & Francis Ltd, UK, 2007.
11. Shara L. Aranoff, Daniel R. Pearson, Deanna Tanner Okun, Irving A. Williamson, Dean A. Pinkert – Industrial Biotechnology; Nova Science 2009
12. L Y Kun, Microbial Biotechnology: Principles and applications,2003
13. M. Debnath () Tools and Techniques in Biotechnology, 2011

List of Practical's:-

1. Isolation and identification of microorganisms from industrial waste water.
2. Determination of thermal death point (TDP) and thermal death time (TDT) of microorganism (Bacteria and Fungi).
4. To study the production of citric acid by *Aspergillus niger* and also qualitative and quantitative test.
5. To study the bacterial growth curve.
6. To study the fungal growth curve.
7. Enzyme kinetics
8. Bio-ethanol production

School of Studies in Biotechnology

Semester III

Paper 12: Environmental Biotechnology

M.M. 80

Unit I

1. Environment: Basic concepts and issues.
2. Environmental Pollution: Types of pollution, Methods for the measurement of pollution; Methodology of environmental management – the problem solving approach, its limitations.
3. Air pollution and its control through Biotechnology

Unit II

1. Water pollution and its control: Water as a scarce natural resource, sources of water pollution, Need for water management, Measurement of water pollution, waste water collection, waste water treatment – physical, chemical and biological treatment processes
2. Microbiology of waste water treatments, aerobic process: Activated sludge, oxidation ditches, trickling filter, towers, rotating discs, rotating drums, oxidation ponds.
3. Anaerobic process: Anaerobic digestion, anaerobic filters, Up flow anaerobic sludge blanket reactors.

Unit III

1. Treatment schemes for waste waters of dairy, distillery, tannery, sugar, antibiotic industries. Bioremediation
2. Xenobiotics in Environment – Ecological considerations, oil pollution, surfactants, pesticides.

Unit IV

1. Biopesticides in integrated pest management.
2. Solid wastes: Sources and management (composting, wormiculture and methane production).
3. Global Environmental Problems: Ozone depletion, UV – B, green house – effect and acid rain, their impact and biotechnological approaches for management.
4. Role of National organization in Biotechnology.
5. IPR.

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

1. Gareth G. Evans, Judy Furlong - Environmental Biotechnology: Theory and Application 2nd Edition; John Wiley and Sons 2011
2. Hans-Joachim Jördening, Josef Winter - Environmental biotechnology: concepts and applications; Wiley-VCH 2005
3. Indu Shekhar Thakur – Environmental Biotechnology: Basic concepts and Applications. First Edition (2006). I. K. International Pvt. Ltd.
4. A.K. Chatterji – Introduction to Environmental Biotechnology. First Edition (2002). Prentice Hall of India Pvt. Ltd. New Delhi.
5. Manoj Tiwari, Kapil Khulbe and Archana Tiwari – Environmental Studies. First Edition (2007), I. K. International Publishing House Pvt. Ltd.
6. H.D. Kumar – Modern Concepts of Biotechnology Third repring Edition (2003), Vikas Publishing House. Pvt. Ltd.
7. B.D. Singh – Biotechnology: Expanding Horizons, 1st Edition (2004). Kalyani Publishers.
8. Alan Scragg – Environmental Biotechnology First Edition, reprinted (2005). Oxford University Press.
9. L Y Kun-Microbial Biotechnology: Principles and applications, (2003).
10. Sharad Saxenda-Microbiology and Environmental Toxicology, Published by Manglam Publications.
11. M. Debnath -Tools and Techniques in Biotechnology, (2011).

List of Practical's:-

- To determine the total dissolved solids of water.(TDS)
- Determination of Dissolved oxygen (DO) of water.
- Determination of chemical oxygen demand (COD) of water.
- Determination of biochemical oxygen demand (BOD) of water.
- To screen the antagonism between *Trichoderma* sp. and *Curvularia* sp.
- Determination of effect of fungicide on the growth of fungi (*Trichoderma* sp.).
- Effect of fungicide on the antagonism between *Trichoderma* sp. and *Curvularia* sp.
- To determine the Most Probable number (MPN) of a given water sample.

Lab. Course 5

Based on Theory Papers 9, 10

Time: 6 hrs. **Total Marks – 100**

Q.1 Experiment based on Theory paper 9 (one major & one minor)	30
Q.2 Experiment based on Theory paper 10 (one major & one minor)	30
Q.3 Spotting based on Theory papers	10
Q.4 *Viva Voce*.	10
Q.5 Sessional	20

Lab. Course 6

Based on Theory Papers 11 and 12

Time: 6 hrs. **Total Marks – 100**

Q.1 Experiment based on Theory paper 11 (one major & one minor)	30
Q.2 Experiment based on Theory paper 12 (one major & one minor)	30
Q.3 Spotting based on Theory papers	10
Q.4 *Viva Voce*.	10
Q.5 Sessional	20

School of Studies in Biotechnology

Semester IV

Scheme of Examination

Paper Code	Title of Theory/Practical Paper	Marks		
		External	Internal	**Total**
13	Basic Concept of Bioinformatics & Nano-biotechnology	80	20	100
14	Advance techniques in Biotechnology	80	20	100
15	Animal Biotechnology	80	20	100
16	Functional Genomics & Proteomics	80	20	100
Lab Course 7	Based on paper 13 & 14	80	20	100
Lab Course 8	Based on paper 15 & 16	80	20	100
	Total Marks			**600**

School of Studies in Biotechnology

Semester IV

Paper 13: Basic Concept of Bioinformatics and Nanobiotechnology

M.M. 80

Unit – I

Bioinformatics: Introduction, History, Scope of Bioinformatics,
Biotechnology and Bioinformatics,
BTIS network in India,
Bioinformatics tools,
Sequence and Nomenclature,
Application of Bioinformatics

Unit – II

Types of Sequences - Genomic DNA, cDNA, ESTS, GSTS, Organelle's DNA; Biological database,
Biological database: Introduction, primary, secondary and tertiary biological database;
Information sources with special reference to NCBI, EMBL, DDBJ,
Gene bank

Unit-III

Cheminformatics,
Pharmacogenomics,
Genomic mapping,
Microarray technology,
Bioinformatics in Drug discovery,
Human Genome Project

Unit-IV

Nanobiotechnology: General Introduction, Nanotechnology and Nanobiotechnology;
Nanoscale;
Nanomicrooganisms – Nano virus, Nanobacteria;
Application of Nanobiotechnology

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

1. David W. Mount (2004) Bioinformatics: sequence and genome analysis; CSHL press
2. C.S.V. Murthy (2003) Bioinformatics. First Edition, Himalaya Publishing House.
3. Dov Stekel (2005) Microarray bioinformatics. Cambridge University Press.
4. S.C. Rastogi, Namita Mendiratta, Parag Rastogi (2003) Bioinformatics: Concepts, Skills and Applications, CBS Publishers and Distributors, New Delhi.
5. Andreas D. Baxebanis. B.F. Francis Ouellette (2001) Bioinformatics: A practical Guide to the Analysis of genes and proteins. Wiley Interscience.
6. C. Subramanian (2004) A Text Book of Bioinformatics. Dominant Publishers and Distributors, New Delhi.
7. Sandra J. Rosenthal, David W. Wright (2005) Nanobiotechnology Protocols. Humana Press Inc. 999 Riverview Drive, Suite, 208, Totowa, New Jersery.
8. David W. Mount (2005) Bioinformatics: sequence and genome analysis. Second edition. CBS Publishers and Distributors, New Delhi, Bangalore (India).
9. B.D. Singh, (2004) Biotechnology. Expending Horizons. First Edition. Kalyani Publishers, Ludhiana.
10. U. Satyanarayana (2005) Biotechnology. Books and Allied (P) Ltd., Kolkata.
11. PC Trivedi (2008) Nanobiotechnology; Pointer Publishers.
12. GL Hornyak, HF Tibbals, and J Dutta (2008) Fundamentals of Nanotechnology
13. S Choudhuri, and DB Carlson (2008) Genomics: Fundamentals and applications, 1st edition
14. Rita Khare (2013) Concepts in Nano Biotechnology
15. Johnathan Pevsner (2015) Bioinformatics and Functional, 3nd edition.

List of Practical:

1. To extract protein / nucleotide database of phosphoprotein P of [*Swine parainfluenza virus* 3]
2. To find out and study the human nucleotide sequence records associated with cancer
3. To find out the location of particular target gene on human chromosome map
4. To study the future and scope of BLAST in Biotechnology research
5. To study how to develop primer (F+R) from given nucleotide sequences

School of Studies in Biotechnology

Semester IV

Paper 14: Advanced techniques in Biotechnology

M.M. 80

Unit I

1. Principles and application of: Microscopy, Centrifugation, Chromatography, Electrophoresis, HPLC.
2. Principles and application of: Colorimetry, Spectrophotometry and densitometry
3. RIA and autoradiography in biology, ELISA

Unit II

1. Methods in Microbiology – Pure culture techniques; Theory and practice of sterilization; Principles of microbial nutrition; Types of culture media: defined and undefined media, selective and differential media, minimal and enrichment media; Enrichment culture techniques for isolation of chemoautotrophs, chemohetrotrophs and photosynthetic microorganisms.
2. Principles and application of Thermocycler

Unit III

1. Principles and application of DNA micro array
2. Fluorescence spectroscopy
3. NMR and X- ray diffraction

Unit IV

1. Principles and application of Cytophotometry
2. Flow cytometry
3. Southern, Northern, and Western Blotting.
4. DNA sequencer

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Reference Books:-

1. K. Wilson and J. Walker: Principle and Techniques of Biotechnology and Molecular Biotechnology.
2. Upadhya and Upadhya: Biophysical Chemistry.
3. David, L. Nelson and Michael, M. Cox: Lehniger: Principal of Biochemistry. 4th Edition. W.H. Freeman and Company, New York.
4. Anthony J.F. Griffiths, William M. Gelbart, Richard C. Lewontin and Jeffrey H. Miller; Modern Genetic Analysis; Publisher: W. H. Freeman
5. Ralf Pörtner; Animal cell biotechnology: methods and protocols; Humana Press
6. M. Debnath (2011) Tools and Techniques in Biotechnology

List of Practical's:-

1. Preparation of different culture media for culture of various microorganisms, like – Bacteria, Fungi, Yeast, Actinomycetes, Algae, etc
2. Perform the various culture techniques for microbial culture
3. Perform various laboratory techniques, like – centrifugation, chromatography, spectrophotometry, electrophoresis, etc.
4. Pure culture techniques of microbes from various sources
5. Perform the advance biotechnological techniques, like – ELISA, PCR, Southern blotting, etc.

School of Studies in Biotechnology

Semester IV

Paper 15: Animal Biotechnology

M.M. 80

Unit I

1. Animal cell: Structure and organization
2. Equipment's and materials for animal cell culture
3. Primary and established cell line cultures.
4. Constituents of culture media and their application
5. Application of animal cell culture

Unit II

1. Biology and characterization of the cultured cells, measuring parameters of growth
2. Basic techniques of mammalian cell culture *in vitro*; disaggregating of tissue and primary culture; maintenance of cell culture; cell separation
3. Scaling - up of animal cell culture.
4. Cell synchronization: Cell growth stages
5. Cell cloning: Basic techniques for cell cloning
6. Cell transformation: Characteristics of transformed cells

Unit III

1. Stem cell cultures, embryonic stem cells and their applications.
2. Cell culture based vaccines: General introduction, Vaccines for Malaria and AIDS
3. Somatic cell genetics.
4. Ethical issues in relation to animal biotechnology

Unit IV

1. Transgenic animals: Mice, Sheep, Birds and Fish
2. Apoptosis.
3. Tissue engineering: Elementary idea of tissue engineering, Artificial skin, artificial cartilage

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Books:-

1. Animal Cell Culture, Practical Approach: RW Masters; Oxford University Press 2000
2. Animal cell biotechnology: Ralf Pörtner; Humana Press 2007
3. Animal Cell Culture Techniques, M Clynes.
4. Animal Cell Biotechnology methods and Protocols. Nigel Jenkins. Humana Press, Totowa, New Jersey.
5. Biotechnology. Expending Horizons. First Edition. Kalyani Publishers, Ludhiana. B.D. Singh, (2004)
6. Biotechnology. Books and Allied (P) Ltd., Kolkata. U Satyanarayana (2005)

Practical's:

1. Extraction and estimation of DNA from blood
2. Extraction and estimation of DNA from spleen
3. Extraction and estimation of DNA from muscle tissue
4. To perform mechanical disaggregation of soft tissues of chick, for recovery of cells.
5. To perform enzymatic disaggregation of tissue, for recovery of cells.

School of Studies in Biotechnology

Semester IV

Paper 16: Functional Genomics & Proteomics

M.M. 80

UNIT – I

1. Genomics – General introduction, Types of genomics, Structural genomics, Functional genomics, Comparative genomics, Genome sequencing, Genome mapping, Future of genomics
2. Plant Genomics
3. Genomics in medicine: Gene medicine, Disease models, The impact of genomics on medicine

UNIT – II

1. Human genome project, Methods of gene sequencing: - Random shotgun sequencing, EST. Whole genome shotgun sequencing, Genome prediction and gene counting, Single nucleotide polymorphisms (SNPs)
2. Comparative Genomics: Sequence comparison, Comparative genomics in bacteria, Comparative genomics in Eukaryotes & organelles

UNIT – III

1. Proteomics – General concept, Gene and Protein, Types of proteomics, Structural proteomics and Functional proteomics
2. Methods of study the protein, Protein arrays, protein chips, System biology, Practical application of proteomics

UNIT – IV

1. Future of proteomics, Analysis of protein structure,
2. Protein-Protein interactions, Protein database, Global analysis of protein, Expression analysis and characterization of protein

NOTE: Questions will be asked as per the new policy of question paper. In which, 20 multiple choice questions (covering entire syllabus of the paper), 8 very short answer (2-3 sentences) type questions (two from each unit), 8 short answer (about 75 words) type questions (two from each unit), and 5 long answer (about 150 words) type questions (at least one from each unit) will be asked. Each question will cover entire (4) units of the paper.

Practical's:-

1. To find out and study the sequence similarity search by BLAST & FASTA.
2. To study the genome map from NCBI resource.
3. To study the basic functionality of genome by genome browser.
4. Study the whole genome of Hepatitis B virus and Human Mitochondrial Genome using genome databases of Gene Bank.
5. Study the single nucleotide polymorphism (SNP) of human genome using SNP databases of NCBI (Example: MTHFR gene)
6. Study the Sequence comparison in bacterial genome using Gene Bank (16S Ribosomal DNA sequence of *Rickettsia* sp.)
7. To study the Multiple Alignment Sequence by using CLUSTAL OMEGA tools.
8. To determine the sequence of database of RNA families by using Rfam.
9. To retrieve the protein sequence by Swiss Prot database
10. Study the Protein protein and Protein nucleotide interaction using Gene Bank databases (Example : Human 40S ribosome)

Practical References:-

1. Bioinformatics: A Practical Approach Chapman & Hall Taylor & Francis Gen.
2. Bioinformatics – Sequence & Genome Analysis, David W-Mount CBS Publishers & Distributors (Pvt) Ltd.
3. Introductory Bioinformatics For Users: The Practicals Bela Tiwari October 29, 2007.
4. Griffiths-Jones S, Bateman A, Marshall M, Khanna A, Eddy SR (2003). "Rfam: an RNA family database". Nucleic Acids Res. 31 (1): 439–41.

Books:-

1. Principles of Gene Manipulation and Genomics; by Primrose & Twyman
2. Gene cloning and DNA analysis: An introduction; by TA Brown
3. Genomics, Proteomics & Vaccines; by Guido Grandi
4. Genomics: Application in Human biology; by Primrose & Twyman
5. Introduction to molecular Genetics and Genomics; JBH Publication
6. Proteomics by Timothy Palzkill
7. U. Satyanarayan: Biotechnology. Books and Allied (P) Ltd. Kolkata
8. P.K. Gupta: Biotechnology and Genomics. Rastogi Publication
9. S Choudhuri, and DB Carlson (2008) Genomics: Fundamentals and applications, 1st edition
10. Johathan Pevsnev (2015) Bioinformatics and Functional, 3nd edition.

Lab. Course 7

Based on Theory Papers 13, 14

Time: 6 hrs.	**Total Marks – 100**
Q.1 Experiment based on Theory paper 13 (one major & one minor)	30
Q.2 Experiment based on Theory paper 14 (one major & one minor)	30
Q.3 Spotting based on Theory papers	10
Q.4 *Viva Voce.*	10
Q.5 Sessional	20

Lab. Course 8

Based on Theory Papers 15 and 16

Time: 6 hrs.	**Total Marks – 100**
Q.1 Experiment based on Theory paper 15 (one major & one minor)	30
Q.2 Experiment based on Theory paper 16 (one major & one minor)	30
Q.3 Spotting based on Theory papers	10
Q.4 *Viva Voce.*	10
Q.5 Sessional	20

Project

Project Work	External	Internal	Total
Dissertation	240	60	300
Seminar based on project	160	40	200
Viva-voce	80	20	100
Total			**600**

1. *A student of IV semester will have the option to opt for project work in lieu of four theory papers and two lab courses provided he/she secures at-least 65% or more marks in aggregate in semester I and II.*

2. *The project has to be carried out in recognized national laboratories or UGC recognized universities. No student will be allowed to carry out project in private laboratories/ college/ institutions, excluding the colleges recognized as research centers by the RDC of Pt. Ravishankar Shukla University, Raipur.*

3. *The valuation of all the projects will be carried out by the external examiner and HoD of UTD or its nominee at the UTD Centre.*

The project work should be related to the field of Biotechnology. The project report should include declaration by the candidate, certificate by the supervisor, acknowledgement, title and introduction along with the following points:

1. Introduction
2. Review of Literature
3. Materials and Methods
4. Results & Discussion
5. Summary
6. Bibliography

SCHOOL OF STUDIES IN BIOTECHNOLOGY

Pt. Ravishankar Shukla University
Raipur-492 010

Syllabus

M.Phil. in Biotechnology

Session
2017-2018

BoS approved syllabus for M.Phil. in Biotechnology
(Academic session 2017-18)

M.Phil. Biotechnology
Scheme of Examination (2017-2018)

S.N.	Paper Code	Title of Theory/Practical Paper	Marks
i	01	Research Methodology	100
ii	02	Applied Biotechnology	100
iii	Lab Course	Based on Theory papers 1,2	100
		Total Marks	**300**

iv	Seminar	Seminar based on theory	50
v	Dissertation	Seminar based on dissertation	50
		Dissertation Writing	75
		Viva-voce	25
		Total Marks	**200**
		Grand Total	**500**

Distribution of 100 marks of practical:

Time: 6 hrs **Total Marks: 100**

Q1. Experiment(s) based on theory paper 1 30

Q2. Experiment(s) based on theory paper 2 30

Q3. *Viva voce* 20

Q4. Sessional 20

BoS approved syllabus for M.Phil. in Biotechnology
(Academic session 2017-18)

List of Practical's for M. Phil Biotechnology

1. To study citric acid production, isolation and quantization. (Industrial Biotechnology).
2. Fermentation of carbohydrate by fungal strain. (Industrial Biotechnology).
3. Fermentation of carbohydrate by bacterial strain. (Industrial Biotechnology).
4. Effect of antibiotic on bacterial strain (Gram positive). (Industrial Biotechnology).
5. To study the effect of xenobiotic on microbial fungal growth (*Aspergillus* species). (Environmental Biotechnology).
6. Plant Tissue Culture: Micropropagation
7. Plant Tissue Culture: Callus culture and organogenesis
8. Genetic Engineering: Dot ELISA. (Kit based).
9. Genetic Engineering: Sandwich ELISA. (Kit based).
10. Genetic Engineering: Radial Immuno Diffusion. (Kit based).
11. Genetic Engineering: Agglutination. (Kit based).
12. To perform t-test for given data of samples of leaves.
13. To perform Chi-square test from given samples of leaves.
14. To calculate standard deviation from given data.
15. To study the data presentation in graphical from.
16. Research report presentation through tabulation of data.
17. Applications of internet.

School of Studies in Biotechnology
M.Phil. Biotechnology, 2017 - 2018

Dissertation Work

The dissertation work should be related to the field of Biotechnology. The dissertation work should include declaration by the candidate; certificate by the supervisor, acknowledgement, title and introduction along with the following points:

1. Introduction
2. Review of Literature
3. Materials and Methods
4. Results & Discussion
5. Summary
6. Bibliography

Last date of submission of dissertation work: As per M. Phil. Ordinance

School of Studies in Biotechnology
Pt. Ravishankar Shukla University,
Raipur

M.Phil. Biotechnology
Paper 1 - Research Methodology

M.M. 100

Unit –I

1. Essential steps in research: Basic and applied research
2. Importance of literature collection: Different system of literature citation and components of research report
3. Research report presentation: Tables, figures, formatting and typing
4. Basic principles if experimental design: Experimental error and control

Unit –II

1. Introduction to general laboratory measure
2. Laboratory acquired infections
3. Radiation hazards and spillage disposal
4. Experimental animals: Ethics and biological models

Unit – III

1. Basics of Computer Application , Application of software,
2. MS office, Photoshop, Corel,
3. Internet use and its application in Biotechnology
4. Fundamentals of Bioinformatics
5. Biological databases and their uses in Biotechnology

Unit –IV

1. Sequencing methods: DNA and proteins
2. Radioisotopic techniques and its biological application
3. Biosensors: Development, Types Application of biosensor.

Unit – V

1. Measures of variability: Standard Deviation, standard error, coefficient of variation
2. Correlation and Regression
3. Test of significant: t-test, chi-square test and analysis of variance
4. Frequency distribution: Binomial and normal distribution

BoS approved syllabus for M.Phil. in Biotechnology
(Academic session 2017-18)

23/12/16 24/12/16

Reference Books:-

1. Diana Rain, Marni Ayers Barby: (2006) Textbook on Q level Programming. 4th Edition
2. Karl Schwartz: (2006) Guide to Micro Soft. Marina Raod. 4th Edition
3. C.S.V. Murthy (2003) Bioinformatics. First Edition, Himalaya Publishing House.
4. Dov Stekel (2005) Microarray bioinformatics. Cambridge University Press.
5. S.C. Rastogi, Namita Mendiratta, Parag Rastogi (2003) Bioinformatics: Concepts, Skills and Applications, CBS Publishers and Distributors, New Delhi.
6. Andreas D. Baxebanis. B.F. Francis Ouellette (2001) Bioinformatics: A practical Guide to the Analysis of genes and proteins. Wiley Interscience.
7. C. Subramanian (2004) A Text Book of Bioinformatics. Dominant Publishers and Distributors, New Delhi.
8. Anmesh K. Dutta: Basic Biostatistics and Its Application. New Central Book Agency (P) Ltd. Kolkata.
9. P.K. Banerjee: Introduction to Biostatistics. S. Chand & Company Ltd.
10. P.S.S. Sunder Rao and J. Richard (2012) Introduction to Biostatics and Research Methods, 5th edition.
11. Johathan Pevsnev (2015) Bioinformatics and Functional, 3nd edition.
12. M. Debnath (2011) Tools and Techniques in Biotechnology

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Raipur

M.Phil. Biotechnology
Paper 2 – Applied Biotechnology

M. M. 100

Unit – I

1. Micro-propagation method for different plants (Banana, Sugarcane and Eucalyptus).
2. Metabolic engineering and industrial products: Secondary metabolites, edible vaccines/industrial enzymes
3. Anther culture, embryo and endosperm culture
4. Cryopreservation and DNA banking for germplasm conservation

Unit – II

1. Immunodiagnostic techniques: Agglutination techniques, Western blotting
2. Monoclonal antibodies: Preparation and application
3. Application of animal tissue culture.
4. Stem cell theory ,Tissue engineering

Unit – III

1. Bioreactors : Structure, types and application
2. Microorganisms in Bioprocess engineering
3. Industrial products and Microbes with special reference to Alcohol, Acids, Antibiotics.
4. Food processing, Bioleaching and Biosensor

Unit – IV

1. Environmental biotechnology: Utilization of various microorganisms for pollution control
2. Pollution: Definition, effects, causes and control
3. Xenobiotics,
4. Bioremediatant

Unit – V

1. Electrophoresis : Principle, Types and Applications
2. Principle and working of PCR
3. Applications of PCR in genetic finger printing of human and plant genomes

BoS approved syllabus for M.Phil. in Biotechnology
(Academic session 2017-18)

Reference Books:-

1. Thomas J Kindt, Barbara A. Osborne and Richard A. Goldsby: Immunology 6th edition; W. H. Freeman 2007
2. J.Kuby: Immunology. W.H. Freeman and Company, New York.
3. Razdan M K: Introduction To Plant Tissue Culture, 2nd edition 2010; Oxford & Ibh Publishing Co. Pvt Ltd
4. Michael L. Shuler, Fikret Kargi: Bioprocess engineering: basic concepts; Prentice Hall 2002
5. Manoj, Kapil and Archana: Environmental studies. I.K. International Publishing House Pvt. Ltd., New Delhi.
6. A.K. Chatterjii: Introduction to Environmental Biotechnology. Prentice Hall of India Pvt. Ltd.
7. David Evans Reisner: Bio-nanotechnology: global prospects; CRC Press 2009
8. U. Satyanarayana (2005) Biotechnology. Books and Allied (P) Ltd., Kolkata.
9. Hans-Joachim Jördening, Josef Winter: Environmental biotechnology: concepts and applications; Wiley-VCH 2005
10. P. F. Stanbury A, Whitaker and S.J. Hall (1995) Principles of Fermentation technology, second Edition, Pub. Butterwork-Heinemann, Am imprint of Elsevier.
11. Lewin Benjamin: Gene IX; Jones And Bartlett Publishers 2007
12. John R. W. Masters: Animal cell culture: a practical approach; Oxford University Press 2000
13. L Y Kun :Microbial Biotechnology: Principles and applications, 2003
14. GL Hornyak, HF Tibbals, and J Dutta: Fundamentals of Nanotechnology, 2008
15. S Choudhuri, and DB Carlson: Genomics: Fundamentals and applications, 1st edition, 2008
16. Rita Khare: Concepts in Nano Biotechnology, 2013
17. Sharad Saxenda : Microbiology and Environmental Toxicology, Published by Manglam Publications.
18. Veena Kumari: Food Microbiology, 2012
19. P.S.S. Sunder Rao and J. Richard () Introduction to Biostatics and Research Methods, 5th edition, 2012
20. Johathan Pevsnev : Bioinformatics and Functional, 3nd edition, 2015
21. M. Debnath: Tools and Techniques in Biotechnology, 2011

BoS approved syllabus for M.Phil. in Biotechnology
(Academic session 2017-18)

22/12/16

24/12/16

SCHOOL OF STUDIES IN BIOTECHNOLOGY

Pt. Ravishankar Shukla University
Raipur-492 010

Syllabus

Ph.D. Course Work in Biotechnology

Session
2017-2018

School of Studies in Biotechnology

Syllabus for PhD Course Work in Biotechnology (2017-18)

One Semester

There will be two papers; each with 100 marks maximum.

Paper-I: Research Methodology, Advanced Tools & Techniques, Quantitative Data Analyses and Computer Fundamentals

Paper-II Review of Literature & Seminar

Paper- I: Research Methodology, Advanced Tools & Techniques, Quantitative Data Analyses and Computer Fundamentals		Maximum Marks
A	**Research Methodology** Essential steps in research: Identification, Selection of objectives, Research design: - Components, importance of literature collection, citation & indexing. Research ethics, IPR, Experimental error and control, Research Report Presentation-table, Figure, Formatting and typing	25.0
B	**Advanced Tools & Techniques** Electrophoresis, HPLC, Microscopy, PCR, Biosensors: Types, Application of biosensor, Protein sequencing, DNA sequencing, Radioisotope Techniques	25.0
C	**Quantitative Data Analysis** Measures of variability: Standard Deviation, Standard Error, Coefficient of Variation, Correlation and Regression, Test of Significant: t-test, chi-square test, Frequency distribution: Binomial and normal distribution	25.0
D	**Computer Fundamentals** Computer Application, Application of software, Internet and Biotechnology, Fundamental of Bioinformatics, Biological databases and Biotechnology	25.0
Paper-II: Review of Literature & Seminar		**Maximum Marks**
A	**Review of Literature- Writing review of literature in the area of the proposed Ph.D. program**	50.0
B	**Seminar-Based on the review of literature**	50.0

Note:

1. **There will be FOUR units (A, B, C & D) of 25 marks each. The pattern will include both objective (multiple-choice questions) and subjective (short answer, using 50 to 100 words) questions.**
2. **The candidate should obtain 50% or more marks to qualify in the course work examination. Each answer paper will be assessed by two examiners independently.**

Syllabus of Ph.D LabCourse:

As per session 2015-2016 (No change)

Syllabus of M.Phil in Botany

Course not recognized

SYLLABUS

2017-2018

PT. RAVISHANKAR SHUKLA UNIVERSITY

RAIPUR

CHHATTISGARH

SYLLABUS

CODE 321 & 322

M. Sc. CHEMISTRY

SEMESTER EXAMINATION

2017-2018

PT. RAVISHANKAR SHUKLA UNIVERSITY

RAIPUR - 492 010, CHHATTISGARH

EXAMINATION SCHEME

M.Sc. examination will be conducted in four SEMESTERS. Each semester exam shall consist of FOUR THEORY PAPERS AND TWO LAB COURSES.

SEMESTER –I (20 CREDIT)[July-Dec 2017]

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 1	GROUP THEORY AND CHEMISTRY OF METAL COMPLEXES	4	4 Hrs	20	80	100
CH – 2	CONCEPTS IN ORGANIC CHEMISTRY	4	4 Hrs	20	80	100
CH – 3	QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - I	4	4 Hrs	20	80	100
CH – 4	THEORY AND APPLICATIONS OF SPECTROSCOPY-I	4	4 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH – 5	Lab Course - I	2	8 Hrs	100
CH – 6	Lab Course - II	2	8 Hrs	100

SEMESTER –II (20 CREDIT) [Jan-Jun 2018]

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 7	TRANSITION METAL COMPLEXES	4	4 Hrs	20	80	100
CH – 8	REACTION MECHANISMS	4	4 Hrs	20	80	100
CH – 9	QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - II	4	4 Hrs	20	80	100
CH – 10	THEORY AND APPLICATIONS OF SPECTROSCOPY-II	4	4 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH – 11	Lab Course - III	2	8 Hrs.	100
CH – 12	Lab Course - IV	2	8 Hrs.	100

SEMESTER –III (20 CREDIT) [July-Dec 2018]

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 13	RESONANCE SPECTROSCOPY, PHOTOCHEMISTRY AND ORGANOCATALYSIS	4	4 Hrs	20	80	100
CH – 14	CHEMISTRY OF BIOMOLECULES	4	4 Hrs	20	80	100
CH – 15	CATALYSIS, SOLID STATE AND SURFACE CHEMISTRY	4	4 Hrs	20	80	100
CH – 16	ANALYTICAL TECHNIQUES AND DATA ANALYSIS	4	4 Hrs	20	80	100

PRACTICAL (4 CREDIT)

PAPER	COURSE	CREDIT	DURATION	MARKS
CH – 17	Lab Course - V	2	8 Hrs.	100
CH – 18	Lab Course - VI	2	8 Hrs.	100

SEMESTER –IV (20 CREDIT) [Jan-Jun 2019]

THEORY (16 CREDIT)

PAPER	COURSE	CREDIT	DURATION	INTERNAL ASSESSMENT	THEORY MARKS	TOTAL MARKS
CH – 19	INSTRUMENTAL METHODS OF ANALYSIS	4	4 Hrs	20	80	100
CH – 20	NATURAL PRODUCTS AND MEDICINAL CHEMISTRY	4	4 Hrs	20	80	100
CH – 21	MATERIAL AND NUCLEAR CHEMISTRY	4	4 Hrs	20	80	100

CH – 22	ENVIRONMENTAL & APPLIED CHEMICAL ANALYSIS	4	4 Hrs	20	80		100

OR

OPTIONAL PAPERS

CH-22 a	MEDICINAL CHEMISTRY
22 b	CHEMISTRY OF SURFACTANTS
22 c	CHEMISTRY AND APPLICATION OF PESTICIDES
22 d	MOLECULAR SYMMETRY, COORDINATION AND ORGANOMETALLIC CHEMISTRY
22 e	NANOCHEMISTRY
22 f	CHEMISTRY OF NATURAL PRODUCTS
22 g	POLYMERS
22 h	FORENSIC CHEMISTRY

PRACTICAL (4 CREDIT)

PAPER	**COURSE**	**CREDIT**	**DURATION**	**MARKS**
CH - 23	SEMINAR	2	8 Hrs.	100
CH - 24	PROJECT WORK	2	8 Hrs.	100

SCHEME FOR PRACTICAL EXAMINATION

EXPERIMENT	**MARKS**
Experiment-1	30
Experiment -2	30
Viva-voce	20
Sessional Marks	20
TOTAL MARKS	**100**

FIRST SEMESTER

PAPER NO. CH –1

GROUP THEORY AND CHEMISTRY OF METAL COMPLEXES

Max. Marks 100

UNIT - I

SYMMETRY AND GROUP THEORY IN CHEMISTRY: Symmetry elements and symmetry operation, definitions of group, subgroup, relation between orders of a finite group and its subgroup. Conjugacy relation and classes. Point symmetry group. Schonflies symbols, representations of groups by matrices (representation for the C_n, C_{nv}, C_{nh}, D_{nh} etc. groups to be worked out explicitly). Character of a representation. The great orthogonality theorem (without proof) and its importance. Character tables and their use; spectroscopy.

UNIT - II

A. **METAL-LIGAND BONDING:** Limitation of crystal field theory, molecular orbital theory, octahedral, tetrahedral and square planar complexes, bonding and molecular orbital theory.

B. **METAL-COMPLEXES:** Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structural elucidation, important reactions of metal carbonyls; preparation, bonding, structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes; tertiary phosphine as ligand.

UNIT –III

A. **METAL–LIGAND EQUILIBRA IN SOLUTION:** Stepwise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH-metry and spectrophotometry.

B. **ISOPOLY ACID AND HETEROPOLYACID:** Isopoly and heteropoly acids of Mo and W. Preparation, properties and structure. Classification, Preparation, properties and structures of borides, carbides, nitrides and silicides. Silicates- classification and Structure, Silicones- preparation, properties and application.

UNIT – IV

A. **METAL CLUSTERS:** Higher boranes, carboranes, metalloboranes and metallocarboranes. Metal
carbnonyl and halide cluster, compounds with metal-metal multiple bonds.

B. **CHAINS:** catenation, heterocatenation, intercatenation.

C. **RINGS:** Borazines, phosphazines.

BOOK SUGGESTED:

1. Advanced Inorganic Chemistry, F.A. Cotton and Wilkinson, John Wiley.
2. Inorganic Chemistry, J.E. Huhey, Harpes and Row.
3. Chemistry of the Elements, N.N. Greenwood and A. Earnshow, Pergamon.
4. Inorganic Electronic Spectroscopy, A.B.P. Lever, Elsevier.
6. Comprehensive Coordination Chemistry Eds. G. Wilkinson, R.D. Gillars and J.A. McCleverty, Pergamon.

PAPER NO. CH –2

CONCEPTS IN ORGANIC CHEMISTRY

Max. Marks 100

UNIT - I

A. NATURE OF BONDING IN ORGANIC MOLECULES: Localized and Delocalized chemical bond, conjugation and cross-conjugation, Bonding in Fullerenes, Bonds weaker than covalent, addition compounds,

Crown ether complexes and cryptands. Inclusion compounds, Cyclodextrins, Catenanes and Rotaxanes.

B. AROMATICITY: Aromaticity in benzonoid and non-benzenoid compounds, Huckel anti-aromaticity, homo-aromaticity. PMO approach for Aromaticity, Annulenes.

UNIT - II

A. CONFORMATIONAL ANALYSIS: Conformational analysis of cycloalkanes, decalins, effect of conformation on reactivity, conformation of sugars, steric strain due to unavoidable crowding.

B. STEREOCHEMISTRY: Elements of symmetry, chirality, molecules with more than one chiral center, methods of resolution, optical purity, stereospecific and stereoselective synthesis. Asymmetric synthesis. Optical activity in the absence of chiral carbon (Biphenyls, allenes and spiranes), chirality due to helical shape**.**

UNIT - III

A. REACTION INTERMEDIATES: Generation, structure, stability and reactivity of carbocations, carbanions, free radicals, carbenes and nitrenes. Sandmeyer reaction, Free radical rearrangement and Hunsdiecker reaction.

B. ELIMINATION REACTIONS: The E_2, E_1 and E_{1cB} mechanisms. Orientation of the double bond. Reactivity, effects of substrate structures, attacking base, the leaving group and the medium.

UNIT - IV

PERICYCLIC REACTIONS: Classification of pericyclic reactions. Woodward-Hoffmann correlation diagrams. FMO and PMO approach. Electrocyclic reactions - conrotatory and disrotatory motions, 4n, 4n+2 and allyl systems. Cycloadditions - antrafacial and suprafacial additions, 4n and 4n+2 system, 2+2 addition of ketenes, 1,3 dipolar cycloadditions and cheleotropic reactions. Sigmatropic rearrangements - suprafacial and antarafacial shifts of H, sigmatrophic shifts involving carbon moieties, 3,3- and 5,5- sigmatropic rearrangements. Claisen, Cope and Aza-Cope rearrangements. Ene reaction.

BOOKS SUGGESTED:

1. Advanced Organic Chemistry, F. A. Carey and R. J. Sundberg, Plenum.
2. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
3. Structures and Mechanism in Organic Chemistry, C. K. Ingold, Cornell University Press.
4. Organic Chemistry, R. T. Morrison and R. N. Boyd, Prentice-Hall.
5. Modern Organic Reactions, H. O. House, Benjamin.
6. Principles of Organic Synthesis, R. O. C. Norman and J. M. Coxon, Blackle Academic and Professional.
7. Pericyclic Reactions, S. M. Mukherji, Macmillan, India.
8. Reaction Mechanism in Organic Chemistry, S. M. Mukherji and S. P. Singh, Macmillian.
9. Stereochemistry of Organic Compounds, D. Nasipuri, New Age International.
10. Some Modern Methods of Organic Synthesis, W. Carruthers, Cambridge Univ. Press.
11. Rodd's Chemistry of Carbon Compounds, Ed. S. Coff
12. Organic Chemistry, Vol 2, I. L. Finar, ELBS.
13. Stereo selective Synthesis: A Practical Approach, M. Nogradi, and VCH.
14. Organic Chemistry, Paula Yurkanis Bruice, Pearson Education.

PAPER NO. CH –3

QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - I

Max. Marks 100

UNIT - I

A. MATHEMATICAL CONCEPT IN QUANTUM CHEMISTRY :

Vector quantities and their properties Complex numbers and Coordinate transformation. Differential and Integral Calculus, Basis rules of differentiation and Integration Applications.

B. The Schrodinger equation and postulates of quantum mechanics. Discussion of solutions of the Schrodinger equation to some model systems viz Particle in a box the harmonic oscillator, the rigid rotator, the hydrogen atom.

UNIT –II

BASICS OF THERMODYNAMICS: Maxwell's thermodynamic relations isotherm, Vant's Hoff hypothesis. Partial molar volume and partial molar heat content. Chemical potential, Gibbs Duhem equation, variation of

chemical potential with temperature and pressure. Chemical potential of ideal gases, pure solids, liquids and mixture of ideal gases. Activity and Fugacity, Determination of Fugacity, Variation of Fugacity with Temperature and Pressure.

UNIT –III

ELECTROCHEMISTRY–I: Electrochemistry of solution. Debye-Huckel Onsager treatment and its extension, ion solvent interactions. Debey-Huckel-Limiting Law. Debye-Huckel theory for activity coefficient of electrolytic solutions. Determination of activity and activity coefficient, ionic strength, Thermodynamics of electrified interface equations. Derivation of electro-capillarity, Lippmann equation (surface excess), methods of determination.

UNIT –IV

CHEMICAL DYNAMICS –I: Methods of determining rate laws, consecutive reactions, collision theory of reaction rates, steric factor, Activated complex theory, kinetic salt effects, steady state kinetics, and thermodynamic and Kinetic control of reactions. Dynamic chain (Hydrogen-bromine and Hydrogen-chlorine reactions) and Oscillatory reactions (Belousov-Zhabotinsky reaction etc.)

BOOKS SUGGESTED :

1. Physical Chemistry, P.W. Atkins, ELBS.
2. Coulson's Valence, R. McWeeny, ELBS.
3. Chemical Kinetics, K. J. Laidler, Pearson.
4. Kinetics and Mechanism of Chemical Transformations, J. Rajaraman and J. Kuriacose, McMillan.
5. Modern Electrochemistry Vol. I and Vol. II, J.O.M. Bockris and A.K.N. Reddy, Plenum.
6. Thermodynamics for Chemists, S. Glasstone EWP.
7. An Introduction to Electrochemistry S. Glasstone EWP.
8. Organic Chemist's Book of Orbitals. L. Salem and W.L. Jorgensen, Academic Press
9. The Physical Basis of Organic Chemistry, H. Maskill, Oxford University Press

PAPER NO. CH - 4

THEORY AND APPLICATIONS OF SPECTROSCOPY- I

Max. Marks 100

UNIT - I

UNIFYING PRINCIPLES :

Electromagnetic radiation, interaction of electromagnetic radiation with matter-absorption, emission transmission, reflection, dispersion, polarization and scattering, Uncertainty relation and natural line width and natural line broadening, transition probability, selection rules, intensity of spectral lines, Born-Oppenheimer approximation, rotational, vibrational and electronic energy levels. Region of spectrum, representation of spectra, F.T. spectroscopy, computer averaging, lasers.

UNIT- II

MICROWAVE SPECTROSCOPY:

Classification of molecules in term of their internal rotation mechanism, determination of rotation energy of diatomic and polyatomic molecules, intensities of rotational spectral lined, effect of isotopic substitution on diatomic and polyatomic molecules, intensities of rotational spectral lines and parameters of rotational energy of linear and the transition frequencies, non-rigid rotators, spectral lines and parameters of rotational energy of linear and symmetric top polyatomic molecules. Application in determination of bond length.

UNIT- III

SCATTERING SPECTROSCOPY:

Principle, instrumentations and application of Auger spectroscopy and Scanning Electron Microscopy for chemical characterization, electron diffraction of gases and vapours, The Wierl equation and co-related method, application of electron diffraction.

Theory, instrumentation and application of turbidimetry, nephelometry and fluorometry. Fluoroscence and phosphorescence and factors affecting them.

UNIT- IV

RAMAN SPECTROSCOPY:

Classical and quantum theories of Raman effect, pure rotational, vibrational and vibrational-rotational Raman spectra, selection rules mutual exclusion principle, Resonance Raman spectroscopy, Coherent anti Stokes Raman spectroscopy (CARS), Instrumentation , Application of Raman effect in molecular structures, Raman activity of molecular vibration, structure of CO_2, N_2O, SO_2, NO_3^-, ClF_3

BOOKS SUGGESTED

1. Modern Spectroscopy, J.M. Hollas, John Wiley.
2. Fundamentals of Molecular Spectroscopy, C.N. Banwell.
3. Spectroscopy, B.K. Sharma, Goel Publication.
4. Organic Spectroscopy: Principles and Applications, Jag Mohan, Narosa Publication.
5. Spectroscopy Methods in Organic Chemistry, D.H. Williams & I. Fleming, Tata Mcgraw-Hill Publication.
6. Spectrophometric Identification of Organic Compounds, R.M. Silversteion & F. X. Webster, John Wiley Publication.

PAPER NO. CH - 5

LABORATORY COURSE–I

Max. Marks 100

1. QUALITATIVE ANALYSIS OF MIXTURE CONTAINING EIGHT RADICALS INCLUDING TWO LESS COMMON METAL FROM AMONG THE FOLLOWING BY SEMI MICRO METHOD.

1) *Basic Radicals :*

Ag, Pb, Hg, Bi, Cu, Cd, As, Sb, Sn, Fe, Al, Cr, Zn, Mn, Co, Ni, Ba, Sr, Ca, Mg, Na, K, Ce, Th, Zr, W, Te, Ti, Mo, U, V, Be, Li, Au, Pt.

2) *Acid Radicals :*

Carbonate, Sulphite, Sulphide, Nitrite, Nitrate, Acetate, Flouride. Chloride, Bromide, Iodide, Sulphate, Borate, Oxalate, Phosphate, Silicate, Thiosulphate, Ferrocyanide, Ferricyanide, Sulphocyanide, Chromate, Arsenate and Permanganate.

2. QUANTITATIVE ANALYSIS:

Involving separation of two of the following in ores, alloys, or mixtures in solution, one by volumetric and the other by gravimetric methods.

3. ESTIMATION OF:

1) Phosphoric acid in commercial orthophosphoric acid.
2) Boric acid in borax.
3) Ammonia in a ammonium salt.
4) Manganese dioxide in pyrolusite.
5) Available chlorine in bleaching powder.
6) Hydrogen peroxide in a commercial samples.

4. PREPARATIONS:-

Preparation of selected inorganic compound and their studies by I.R. electronic spectra, Mössbauer, E.S.R. and magnetic susceptibility measurements. Handling of air and moisture sensitive compounds

(1) $VO(acac)_2$
(2) $TiO(C_9H_8NO)_2 . 2H_2O$
(3) cis-K $[Cr(C_2O_4)_2 (H_2O)_2]$
(4) Na $[Cr (NH_3)_2 (SCN)_4]$
(5) $Mn (acac)_3$
(6) $K_2[Fe(C_2O_4)_3]$
(7) Prussian Blue, Turnbull's Blue.
(8) $[Co (NH_3)_6] [Co (NO_2)_6]$
(9) cis-$[Co(trien) (NO_2)_2] Cl.H_2O$
(10) Hg $[Co (SCN)_4]$
(11) $[Co (Py)_2Cl_2]$
(12) $[Ni (NH_3)_6] Cl_2$
(13) $Ni (dmg)_2$
(14) $[Cu (NH_3)_4] SO_4 . H_2O$

BOOKS SUGGESTED

1. Vogel's Textbook of Quantitative Analysis, revi Mendham, ELBS.
2. Synthesis and Characterization of Inorganic Compounds, W.L. Jolly, Prentice Hall.

PAPER NO. CH –6

LABORATORY COURSE –II **Max. Marks 100**

ADSORPTION/SURFACE CHEMISTRY

1. To Study Surface Tension - Concentration relationship for solutions (Gibbs equation).
2. To Verify the Freundlich and Langmuir Adsorption isotherms using acetic acid/Oxalic acid and activated charcoal.
3. Determination of CMC of surfactants.

PHASE EQUILIBRIA

1. To Construct the Phase diagram for three component system (e.g., chloroform-acetic acid-water).

CHEMICAL KINETICS

1. Determination of the effect of (a) Change of temperature (b) Change of concentration of reactants and catalyst and (c) Ionic strength of the media on the velocity constant of hydrolysis of an ester/ionic reactions.
2. Determination of the velocity constant of hydrolysis of an ester/ionic reaction in micellar media.
3. Determination of the rate constant for the decomposition of hydrogen peroxide by Fe^{+++} and Cu^{++} ions.
4. Determination of the primary salt effect on the kinetics of ionic reactions and testing of the Bronsted relationship (iodide ion is oxidized by persulphate ion).

SOLUTIONS/MOLECULAR WEIGHTS

1. Determination of molecular weight of non-volatile substances by Landsber
2. Determination of Molar masses of Naphthelene/acetanilid
3. Molecular weight of polymers by viscosity measurements.

CONDUCTOMETRY

1. Determination of the velocity constant, order of the reaction and energy of activation for saponification of ethyl acetate by sodium hydroxide conductometrically.
2. Determination of solubility and solubility product of sparingly soluble salts (e.g., $PbSO_4$, $BaSO_4$) conductometrically.
3. Determination of pK_a of Acetic acid and verification of Ostwald dilution law.

POTENTIOMETRY/pH METRY

1. Determination of the strength of strong and weak acids in a given mixture using a potentiometer/pH meter.
2. Determination of the dissociation constatnt of acetic acid in DMSO, DMF, acetone and dioxane by titrating it with KOH.
3. Determination of the dissociation constant of monobasic/dibasic acid by Albert-Serjeant method.
4. Determination of Redox potential of Fe^{++}/Fe^{+++} system.

POLARIMETRY

1. Determination of rate constant for hydrolysis/inversion of sugar using a polarimeter.
2. Enzyme kinetics –inversion of sucrose.
3. Determine the specific and molecular rotation of optically active substances.

BOOKS SUGGESTED

1. Experiments and Techniques in Organic Chemistry, D.Pasto, C. Johnson and M.Miller, Prentice Hall.
2. Macroscale and Microscale Organic Experiments, K.L. Williamson, D.C. Heath.
3. Systematic Qualitative Organic Analysis, H. Middleton, Adward Arnold.
   Handbook of Organic Analysis –Qualitative and Quantitative, H. Clark, Adward Arnold.
4. Vogel's Textbook of Practical Organic Chemistry,
5. Practical Physical Chemistry, A.M. James and F.E. Prichard, Longman.
6. Findley's Practical Physical Chemistry, B.P. Levi
   Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.

SECOND SEMESTER

PAPER NO. CH - 7

TRANSITION METAL COMPLEXES

Max. Marks 100

UNIT - I

REACTION MECHANISM OF TRANSITION METAL COMPLEXES: Energy profile of a reaction, reactivity of metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetics of octahedral substitution, anation reactions, reactions without metal ligand bond cleavage. Substitution reactions in square planar complexes, the trans effect. Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

UNIT - II

ELECTRONIC SPECTRA AND MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES:

Spectroscopic ground states, Correlation, Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^1-d^9 states), Selection rules, mechanism for break down of the selection rules, intensity of absorption, band width, spectra of d-d metal complexes of the type $[M(H_2O)]^{n+,}$ spin free and spin paired ML_6 complexes of other geometries, Calculations of Dq, B and parameters, spin forbidden transitions, effect of spin-orbit coupling, Spectrochemical and Nephelouxetic series. Magnetic properties of complexes of various geometries based on crystal field model, spin free-spin paired equillibria in octahedral stereochemistry.

UNIT - III

A. **TRANSITION METAL COMPLEXES:** Tranisition metal complexes with unsaturated organic molecules,alkanes ,allyl ,diene dienyl,arene and trienyl complex,preparations,properties,nature of bonding and structure features.Imporant reaction relating to nucleophilic and electrophilic attack on ligands and organic synthesis.
B. **TRANSITION METALS COMPOUND WITH BOND TO HYDROGEN:** Transition Metals Compound with Bond to Hydrogen.

UNIT-IV

A. **ALKYLS AND ARYLS OF TRANSITION METALS:** Types, routes of synthesis, stability and decomposition pathways, organocopper in organic synthesis.
B. **COMPOUNDS OF TRANSITION METAL - CARBON MULTIPLE BONDS :** Alkylidenes, low valent carbenes nature of bond and Structural characteristics.
C. **FLUXIONAL ORGANOMETALLIC COMPOUNDS:** Fluxionality and dynamic equilibria in compounds such as olefin, -allyl and dienyl complexes.

BOOKS SUGGESTED :

1. Pinciples and application of organotransition metal chemistry, J.P.Collman, L.S.Hegsdus, J. R. Norton and R.G. Finke, University Science Books.
2. The Organometallic chemistry of the Transition metals, R. H. Crabtree, John Wiley.
3. Metallo - organic chemistry, A.J. Pearson, Wiley.
4. Organometallic chemistry, R. C. Mehrotra and A.Singh, New age International.

10

PAPER NO. CH - 8

REACTION MECHANISMS

Max. Marks 100

UNIT - I

A. **ALIPHATIC NUCLEOPHILIC SUBSTITUTION:** The S_N2, S_N1, mechanisms.The neighbouring group mechanism, neighbouring group participation by πand σbonds, anchimeric assistance. Reactivity effects of substrate structure, attacking nucleophile, leaving group and reaction medium, phase transfer catalysis, ambident nucleophile and regioselectivity.

B. **AROMATIC NUCLEOPHILIC SUBSTITUTION:** The S_NAr, S_N1, and benzyne mechanisms. Reactivity - effect of substrate structure, leaving group and attacking nucleophile. The von Richter, Sommelet-Hauser, and Smiles rearrangements.

UNIT - II

A. **ALIPHATIC ELECTROPHILIC SUBSTITUTION:** Mechanisms of- S_E2 S_E1, electrophilic substitution accompanied by double bond shifts. Effect of substrates, leaving group and the solvent polarity on the reactivity.

B. **AROMATIC ELECTROPHILIC SUBSTITUTION:** The arenium ion mechanism, orientation and reactivity.

The ortho/para ratio, ipso attack, orienation in other ring systems.Ɵ Reactivity-Effectofsubstrates and electrophilles. Vilsmeir reaction and Gattermann-Koch reaction.

UNIT - III

ADDITION TO CARBON-CARBON MULTIPLE BONDS: Mechanistic and stereochemical aspects of addition reactions involving electrophiles, nucleophiles and free radicals, regio- and chemoselectivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic rings Hydroboration, Micheal reaction. Shrapless asymetric epoxdation.

UNIT - IV

ADDITION TO CARBON-HETERO MULTIPLE BONDS: Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acids esters and nitriles.Addition of Grignard Reagents, Organo-Zinc and Organo-lithium to carbonyls and unsaturated carbonyl compounds, Wittig reaction.

Mechanism of condensation reactions involving enolates - Aldol, Knoevenagel and Stobbe reactions. Hydrolysis of esters and amides, ammonolysis of esters.

BOOKS SUGGESTED :

1. Advanced Organic Chemistry-Reactions, Mechanism and Structure, Jerry March,Johan Wiley.
2. Modern Organic Reactions, H. O. House, Benjamin.
3. Principles of Organic Synthesis, R. O. C. Norman and J. M. Coxon, Blackle Academic & Professional.
4. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes, Longman.
5. Structures and Mechanism in Organic Chemistry, C. K. Ingold, Cornell University Press.
6. Reaction Mechanism in Organic Chemistry, S. M. Mukherji and S. P. Singh, Macmillian

PAPER NO. CH –9

QUANTUM CHEMISTRY, THERMODYNAMICS AND CHEMICAL DYNAMICS - II

Max. Marks 100

UNIT –I

A. **APPLICATION OF MATRICES IN QUANTUM CHEMISTRY :** Addition and multiplication, inverse and transpose of matrices. Determinants, in quantum Chemistry**.**

B. **ANGULR MOMENTION IN QUANTUM CHEMISTRY:** Angular momentum, angular momentum Operators. Eigen functions and Eigen values Angular momentum, ladder operators.

C. **APPROXIMATE METHODS:** The variation theorem, linear variation principle. Perturbation theory (first order and non-degenerate). Applications of variation method and perturbation theory to the Helium atom.

UNIT –II

STATISTICAL THERMODYNAMICS : Probability, permutations and combinations

concepts of probability, Maxwell Boltzmann distribution. Different ensembles and Partition functions translational, rotational, vibrational and Electronic. Thermodynamic function using appropriate Partition function. Fermi-Dirac and Bose-Einstein Statistics and statistical basis of entropy. Heat capacity of solids Debye and Einstein Models.

UNIT –III

ELECTROCHEMISTRY –II: Structure of electrified interfaces. Gouy-Chapman, Stern, Over potentials and exchange current density, Derivation of Butler –Volmer equation, Tafel plot.Semiconductor interfaces, Theory of double layer at semiconductor, electrolyte solution interfaces, structure of double layer interfaces. Effect of light at semiconductor solution interfaces. Electro catalysis influence of various parameters. Hydrogen electrode.

UNIT –IV

CHEMICAL DYNAMICS –II: General features of fast reactions by flow method, relaxation method, flash photolysis and the nuclear magnetic resonance method. Molecular reaction dynamics, Dynamics of molecular motions, probing the transition state, dynamics of barrierless chemical reactions in solutions, dynamics of unimolecular reaction. [Lindemann –Hinshelwood , RRK and Rice-Ramsperger-Kassel-Marcus {RRKM}] theories of unimolecular reactions.

BOOKS SUGGESTED :

1. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
2. Mathematics for Chemistry, Doggett and Sutclilffe, Longman.
3. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill.
4. Chemical Mathematics, D.M, Hirst, Longman.
5. Applied Mathematics for Physical Chemistry, J.R. Barrante, Prentice Hall.
6. Basic Mathematics for Chemists, Tebbutt, Wiley.
7. Physical Chemistry, P.W. Atkins, ELBS.
8. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.
9. Quantum Chemistry, Ira N. Levine, Prentice Hall.
10. Coulson's Valence, R. McWeeny, ELBS.
11. Chemical Kinetics, K. J. Laidler, Pearson.
12. Kinetics and Mechanism of Chemical Transformations, J. Rajaraman and J. Kuriacose, McMillan.
13. Modern Electrochemistry Vol. I and Vol. II, J.O.M. Bockris and A.K.N. Reddy, Plenum.
14. Thermodynamics for Chemists, S. Glasstone EWP.
15. An Introduction to Electrochemistry S. Glasstone EWP.
16. Physical Chemistry, Ira N. Levine McGraw Hill.
17. Physical Chemistry, Silbey, Alberty, Bawendi, John-Wiley.

PAPER NO. CH - 10

THEORY AND APPLICATIONS OF SPECTROSCOPY –II

Max. Marks 100

UNIT - I

ULTRAVIOLET AND VISIBLE SPECTROSCOPY:

Introduction, intensity of vibrational-electronic spectra and Frank-Condon principle for dissociation energy, rotational fine structure of electronic-vibrational spectra, Shape of some molecular orbitals viz., H_2, He_2, N_2, O_2. Electronic spectra of organic molecules, chromophores, application of electronic spectroscopy: spectrophotometric studies of complex ions, determination of ligand/metal ratio in a complex, identification of compounds, determination stability constants.

UNIT -II

INFRA RED SPECTROSCOPY:

Introduction, simple and anharmonic oscillators in vibrational spectroscopy, diatomic-vibrating rotator, Modes of vibration in polyatomic molecules, vibration-coupling, Fourier Transform IR spectroscopy: instrumentation, interferometric spectrophotometer, sample handling,Factors influencing vibrational frequencies, Application of IR spectroscopy: Interpretation of IR spectraof normal alkanes, aromatic hydrocarbons, alcohols and phenols aldehydes and ketones, eathers, esters, carboxylic acids and amines and amides

UNIT - III

MASS SPECTROMETRY:

Introduction, basic principles, separation of the ions in the analyzer, resolution, molecular ion peak, mass spectral fragmentation of organic compounds, factors affecting fragmentation, McLafferty rearrangement. Instrumentation, Characteristics of mass spectra of Alkanes, Alkenes, Aromatic hydrocarbons, Alcohols, Amines. Nitrogen rule, ring rule, Molecular weight and formula determination, Gas chromatography-Mass spectrophotometry: Introduction.

UNIT - IV

NUCLEAR RESONANCE SPECTROPHOTOMETRY:

Theory of NMR spectroscopy, interaction of nuclear spin and magnetic moment, chemical shift, processional motion of nuclear particles in magnetic field, spin-spin splitting, coupling constants, factor affecting the chemical shift, shielding effect, effect of chemical exchange, hydrogen bonding, instrumentation of Fourier transform NMR spectrophotometer, structure determination of organic compounds, Carbon-13 NMR spectroscopy, Multiplicity-proton (^1H) decoupling-noise decoupling, off resonance decoupling, selective proton decoupling, chemical shift.

BOOKS SUGGESTED

1. Modern Spectroscopy, J.M. Hollas, John Wiley.
2. Fundamentals of Molecular Spectroscopy, C.N. Banwell.
3. Spectroscopy, B.K. Sharma, Goel Publication.
4. Organic Spectroscopy : Principles and Application, Jag Mohan, Narosa Publication.
5. Spectroscopic Methods in Organic Chemistry, D.H. Williams & I. Fleming, Tata Mcgraw-Hill Publication.
6. Spectrophometric Identification of Organic Compounds, R.M. Silverstein & F.X. Webster, John Wiley Publications.

PAPER NO. CH - 11

LABORATORY COURSE –III

Max. Marks 100

1. GENERAL METHODS OF SEPARATION AND PURIFICATION OF ORGANIC COMPOUNDS WITH SPECIAL REFERENCE TO:

1) Solvent Extraction
2) Fractional Crystallisation

2. DISTILLATION TECHNIQUIES:

Simple distillation, steam distillation, Fractional distillation and distillation under reduced pressure.

3. ANALYSIS OF ORGANIC BINARY MIXTURE:

Separation and Identification of organic binary mixtures containing at least one component with two substituents.
(A student is expected to analyse at least 10 different binary mixtures.)

4. PREPARATION OF ORGANIC COMPOUNDS: SINGLE STAGE PREPARATIONS.

1) **Acetylation:** Synthesis of β-Naphthyl acetate from β-Naphthol / Hydroquinone diacetate from Hydroquinone.
2) **Aldol condensation:** Dibenzal acetone from benzaldehyde.
3) **Bromination:** p-Bromoacetanilide from acetanilide.
4) **Cannizzaro Reaction:** Benzoic acid and Benzyl alcohol from benzaldehyde.
5) **Friedel Crafts Reaction:** O-Benzoyl Benzoic acid from phthalic anhydride.
6) **Grignard Reaction:** Synthesis of triphenylmethanol from benzoic acid,
7) **Oxidation:** Adipic acid by chromic acid oxidation of cyclohexanol.
8) **Perkin's** Cinnamic **Reaction:** acid from benzaldehyde.
9) **Sandmeyer Reaction:** p-Chlorotoluene from p-toluidine/o-Chlorobenzoic acid from anthranilic acid.
10) **Schotten Baumann Reaction:** β-Naphthyl benzoate from:β-Naphthol / Phenyl benzoate from phenol.
11) **Sulphonation Reaction:** Sulphanilic acid from aniline.

BOOK SUGGESTED :

1. Practical Organic chemistry by A. I. Vogel.
2. Practical Organic chemistry by Mann and Saunders.
3. Practical Organic chemistry by Garg and Salija.
4. The Systematic Identification of Organic compounds, R. L. Shriner and D. Y. Curtin.
5. Semimicro Qualitative Organic Analysis, N.D. Cheronis, J. B. Entrikin and E. M. Hodnett.
6. Practical Physical chemistry by Alexander Findlay.
7. Experimental Physical chemistry, D. P. Shoemaker, G. W. Garland and J. W. Niber, Mc Graw Hill Interscience.
8. Findlay's Practical Physical chemistry, revised B

PAPER NO. CH –12

LABORATORY COURSE –IV

Max. Marks 100

I. ERROR ANALYSIS AND STATISTICAL DATA ANALYSIS

1. Linear Regression Analysis
2. Curve Fitting
3. Student "t" Test
4. Data Analysis Using Basic Statistical Parameters
5. Calibration of volumetric Apparatus, Burette, Pipette Weight Box etc.

II. USE OF COMPUTER PROGRAMMES

The students will learn how to operate a PC and how to run standard programmes and packages. Execution of linear regression, X-Y plot, numerical integration and differentiation as well as differential equation solution programmes. Monte Carlo and Molecular dynamics. Programmes with data preferably from physical chemistry laboratory. Further, the student will operate one or two or the packages such as MICROSOFT ECXEL, WORLD, POWERPOINT, SPSS, ORIGIN, MATLAB, EASYPLOT.

III. A. FLAME PHOTOMETRIC DETERMINATIONS

1. Sodium and potassium when present together.
2. Sodium/potassium in solid samples.
3. Solid Sodium and Potassium in Liquid Samples.
4. Lithium/calcium/barium/strontium.
5. Cadmium and magnesium in tap water.

B. NEPHELOMETRIC DETERMINATIONS

1. Sulphate
2. Phosphate
3. Silver

IV. ELECTROPHORESIS

1. To separate cations of inorganic salts by paper electrophoresis.
2. Capillary Electrophoresis of water –soluble Vitamines

V. SPECTROSCOPY

1. Verification of Beer's Lambert Law.
2. Determination of stoichiometry and stability constant of inorganic (e.g. ferric –salicylclic acid) and organic (e.g. amine-iodine) complexes, thiocynam.
3. Characterization of the complexes by electronic and IR, UV spectral data.
4. Determination of Indicator constant (pK_a) of methyl red.

BOOK SUGGESTED :

1. Computer and Common Sense, R. Hunt and J. Shelley, Prentice Hall.
2. Computational Chemistry, A.C. Norris.
3. Microcomputer Quantum Mechanics, J.P. Killngbeck, Adam Hilger.
4. Computer Programming in FORTRAN IV, V. Rajaraman, Prentice Hall.
5. An Introduction to Digital Computer Design, V. Rajaraman and T. Radhakrishnan, Prentice Hall.
6. Experiments in Chemistry, D.V. Jahagirgar.

THIRD SEMESTER

PAPER NO. CH - 13

RESONANCE SPECTROSCOPY, PHOTOCHEMISTRY AND ORGANOCATALYSIS

Max. Marks 100

UNIT –I

A. ELECTRON SPIN RESONANCE SPECTROSCOPY : Hyperfine coupling, spin polarization for atoms and transition metal ions, spin-orbit coupling and significance of g-tensors, application to transition metal complexes (having one unpaired electron).

B. NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY: Quadrupole nuclei, quadrupole moments, electric field gradient, coupling constant, splittings, applications.

UNIT –II

A. PHOTOELECTRON SPECTROSCOPY : Basic principle both for atoms and molecules; Photo-electric effect, ionization process, ectraKoopman'sofsimplemolecules,theorem,Auger p electron spectroscopy, Determination of Dipole moment.

B. PHOTOACOUSTIC SPECTROSCOPY: Basic principle of Photo acoustic Spectroscopy (PAS), PAS –gases and condensed system Chemical and Surface application.

UNIT –III

A. PHOTOCHEMICAL REACTIONS : Interaction of electromagnetic radiation with matter, Photophysical processes , Stern Volmer equation, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy, Actinometry.

B. DETERMINATION OF REACTION MECHANISM: Classification, rate constatnts and life times of reactive energy states –determination of rate constants of reactions. Effect of light intensity on the rate of photochemical reactions.

C. MISCELLANEOUS PHOTOCHEMICAL REACTIONS : Photo-Fries reactions of anilides, Photo-Fries rearrangement. Barton reaction. Singlet molecular oxygen reactions. Photochemical formation of smog. Photodegradation of polymers, Photochemistry of vision.

UNIT –IV

A. ORGANOCATALYSIS

General Principles: Energetic, Catalytic cycles, catalytic efficiency and life time, selectivity. Type of organometallic reaction: Ligand substitution, Oxidative addition, reductive elimination and insertion and deinsertion. Homogeneous catalysis: Hydrogenetion of alkenes, Hydroformylation, Monsanto acetic acid synthesis, Wacker oxidation of alkenes, Alkenes metathesis, Palladium-Catalysed C-C bond forming reactions, asymmetric oxidation. Heterogenous catalysis: The nature of heterogenous catalysts, Fischer- Tropsch synthesis, alkene polymerization

BOOK SUGGESTED:

1. Infrared and Raman Spectra: Inorganic and Coordination Compounds, K. Nakamoto, Wiley.
2. Fundamentals of Photochemsitry, K.K. Rohtagi-Mukherji, Wiley-Eastern.
3. Essentials of Molecular Photochemistry, A. Gilbert and J. Baggott, Blackwell Scientific Publications.
4. Molecular Photochemsitry, N.J. Turro, W.A. Benjamin.
5. Introductory Phtochemistry, A. Cox and T. Camp, McGraw-Hill.
6. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson.
7. Application of Spectroscopy of Organic Compounds, J.R. Dyer, Prentice Hall.
8. Photochemistry , R.P. Kundall and A. Gilbert, Thomson Nelson.
9. Organic Photochemistry, J. coxon and B. Halton, Cambridge University Press.
10. Shriver& Atkins Inorganic Chemistry: P.Atkins, T.Overtone, J. Rourke, M. Weller, F. Armstrong, Oxford University Press
11. Inorganic Chemistry: C.E. Housecraft, A.G. Sharpe, Pearson Education Limited.
12. Inorganic Chemistry: Principles of Structure and Reactivity: J.E. Huheey, E.A. Keiter, R.L.Keiter, O.K. Medhi, Pearson Education
13. Organometallic Chemistry: A Unified Approach: R.C. Mehrotra, A.Singh, New Age International Publishers.

PAPER NO. CH - 14

CHEMISTRY OF BIOMOLECULES

Max. Marks 100

UNIT –I

A. BIOENERGETICS: Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.

B. ELECTRON TRANSFER IN BIOLOGY: Structure and function of metalloproteins in electron transport processes –cytochromes and ion-sulphur proteins, synthetic models.

C. TRANSPORT AND STORAGE OF DIOXYGEN: Heme proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, haemocyanins and haemerythrin, model synthetic complexes of iron, cobalt and copper.

UNIT –II

A. METALLOENZYMES: Zinc enzymes –carboxypeptibase and carbonic anhydrase. Iron enzymes – catalase, peroxidase and cytochrome P-450. copper enzymes- superoxide dismutase. Molybdenum oxatransferase enzymes –xanthine oxidase.

B. ENZYME MODELS: Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality. Biomimetic chemistry, Cyclodextrin-based enzyme models, calixarenes, ionophores, synthetic enzymes or synzymes.

UNIT –III

A. ENZYMES : Nomenclature and classification ofnducedEnzyme. F fit hypothesis, concept and identification of active site by the use of inhibitors.

B. CO-ENZYME CHEMISTRY: Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD+, NADP+, FMN, FAD, lipoic acid, vitamin B_{12}.

C. BIOTECHNOLOGICAL APPLICATIONS OF ENZYMES: Tehcniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application of immobilization enzymes in medicine and industry. Enzymes and Recombinant DNA Technology.

UNIT –IV

A. BIOPOLYMER INTERACTIONS: forces involved in biopolymer interaction. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.

B. THERMODYNAMICS OF BIOPOLYMER SOLUTIONS: Thermodynamics of biopolymer solution, osmotic pressure, membrane equilibrium, muscular contraction and energy generation in mechnochemical system.

C. CELL MEMBRANE AND TRANSPORT OF IONS: Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport and Nerve conduction.

BOOK SUGGESTED:

1. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
2. Bioinorganic Chemistry, I. Bertini, H.B. Gray, S.L. Lippard and J.S. Valentine, University Science Books.
3. Inorganic Biochemistry vols II and I.Ed G.L. Eichhorn, Elservier.
4. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
5. Bioinorganic Chemistry, I. Bertinin, H.B. Gary, S.J. Lippard and J.S. Valentine, University Science.
6. Inorganic Biochemistry vols I and II ed. G.L. Eichhorn, Elsevier.
7. Bioorganic Chemistry: A Chemical Approach to Enzyme Action, Hermann Dugas and C. Penny, Springer-verlag.
8. Understanding Enzymes, Trevor palmer, Prentice Hall.
9. Enzyme Chemistry : Impact and Applications, Ed. Collin J Suckling, Chapman and Hall.
10. Enzyme Mechanisms Ed, M.I. Page and A. Williams, Royal Society of Chemistry.
11. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
12. Immobilizaed Enzymes: An Introduction and Applications in Biotechnology, Michael D. Trevan, and John Wiley.

13. Enzymatic Reaction Mechanisms, C. Walsh, W.H. Freeman.
14. Enzyme Structure and Mechanisms, A Fersht, W.H. Freeman.
15. Biochemistry: The Chemical Reacitons of liging cells, D.E. Metzler, Academic Press.
16. Principles of Biochemistry, A.L. Lehninger, Wroth Publishers.
17. Biochemistry, L. Stryer, W.H. Freeman.
18. Biochemistry, J. David Rawn, Neil Patterson.
19. Biochemistry, Voet and Voet, John Wiley.
20. Outlines of Biochemistry, E.E. Conn and P.K. Stumpf, John Wiley.
21. Bioorganic Chemistry : A Chemistry Approach to Enzyme Action, H. Dugas and C. Penny, Springer-Verlag.
22. Biochemistry and Molecular Biology of Plants, Buchanan, Gruissem and Jones, I.K. International Pvt. Ltd.

PAPER NO. CH –15

CATALYSIS, SOLID STATE AND SURFACE CHEMISTRY

Max. Marks 100

UNIT –I

ACIDS, BASES, ELECTROPHILES, NUCLEOPHILES AND CATALYSIS :

Acid-base dissociation, Electronic and structural effects, acidity and basicity. Acidity function and their applications. Hard and soft acids and bases. Nucleophilicity scales. Nucleofugacity. The alpha effect. Ambivalent Nucleophilies. Acid base catalysis-specific and general catalysis. Bronsted catalysis, Enzyme Catalysis.

UNIT –II

MICELLES AND ADSORPTION :

Micelles : Classification of surface active agents, micellization, hydrophobic interaction, critical micellar concentration (CMC), factors affecting the CMC of Surfactants. Thermodynamics of micellization - phase separation and mass action models. Reverse micells, micro-emulsion. Micellar Catalysis, Surface tension capillary action, pressure difference across curved surface (Laplace equation), vapor pressure of droplets (Kelvin equation), Gibbs adsorption isotherm.

UNIT –III

SOLID STATE CHEMISTRY - I :

Crystal defects and Non-stoichiometry - Perfect and imperfect crystals, intrinsic and extrinsic defects - point defect, line and plane defects, vacancies - Schotty defects and Frankel defects. Thermodynamics of Schotty and Frenkel defect, formation of color centres, non-stoichiometry and defects. Electronic properties and Band theory of semiconductors.

UNIT –IV

MACROMOLECULES :

Polymer - Definition types of polymers, electrically conducting, fire resistant, liquid crystal polymers, kinetics of polymerization, mechanism of polymerization.

Molecular mass, average molecular mass molecular mass determination (Osmometry, Viscometry, diffusion and light scattering methods), Sedimentation, chain configuration of macromolecules calculation of average dimensions of various chain structures.

BOOK SUGGESTED :

1. G.W. Castellan, "Physical Chemistry", Addison- Lesley Publishing Co.
2. E.A. Moelwyn Hughes, "Physical Chemistry", Pergamon Press.
3. Denbigh, "Chemical Equilibria", D. Van Nostrand.
4. J. Rose, "Dynamic Physical Chemistry" Sir Issac Pitman and Sons.
5. Solid state "Chemistry and its Applications, A.R. West, Plenum.
6. Principle of Solid State H.V. Kar, Wiley Eastern.
7. Solid State Chemists, D.K. Chakrabarty, New Age International (P) Ltd.
8. Micelles, Theoretical and Applied Aspects, V. Moral Plenum.
9. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
10. Mathematics for Chemistry, Doggett and Sutcliffe, Longman.
11. Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill.
12. Chemical Mathematics, D.M. Hirst, Longman.
13. Applied Mathematics for Physical Chemistry, J.R. Barrante, Prentice Hall.
14. Basic Mathematics for Chemists, Tebbutt, Wiley.
15. Quantum Chemistry, Ira N. Levine, Prentice Hall.
16. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.

PAPER NO. CH –16

ANALYTICAL TECHNIQUES AND DATA ANALYSIS

Max. Marks 100

UNIT –I

SAMPLE PREPARATION, DEGESTION AND STATISTICAL ANALYSIS

A. Sampling - Collection, Preservation and preparation of sample, Techniques of sampling solids, liquids and gases, Operation of drying and preparing a solution of the analyte.

Principle, methodology and application of different types of digestions such as acid digestion, base digestion, enzymatic and microwave digestion for liquid and solid materials.

B. Evolution and procession of Analytical Data, Precision and Accuracy, Types of Errors, Propagation of errors, Normal Distribution Curve, Standard deviation, Confidence limit, Graphical presentation of result-method of average, Method of Linear least square, Significant figures, Statistical aid to hypothesis testing-t-test, F-test, Correlation coefficient, Rejection of data.

UNIT –II

SEPARATION TECHNIQUES

A. Efficiency of extraction, Selectivity of extraction, Extraction system, Method of Extraction, applications.

B. Principle, classification of chromatographic techniques, Technique and applications of paper chromatographic, Thin-layer chromatographic, HPTLC, Column chromatography.

UNIT –III

THERMAL AND AUTOMATED METHODS

A. Principle, Instrumentation, Application of TGA, DTA and DSC methods.

B. Automated methods, Principle, instrumentation and application of flow injection analysis.

UNIT –IV

ELECTROCHEMISTRY

A. Principles and instrumentation of pH potentiometry, coulometry and counductometry.

B. Basic principles, Diffusion current, polarized electrode, Micro electrode, Dropping Mercury Electrode llkovic equation, Polarographic wave, Qualitative analysis Stripping methods, Cyclic Voltammetry, Amperometric titration :-curves, Differential pulse polarography and Square wave polarography.

BOOK SUGGESTED :

1. Fundamental of Analytical Chemistry- Skoog D.A. and West D.M.
2. Saunders, College Publication.
3. Textbook of Quantitative Inorganic Analysis-Vogel A.I.
4. Principles and Practice of Analytical Chemistry-Fifield F.W and Kealey
5. D. Black well Science
6. Instrumental Analysis R. Braun, McGraw Hill, International Edition.
7. Analytical Chemistry, Christian, G.D., WSE/Wiley.
8. Instrumental Analysis, Willard Meritt Dean, CBS.
9. Chemical Analysis, Brawn, McGraw Hill.
10. Fundamental of Analytical Chemistry-Skoog D.A. and West D.M.
11. Principles of instrumental analysis, Skoog Holler - Niemann.
12. Instrumental analysis, Wizard Dean and Merit.
13. Principle and PRACTICAL analytical chemistry, Fifield and Kealey.

PAPER NO. CH - 17

LABORATORY COURSE –V

Max. Marks 100

1. To determine the percent efficiency of given counter.
2. To calculate the activity with given radioactive source.
3. Determination of the half-life of Radionuclide.
4. Determination of absorption coefficient & half
5. Determination of absorption coefficient & half thickness of lead for gamma radiation.
6. Determination of range and energy of β particle
7. Prove the inverse square law for gamma rays.
8. Measurement of gamma ray energy by gamma ray spectrometry.
9. Determination of the partition coefficient for iodine between carbon tetrachloride & (a) Water, (b) aqueous potassium iodide.
10. Study of kinetics of exchange between ethyl iodide & the iodide ion.
11. Determination of the solubility product of lead iodide.
12. Determination of the dissociation constant of Barium Nitrate.
13. Determination of the concentration of iodine in a given sample (KI), by isotope dilution technique.
14. To study the effect of temperature, concentration of the reactant and catalyst on the rate of a chemical reaction (Hydrolysis/Nucleophilic Substituttion).
15. Reaction between Sodium Formate and Iodine by
    (i) Volumetric Method.
    (ii) Conductometric Method.
16. Saponification of ethyl acetate
    (i) Volumetric Method.
    (ii) Conductometric Method.
17. Reaction between Acetone and Iodine.
18. To study the autocatalylic reaction between $KMnO_4$ and Oxalic acid.
19. Reaction between $K_2S_2O_8$ and Iodine.
20. Determination of pKa by Kinetic Measurement.
21. Evaluation of Equilibrium constants from kinetic data.
22. Determination of rate constant of the decomposition of benzene diazonium chloride at different temperature.
23. To study the photolysis of uranyl oxalate.
24. To study the effect of substate catalyst etc (i) HCl, $K_2S_2O_8$ (ii) KOH, NaOH.
25. To study the Activation parameters.
26. To study the solvent effect using some Aprotic & Protic Solvents.
27. To examine the substituent effect (Hammett equation).
28. To study the effect of Electrolyte on the rate hydrolysis (KCl, NaCl,)
29. To study some simple enzyme catalyzed reaction.
30. To study the Micellar Catalyzed Reaction.

- **Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIOMETER etc) experiments may be given to the students**

BOOK SUGGESTED :

1. Basic Experiment with radioisotopes by John, N. Andrews & David J. Hornsey, Pitam Publishing New York.
2. Practical radiochemistry by M.F.C. Ladd & W.H. Lee, Cleaver Hune press Ltd.
3. Practical Physical Chemistry by Alexander Findlay.
4. Experimental Physical Chemistry, D.P. Shoemaker, C.W. Garland and J.W. Niber, Mc Graw Hill Interscience.
5. Findlay'sicalPractialChemistry,revised B.Phys.Levitt,Longman.

PAPER NO. CH –18

LABORATORY COURSE –VI

Max. Marks 100

A. SPECTROPHOTOMETRIC DETERMINATIONS

I. Manganese / Chromium, Vanadium in steel sample.

II. Nickel / Molybdenum / Tungsten / Vanadium / Uranium by extractive spectrophotometric method.

III. Fluoride / Nitrate / Phosphate.

IV. Iron –phenanthroline complex; Job's Method of con

V. Zirconium –Alizarin Red –S complex: Mole-ratio method.

VI. Copper –Ethylene diamine complex: Slope-ratio method.

B. pH METRY

Stepwise proton-ligand and metal-ligand stability constant of complexes by Leving –Rossoti methods.

C. POLAROGRAPHY

Composition and stability constant of complexes.

D. FLAME PHOTOMETRIC DETERMINATIONS.

(i) Sodium and potassium when present together

(ii) Lithium / calcium / barium / strontium.

(iii) Cadium and magnesium in tap water.

E. REFRACTOMETRY

1. Determination the specific and molar refraction of a given liquid by abbe Refractometer.
2. Determine the variation of refractive index.
3. To verify law of refraction of mixture (glycerol + water).

F. SEPARATION AND QUANTITATIVE ESTIMATION OF BINARY AND TERNARY MIXTURES BY THE USE OF FOLLOWING SEPARATION TECHNIQUES:

1. Paper chromatography –Cadmium and Zinc, Zinc and Magnesium.
2. Thin –layer chromatography –separation of nickel, manganese, cobalt and zinc.
3. Ion-exchange.
4. Solvent extraction.
5. Electrophoretic separation.

- **Some advanced level sophisticated instrument based (FTIR, NMR, GC-MS, AAS, FLUORESCENCE SPECTROPHOTOMETER, TENSIOMETER etc) experiments may be given to the students**

BOOK SUGGESTED :

1. Quantitative Inorganic Analysis, A.I. Vogel.
2. Test book of quantitative chemical analysis, A.I. Vogel.
3. Practical Physical chemistry, A.M. James and F.E. Prichard, Longman.
4. Findley's Practical Physical Chemistry, B.P. Levi
5. Experimental Physical Chemistry, R.C. Das and B. Behera, Tata McGraw Hill.

FOURTH SEMESTER

PAPER NO. CH - 19

INSTRUMENTAL METHODS OF ANALYSIS

Max. Marks 100

UNIT –I

ADVANCED CHROMATOGRAPHY :

A. Ion chromatography : Ion exchange equilibrium, Ion-exchange packing and Inorganic Applications.

B. Size exclusion chromatography : Column packing, Theory of size of exclusion chromatography and applications.

C. Supercritical fluid chromatography : Properties of supercritical fluid SFC-Instrumentation and operating variables, comparison with other types of chromatography, applications.

D. Capillary Electrophoresis and capillary electro chromatography : overviews and applications

UNIT –II

X-RAY AND PROTON INDUCED SPECTROSCOPY :

A. X-Ray fluorescent method : Principles-Characteristics x-ray emission.
Instrumentation x-ray tube, Radioactive sources. Wavelength dispersive instruments.
Energy dispersive instruments. Analytical Applications-Qualitative Analysis.

B. Proton Induced X-Ray Spectroscopy : Theory, instrumentation and application.

UNIT –III

ATOMIC EMISSION SPECTROSCOPY

A. Selectivity, sensitivity and interferences of atomic spectroscopy.

B. Theory, instrumentation and application of flame photometer, AES, ICP-AES and AFS.

UNIT –IV

ATOMIC ABSORPTION SPECTROSCOPY AND HYPHENATED TECHNIQUES

A. Theory instrumentation and application of flame and graphite furnace AAS, cold-vapor and hydride generation AAS.

B. Theory, instrumentation and application of hyphenated techniques i.e. GC/HPLC/-MS, GC/IC/HPLC-ICP-MS.

BOOK SUGGESTED :

1. Instrumental methods of analysis, Willard, Meritt and Dean.
2. Basic concepts of analytical chemistry, S.M. Khopkar, John Wiley & Sons.
3. Metallurgical analysis, S.C. Jain.
4. Material Science and Engineering. An Introduction, W.D. Callister, Wiley.
5. Material Science, J.C. Anderson, K.D. Leaver, J.M. Alexander and R.D. Rawlings, ELBS.
6. Fundamentals of Analytical Chemistry, Skoog, Welt, Holler and Crouch Thomson Learning Inc.

PAPER NO. CH - 20
NATURAL PRODUCT AND MEDICINAL CHEMISTRY

Max. Marks 100

UNIT-I

A. **Terpenoids and Carotenoids**: Classification, nomenclature, occurrence, isolation, general methods of structure determination of Citral, Geraniol, α-Terpeneol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and β – Carotene.

B. **Alkaloids:** Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation, classification based on Nitrogen heterocyclic ring, role of alkaloids in plant. Synthesis and biosynthesis of the following: Ephedrine, (+)- Coline, Nicotine, Atropine, Quinine and Morphine.

UNIT-II

A. **Steroids:** Isolation, structure determination and synthesis of Cholesterol, Bile acids, Androsterome, Testosterone, Esterone, Progestrone, Aldostrone and Biosythesis of cholesterol.

B. **Plant Pigments**: Occurrence, nomenclature and general method of structure determination. Isolation and synthesis of Apigenin, Luteolin, Quercetin, Myrcetin, Quercetin-3-glucoside, Vitexin, Diadzine, Butein, Aureusin, Cyanidin-7-arebinoside,Cyanidin, Hirsutidin.

C. **Pyrethroids and Rotenones**: Synthesis and reaction of Pyrethroids and Rotenones.

UNIT- III

Drug Design

A. Development of new drugs procedures followed in drug design, concepts of lead compound and lead modification, concepts of prodrugs and soft drugs, Structure-Activity Relationship (SAR), Factors affecting bioactivity, resonance, inductive effect. Theories of drug activity: occupancy theory, rate theory, induced fit theory. Quantitative Structure Activity Relationship (QSAR).

B. Concepts of drug receptors, lipophilicity, phamacophore, pharmacological activity and typical range of parameters related to drug likeness.

C. General introduction of pharmacokinetics and pharmacodynamics.

UNIT – IV

A. **Anteoplastic Agents**: Introduction, Alkylating agents, antimetabolites, carcinolytic antibiotics, mitotic inhibitors.

B. **Antibiotics**: Constitution and synthesis of penicillins, chloramphenicol, tetracycline and streptomycin.

C. **Antimalarials**: Synthesis and properties of the following Antimalarial: 8-amino quinolone derivatives- Pamaquine, Primapune, Pentaquinr, Isopentaquine, 4- amino quinolone derivatives- Santoquine, Camaquine, Acridine derivatives- Mepracrine, Azacrin, Pyrimidine and Biguanid derivatives- Paludrine Pyremethamine.

Book Suggested:

1. Natural Products: Chemistry and Biological Significance, J. Mann, R. S. Davidson, J. B. Hobbs.
2. D. V. Banthrope and J. B. Harbrone, Longman, Essex., Organic Chemistry, Vol. 2, I. L. Finar, ELBS.
3. Chemistry, Biologcal and Pharmacological properties of Medicinal Plants from the Americans, Ed. Kurt Hostettmann, M. P. Gupta and A. Marston, Harwood Academic Publishers.
4. Introduction to Flavonoids, B. A. Bhom, Harwood Academic Publishers.
5. New Trends in Natural Product Chemistry, Att-ur-Rahman and M. I. Choudhary, Harwood, Academic Publishers.
6. Insecticides of Natural Origin, Sukh Dev, Harwood Academic Publishers.
7. Introduction to medicinal Chemistry, A Gringuage, Wiley-VCH.
8. Burger's Medicinal Chemistry-1 (Chapter-9 and Ch- 14), Drug Ed. M. E. Discovery, Wolff, John Wiley.

PAPER NO. CH - 21

MATERIAL AND NUCLEAR CHEMISTRY

Max.Marks 100

UNIT- I

NON EQUILIBRIUM THERMODYNAMICS : Fundamental concepts, Forces and Fluxes, Entropy production, Phenomenological Laws and Onsager's r for biological systems, coupled reactions.

UNIT- II

MATERIAL CHEMISTRY :

Preparation and Properties of Nanopaeticles, Materials-Metals, Ceramics (Oxide, carbides, sulphides, nitrides).physical and chemical Methods, Size and Shape controlled Synthesis, Sol-gel methods, Optical Properties, Electrical and Magnetic Properties, Application of Nanoparticles.Characterization of Nanoparticles(SEM, TEM etc.)

UNIT-III

SUPRAMOLECULAR CHEMISTRY :

Properties of covalent bonds, bond length, inter bond angles, Force constant, bond and molecular dipole moment, molecular and bond polarizability.

Intermolecular Forces, hydrophobic effects, Electro static, induction, dispersion and resonance energy, Hydrogen bond, Magnetic interactions. Principles of molecular association ad organization Biological marcomolecules, Molecular receptors and design principal, cryptands, Cxclophanes, calixerancs and cyclodextrins.

Supramoleular reactivity and catalysis.

UNIT-IV

NUCLEAR AND RADIOCHEMISTRY

NUCLEAR THEORY :

Nuclear cross section and nuclear radii, nuclear shells and magic numbers, theory of nuclear shell model, nuclear potentials, square well and simple harmonic oscillator potentials, application, liquid drop model, semi-empirical mass equation, application and limitations.

NUCLEAR FISSION :

Mass, energy and charge distribution of fission products, decay chains, prompt and neutrons, liquid drop model of nuclear fission.

NUCLEAR ENERGY :

Nuclear fission, chain reaction, multiplication factor, nuclear reactors

APPLIED RADIOCHEMISTRY :

Radioactive isotopes, purity and strength of radioisotopes. Radiochemical principle in the use of tracers, Application of Tracers in Chemical investigations, Physico-chemical methods, Analytical applications, Age determinations, Medical applications, Agricultural application.

BOOKS SUGGESTED:

1. Nuclear and Radiochemistry by G. Friedlander, J.W. Kennedy & J.M. Miller, John Wittey and Sons, Ine New York.
2. Source Book an Atomic Energy –S.Glasstone, Affiliated East –West Press Pvt. Ltd. New Delhi.
3. Nuclear Physics by I. Kaplan, Addision –Welsly. Publishing company London.
4. Nuclear Chemistry and its applications, M. Haissinsky, Addision –Welsley, Publishing Company, London.
5. Essentials of Nuclear chemistry, H.J. Arnikar, Wiley Eatern Ltd, New Delhi.
6. Molecular Mechanics, U. Burkert and N.L. Allinger, ACS Monograph 177, 1982.
7. Mechanism and Theory in Organic Chemistry, T.H. Lowry and K.C. Richrdson, Harper and Row.
8. Introduction to Theoretical Organic Chemistry and Molecular, Modelling, W.B. Smith, VCH, Weinheim.
9. Physical Organic Chemistry, N.S. Isaacs, ELBS./ Longman.
10. Supramolecular Chemistry: concept and Perspectives, J.M. Lehn, VCH.
11. The Chemistry Mathematics Book, E. Steiner, Oxford University Press.
12. Chemical Mathematics, D.M, Hirst, Longman.
13. Applied Mathematics for Physical Chemistry, J.R. Barrante, Prentice Hall.
14. Quantum Chemistry, Ira N. Levine, Prentice Hall.
15. Introduction to Quantum Chemistry, A.K. Chandra, Tata McGraw Hill.

S

PAPER NO. CH - 22

ENVIRONMENTAL & APPLIED CHEMICAL ANALYSIS

Max. Marks 100

UNIT –I

AIR POLLUTION MONITORING AND ANALYSIS

Classification of air pollution monitoring levels, air quality, standards and index, monitoring and analysis of selected air borne pollutants: SO_2, NO_x, SPM, VOC's, Pb, CO_2, POP's, Hg, carbon and ozone air pollution control devices Viz ESP, scrubber technique, baghouse filters etc. Atmospheric chemistry of acid rains, photochemical smog, green house effect, global warming, ozone hole.

UNIT –II

SOIL AND WATER POLLUTION

Soil and water quality standards, monitoring and analysis of selected soil water contaminants: COD, pesticides, heavy metals, POP's, fluoride, cynide, nitrate, phosphate, oil & greese, Geobiochemical impact of municipal solid waste, steel plants effluent, domestic sewage. Control devices of water pollutants.

UNIT –III

FOOD ANALYSIS

A. Introduction to general Constituents of food, Proximate Constituents and their analysis, Additives-Introduction -Types - Study of preservatives colors and Antioxidants and method of estimation, adulteration - Introduction, Types, Test for adulterants.

B. Introduction standards composition and analysis of following foods : Wheat, Bread, Biscuits, Jam, Jelly, Honey, Milk, Ice Cream, Butter, Cheese, Milk Powder, Oils and Fats, Tea, Coffee, Soft drinks, Alcoholic beverages, Cereal and pulses, Confectionery, Fruits, Vegetables, Egg, Fish, Meat.

UNIT –IV

COSMETICS, CLINICAL AND DRUG ANALYSIS

A. Introduction of Cosmetics, evaluation of cosmetics materials, raw material and additives, Cosmetics colors, Perfumes in cosmetics, Cosmetics formulating, introduction, standards and methods of analysis, Creams, face powders, Make-up, Shaving preparations, Bath preparations.

B. Concepts and principles of analytic methods commonly used in the clinical species: i.e. ammonia, blood urea Nitrogen, Ca, Cl, CO_2, Fe, K, Li, Mg, Na, P, urea, glucose.

Method for analysis of proteins (i.e. albumin, bilirubin, creatinine, cholesterol, HDL-cholesterol, triglycerides, creatinine) and Enzymes (i.e. Aanine Aminotransferase, acid phosphatase, alkaline phosphatase, amylase, aspartate, aminotransferase, cholinesterase, lactate, and lipase).

BOOK SUGGESTED :

1. Environmental Chemistry, S.E. Manahan, Lewis Publishers.
2. Environmental chemistry, Sharma and Kaur, Krishna Publishers.
3. Environmental Chemistry, A.K. De, Wiley Eastern.
4. Environmental Chemistry, Analysis, S.M. Khopkar, Wiley Eastern.
5. Standard Method of Chemical Analysis, F.J. Welcher Vol. III, Van Nostrand Reinhold Co.
6. Environmental Toxicology, Ed. J. Rose, Gordon and Breach Science Publication.
7. Environmental Chemistry, C. Baird, W.H. Freeman.
8. Analytical chemistry, G.D. Christian, J. Wiley.
9. Fundamentals of Analytical Chemistry, D.A. Skoog, D.m. West and F.J. Holler, W.B. Saunders.
10. Analytical Chemistry - Principles, J.H. Kennedy, W. Saunders.
11. Analytical Chemistry-Principles, and Techniques, L.G. hargis, Prentice Hall.
12. Principles of Instrumental Analysis, D.A. Skoog and J.L. Loary, W.B. Saunders.
13. Principles of Instrumental Analysis, D.A. Skoog, W.B. Saunders.
14. Quantitative Analysis, R.A. Day, Jr. and A.L. Underwood, Prentice Hall.
15. Environmental Solution Analysis, S.M. Khopkar, Wiley Eastern.

16. Basic Concepts of Analytical Chemistry, S.M. Khopkar, Wiley Eastern.
17. Handbook of Instrumental Techniques for Analytical Chemistry, F. Settle, Prentice Hall.
18. Environmental Biotechnology, Indushekhar Thakur, I.K. International Pvt. Ltd.
19. Fundamental of Analytical Chemistry, D.A. Skoog, D.m. West, F.J. Holler and S.R. Crouch, Thompson Learning Inc.
20. APHA, 1977, "Methods of air c HealthSamplingAssociationWashingtonand –Analysis US.

OPTIONAL PAPERS
CH-22a
MEDICINAL CHEMISTRY

UNIT I

(a) **DRUG DESIGN**: Development of new drugs, procedures followed in drug design, concepts of lead compound and lead modification, concepts of prodrugs and soft drugs, structure – activity relationship (SAR). Theories of drug activity: Occupancy theory, rate theory, induced fit theory. Quantitative structure activity relationship. History and development of QSAR. Concepts of drug receptors. Lipophilicity and Lipinski Rule of 5.

(b) **PHARMACOKINETICS**: Introduction to drug absorption, disposition, elimination using pharmacokinetics, important pharmacokinetics parameters in defining drug disposition and in therapeutics.

(c) **PHARMACODYNAMICS**: Introduction, elementary treatment of enzyme stimulation, enzyme inhibition, membrane active drugs, drug metabolism, biotransformation significance of drug metabolism in medicinal chemistry.

UNIT II

(a) **ANTINEOPLASTIC AGENTS**: Introduction, role of alkylating agents and antimetabolites in treatment of cancer. Mention of carcinolytic antibiotics and Mitotic inhibitors. Mechlorethamine, cyclophosphamide, melphalan, uracil, mustards, and 6-mercaptopurine.

(b) **CARDIOVASCULAR DRUGS**: Introduction, cardiovascular diseases, drug inhibitors of peripheral sympathetic function. Direct acting arteriolar dilators. Synthesis of amyl nitrate, sorbitrate, diltiazem, quinidine, verapamil, methyldopa, atenolo, oxyprenolo.

UNIT III

(a) **LOCAL ANTIINFECTIVE DRUGS**: Introduction and general mode of action. Synthesis of sulphonamides, furazolidine, nalidixic acid, ciprofloxacin, norfloxacin, dapsone, amino salicylic acid, isoniazid, ethionamide, ethambutal, fluconazole, econozole, griseofulvin, chloroquin and primaquin.

(b) **ANTIBIOTICS**: Cell wall biosynthesis, inhibitors, β-lactam rings, antibiotic inhibiting protein synthesis. Synthesis of penicillin G, penicillin V, ampicillin, amoxicillin, chloramphenicol, cephalosporin, tetracycline and streptomycin.

UNIT IV

PSYCHOACTIVE DRUGS- THE CHEMOTHERAPY OF MIND : Introduction, neurotransmitters, CNS depressants, mode of action of hypnotics, sedatives, anti-anxiety drugs, benzodiazipines, busipirone.Antipsychotic drugs – the neuroleptics, antidepressants, butyrophenones, serendipity and drug development, stereochemical aspects of psychotropic drugs. Synthesis of diazepam, oxazepam, chlorazepam, alprazolam, phenytoin, ethosuximode, trimethadione, barbiturates, thiopental sodium, glutethimide.

Books Suggested

1. Introduction to Medicinal Chemistry, A Gringuage, Wiley-VCH
2. Wilson and Gisvold's Text Book of Organic Medicinal and Pharmaceutical Chemistry, Ed Robert F. Dorge
3. An Introduction to Drug Design, S. S. Pandeya and J.R.Dimmock, New Age International.
4. Burgers's Medicinal Chemistry and Drug Discovery, Vol-1(Chapter-9 and Chapter-14), Ed. M.E. Wolff, John Wiley.
5. Goodmann and Gilman's Pharmacological Basis of Therapeutics, Mc-Graw Hill.
6. The Organic Chemistry of Drug Design and Drug Action, R. B. Silverman, Academic Press.
7. Strategies for Organic Drug Synthesis and Design, D.Lednicer, John Willey

CHEMISTRY OF SURFACTANTS
CH-22b

UNIT- I

OVERVIEW OF SURFACTANTS: Classification of Surfactants, Physicochemical Properties of Surfactants, Critical Micelle Concentration , Determination, Effect of Additives,Aggregate Shapes , Structure and Morphology, Novel and New Generation Surfactants, Aggregation Behavior.

UNIT-II

PRINCIPLES OF SELF-ASSEMBLY: Closed and Continuous Association , Surfactant MicellizationPseudo-Phase Model , Mass Action Model, Estimation of Micelle Size ,Size Dispersion of Micelles, Concentration Dependence of Micelle Size , Phase Behavior, Aggregation Behavior.

UNIT-III

SURFACTANT MIXTURES: Ideal and Non-Ideal Mixed Micelles ,Regular Solution Model Size and Composition Distribution of Aggregates ,Nonionic –ionic Surfactant Mixtures ,Ionic -Ionic Surfactant Mixtures,Origin of Ideal and Non-Ideal Mixing Behavior, Polymer SurfactantInteraction.

UNIT-IV

APPLICATIONS OF SURFACTANTS: Micellar Catalysis, Quantitative Models ,Micellar Enzymology, Phenomenon of Solubilization , Solubilization in Mixed Micelles, Drug Surfactant Interaction, Protein Surfactant Interactions, Microemulsions and its applications, Industrial Application of Surfactants.

Books:

1. Surfactants Edited by Th. F. Tadros, Academic Press
2. Micelles : Theoretical and Applied Aspects by Y. Moroi
3. Chemistry and Technology of Surfactants by R. J. Farn Wiley

CHEMISTRY AND APPLICATION OF PESTICIDES
CH-22c

UNIT-1

INTRODUCTION: What is pesticides, classification of pesticides, utility of pesticides, categories of toxicity, Threshold limit value, LD 50 value, Effect of pesticides in food, House hold and Human health.

UNIT-2

CHEMICAL TOXICOLOGY: Biochemical effects of pesticides, pesticides persistence, bioaccumulation and biomagnifications of pesticides, Toxicology of pesticides, Toxicology of organophosphates, carbamates, organochlorine and Dermal Toxicology of pesticides.

UNIT-3

INSTUMENTAL TECHNIQUES IN PESTICIDES DETECTION: Spectrophotometry, paper chromatography, Thin layer chromatography (TLC), GC-MS, indicator tube, High performance (pressure) Liquid chromatography (HPLC).

UNIT-4

PESTICIDES AND ITS RESIDUE ANALYSIS: Steps in pesticides residue analysis, clean-up, concentration (evaporation), Analysis, Extent of residue of pesticides in different commodities.

References

- Environmental chemistry. A.K De. New Age International Pvt. Ltd. 6th edition.
- Soil Testing and Analysis,plant, water and pesticide residues- Patiram,Bajendra N.S. Azad, Thakur and T.Ramesh.Agricultural,Horticultural,Food and Veterinary Science Book.2nd edition.
- Toxicology of pesticides: Experimental,clinical and regulatory perspectives. Edited by: Lucio G. Costa,Corrado L. GalliSheldon D. Murphy.Springer,1st edition.
- Persistent Pesticide in the Environment- C.A Edward, CRC Press Inc.,Florida 2nd edition.
- Agricultural chemicals and chemical mutagens- C.L.Canoria.
- Progress in pesticide Biochemistry and Toxicology- D.H Hutson and T.R Roberts. Willey,7th edition.
- Air pollution from Pesticides and Agricultural process. Lee,R.F., Jr.CRC Press Inc., Florida, 1976,174.

MOLECULAR SYMMETRY, COORDINATION AND ORGANOMETALLIC CHEMISTRY
CH-22 d

UNIT – I

SYMMETRY AND GROUP THEORY IN CHEMISTRY: Symmetry elements and symmetry operation, definitions of group, subgroup, relation between orders of a finite group and its subgroup.Conjugacy relation and classes.Point symmetry group.Schonflies symbols, representations of groups by matrices (representation for the C_n, C_{nv}, C_{nh}, D_{nh} etc. groups to be worked out explicitly). Character of a representation.The great orthogonality theorem (without proof) and its importance.Character tables and their use; spectroscopy.

UNIT – II

A. METAL-LIGAND BONDING: Limitation of crystal field theory, molecular orbital theory, octahedral, tetrahedral and square planar complexes, bonding and molecular orbital theory.

B. ELECTRONIC SPECTRA AND MAGNETIC PROPERTIES OF TRANSITION METAL COMPLEXES: Spectroscopic ground states, Correlation, Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^1-d^9 states), Selection rules, mechanism for break down of the selection rules, intensity of absorption, band width, spectra of d-d metal complexes of the type $[M(H_2O)]^{n+}$, spin free and spin paired ML6 complexes of other geometries, Calculations of Dq, B and parameters, spin forbidden transitions, effect of spin-orbit coupling, Spectrochemical and Nephelouxetic series.

UNIT – III

A. REACTION MECHANISM OF TRANSITION METAL COMPLEXES: Energy profile of a reaction, reactivity of metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetics of octahedral substitution, anation reactions, reactions without metal ligand bond cleavage. Substitution reactions in square planar complexes, the trans effect. Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outer sphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

B. METAL–LIGAND EQUILIBRA IN SOLUTION: Stepwise and overall formation onstants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexs with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH-metry and spectrophotometry.

UNIT – IV

METAL π-COMPLEXES: Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structural elucidation, important reactions of metal carbonyls; preparation, bonding, structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes; tertiary phosphine as ligand. B. Tranisition metal complexes with unsaturated organic molecules,alkanes ,allyl ,dienedienyl,arene and trienyl complex,preparations,properties,nature of bonding and structure features.Important reaction relating to nucleophilic, electrophilic attack on ligands and organic synthesis.Alkylidenes, low valentcarbenes nature of bond and Structural characteristics.

NANOCHEMISTRY

CH-22 e

UNIT I

GENERIC METHODOLOGIES FOR NANOCHEMISTRY AND NANOTECHNOLOGY

Introduction and classification, What is nanotechnology?, Classification of nanostructures, Nanoscale architecture, Summary of the electronic properties of atoms and solids, The isolated atom, Bonding between atoms, Giant molecular solids, The free electron model and energy bands, Crystalline solids, Periodicity of crystal lattices, Electronic conduction, Effects of the nanometre length scale, Changes to the system total energy, Changes to the system structure, How nanoscale dimensions affect properties

UNIT -II

MATERIAL CHEMISTRY

Preparation and Properties of Nanoparticles, Materials-Metals, Ceramics (Oxide, carbides, sulphides, nitrides).physical and chemical Methods, Size and Shape controlled Synthesis, Sol-gel methods, Optical Properteis, Electrical and Magnetic Properties, Application of Nanoparticles.

UNIT-III

CHARACTERIZATION METHODS

X-ray diffraction, Debye-Scherer formula, dislocation density, micro strain, Synchrotron Radiation, Principle and Applications, Raman Spectroscopy and its Applications, Dynamic Light Scattering (DLS). Electron microscopes: scanning electron microscope (SEM), transmission electron microscope (TEM), atomic force microscope (AFM), scanning tunneling microscope (STM), XPS, Working Principle, Instrumentation and Applications. Differential scanning calorimeter (DSC), Thermogravimetric/Diffferential Thermal Analyzer (TG/DTA), UV – Visible Spectrophotometer, FTIR, Principle and Applications, Photoluminescence (PL) Spectroscopy.

UNIT-IV

APPLICATIONS ON NANOCHEMISTRY

Nanobiology, Introduction, Bio-inspired nanomaterials, Interaction Between Biomolecules and Nanoparticle Surfaces, Different Types of Inorganic Materials Used for the Synthesis of Hybrid Nano-bio Assemblies, Applications of Nano in Biology, Nanoprobes for Analytical Applications, Current Status of Nanobiotechnology, Future Perspectives of Nanobiology; Nanosensors, Electrochemical, Nanobiosensors, Smart Dust; Nanomedicines, Nanodrug Administration Diagnostic and Therapeutic Applications.

References:

1. Nanoparticles: From Theory to Application Edited by Gu¨nter Schmid, @ 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
2. Nanoparticles and Catalysis Edited by Didier Astruc @ 2008 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
3. Peter Atkins, Tina Overton, Jonathan Rourke, Mark Weller, Fraser Armstrong, Mike HagermanShriver and Atkin's Inorganic Chemistry, Fifth Edition, Oxford, 2010.
4. Nanoscale Science and Technology, Robert W. Kelsall, Ian W. Hamley and Mark Geoghegan, John Wiley & Sons, Ltd., UK, 2005.
5. Introduction to Nanotechnology, Charles P. Poole Jr and Frank J. Owens, Wiley Interscience, 2003.
6. Nano:The Essentials: Understanding Nanoscience and Nanotecnology, T.Pradeep, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.

CHEMISTRY OF NATURAL PRODUCTS

CH-22 f

UNIT-I **Terpenoids and Carotenoids** **15 Hrs**

Classification; nomenclature, occurrence, isolation, general methods of structure determination, isoprene rule.Structure determination, stereochemistry, biosynthesis and synthesis of the following representative molecules; Citral, Geraniol, α-Terpeneol, Menthol, Farnesol, Zingiberene, Santonin, Phytol, Abietic acid and β-Carotene.

UNIT-II **Alkaloids** **15 Hrs**

Definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation, degradation classification based on nitrogen heterocyclic ring, role of alkaloids in plants.Structure, stereochemistry, biosynthesis and synthesis of the following: Ephedrine, (+)- Coniine, Nicotine, Atropine, Quinine and Morphine.

UNIT-III **Gteroids**

Occurrence, nomenclature, basic skeleton, Diel's hydrocarbon and stereochemistry. Isolation, structure determination and synthesis of Cholesterol, Bile acids, Androsterone, Testosterone, Estrone, Progestrone, Aldosterone.

UNIT -IV **Plant Pigments** **7 Hrs**

Occurrence, nomenclature, general methods of structure determination, isolation and synthesis of Apigenin, Luteolin, Quercetin, myrcetin, Quercetin-3-glucoside, Vitexin, Diadzein, Butein, Aureusin, Cyanidin-7-arabinoside, Cyanidin, Hirsutidin. Biosynthesis of flavonoids: Acetate pathway and Shikimic acid pathway.

UNIT -V **Porphyrins**

Structure and synthesis of Haemoglobin and Chlorophyll.

UNIT -VI **Prostaglandins**

Occurrence, nomenclature, classification, biogenesis and physiological effects.
Synthesis of PGE_2 and $PGF_{2\alpha}$.

UNIT-VII **Pyrethroids and Rotenones**

. Synthesis and Reaction of Pyrethroids and Rotenones

Books Suggested :

1. Natural Products : Chemistry and Biological Significance, J. Mann, R.S. Davidson,
J B Hobbs, D.V. Banthrope and J B Harborne, Longman
2. Organic Chemistry, Vol 2 , IL Finar ELBS
3. New Trends in Natural Products Chemistry , A R Rahman and M I Choudhury,
Harwood Academic Publishers

4. Roods Chemistry of Carbon Compounds, Ed S. Coffey, Elsevier

POLYMERS

CH-22 g

8 Hrs

UNIT- I **Basics**

Importance of polymers. Basic concepts: Monomers, repeat units, degree of polymerization. Linear, branched and network polymers. Classification of polymers.Polymerization: condensation, addition, radical chain-ionic and co-ordination and co-polymerization. Polymerization conditions and polymer reactions. Polymerization in homogeneous and heterogeneous system.

UNIT- II **Polymer Characterization** **14 Hrs**

Polydispersion-average molecular weight concept. Number, weight and viscocity average molecular weights. Polydispersity and molecular weight distribution. The practical significance of molecular weight. Measurement of molecular weights. End-group, viscocity, light scattering, osmotic and ultracentrifugation methods. Analysis and testing of polymers-chemical analysis of polymers, spectroscopic methods, X-ray diffraction study. Microscopy. Thermal analysis and physical testing-tensile strength. Fatigue, impact. Tear resistance. Hardness and abrasion resistance.

UNIT-III **Structure and Properties** **14 Hrs**

Morphology and order in crystalline polymers-configurations of polymer chains. Crystal structure of polymers. Morphology of crystalline polymers, strain-induced morphology, crystallization and melting. Polymer structure and physical properties-crystalline melting point Tm- melting point of homogeneous series, effect of chain flexibility and other steric factors, entropy and heat of fusion. The glass transition temperature, Tg-Relationship between Tm and Tg, effects of molecular weight, diluents, chemical structure, chain topology, branching and cross linking. Property requirements and polymer utilization.

UNIT-IV **Polymer Processing** **12 Hrs**

Plastics, elastomers and fibres. Compounding. Processing techniques: Calendering, die casting, rotational casting, film casting, injection moulding, extrusion moulding, thermoforming, foaming, reinforcing and fibre spinning.

UNIT-V **Properties of Commercial Polyme** **12 Hrs**

Polyethylene, polyvinyl chloride, polyamides, polyesters, phenolic resins, epoxy resions and silicone polymers. Functional polymers- Fire retarding polymers and electrically conducting polymers. Biomedical polymers- contact lens, dental polymers, artificial heart, kidney, skin and blood cells.

Books Suggested :

1. Textbook of Polymer Science, F W . Billmeyer Jr. Wiley
2. Polymer Science, V R Gowarikar, N V Viswanathan and J Sreedhar, Wiley Eastern
3. Contemporary Polymer Chemistry, H R Alcock and F W Lambe, Prentice Hall
4. Physics and Chemistry of Polymers, J M G Cowie, Blackie Academic and Professional

FORENSIC CHEMISTRY

Course -22h

Unit-I

Introduction to Forensic Science

Forensic science : methodologies and applications used in the forensic context. Organic and inorganic chemical analyses of physical evidence, principles of serology and DNA analysis, ballistics, arson, fingerprint analysis, drug analysis,

Unit-II

Forensic Chemistry

Chemical aspects of forensic science as it applies to criminal investigation and laboratory preparation. Instrumentation and chemistry associated with crimes. properties of the chemical evidence.. Details of the methods employed for analysis, such as color test, Chromatography (GC, GLC, HPLC), mass spectrometry (MS), GC-MS. Laboratory course. Instrumental Aspects of Liquid Chromatography Solvent delivery systems, sample inlets, temperature control, coupled column systems, detectors, and indirect detection other Separation Techniques

Unit-III

Toxicology

General principles and fundamentals of forensic toxicology, poisons, action, toxicity, postmortem characteristics, samples required for toxicological analysis and methods of collection, methods of preservation and analysis. Chemical, toxicological and pathological characteristics of commonly abused drugs, including the following: ethanol, barbiturates, narcotics, stimulants, and hallucinogens

Unit-IV

Applications of Forensic Chemistry

Investigation of crime against society, food adulteration, environmental pollution, use and distribution of unsafe chemicals, career in criminal investigation, in the laboratory analysis of forensic evidence,. Drug Enforcement Administration, Food and Drug Administration, Environmental Protection Agency, and Occupational Safety and Health Administration. environmental sciences, industrial hygiene,.

PAPER NO. CH –23 SEMINAR

PAPER No. CH-24 PROJECT WORK

SYLLABUS

M. Phil. COURSE

IN

CHEMISTRY

2017-2018

PT. RAVISHANKAR SHUKLA UNIVERSITY

RAIPUR - 492 010, CHHATTISGARH

M. Phil. IN CHEMISTRY

DURATION : 01 YEAR

M.M. : 500

COURSES

Name of Course		Total Marks
Compulsory **Course I :** Research Methodology in Chemistry		100
Out of following three courses , one has to opt any two courses. **Course II :** Medicinal and Physical Organic Chemistry		100
Course III: Advanced Environmental Chemistry		100
Course IV : Chemistry of Nanomaterials		100
Seminar	Based on Theory	50
Dissertation	Seminar based on Dissertation	50
	Script Writing	75
	Viva-voce	25
	Total Marks	**500**

Note : A Student shall submit a dissertation based on his/her Practical work.

M. Phil.

COURSE - I

RESEARCH METHODOLOGY IN CHEMISTRY

M.M. – 100

UNIT-I RESEARCH METHODOLOGY

Purpose of research; Research project Conceptualization, choice of methods; Elements of a research proposal, operationalization choices and illustrations. Research design: formulation, pre-testing of research instruments and procedures, units of analysis, time dimension.Experimental design and use of indicators in research. Survey Research: Guidelines for asking question and questionnaires construction, Self-administered questionnaires, Interview and other survey methods; their strength and weaknesses. Sampling: the logic of sampling , concepts and terminologies , population and Sampling frames , types of sampling design .Field studies : steps in the conducting field study ; evaluation research: how to carry out evaluation research , Fundamental knowledge of Patent and IPR.

UNIT-II LITERATURE SEARCH TECHNIQUE

IUPAC rule for nomenclature –Introduction to chemical abstracts –Subject Index, Substance Index, Author Index, Formula Index and other indices-Uses of these indices with examples-current contents –organization –methods of using the titles and index –other similar abstracts for special topics related to chemistry. Use of computer browsing for literature search and downloading –basics of internet services –various sources of abstracts ,articles and papers of browsing and downloading, Techniques of conversion from one format to another Structure drawing programs and their uses –searches through structure . Use of Literature, Knowledge of National and International Journals, Impact Factor, Citation-Index, h Index,SCI Journals, Plagiarism

UNIT-III INSTRUMENTAL TECHNIQUES

Principle, instrumentation and application of electro-analytical, spectrophotometry, fluorimetry, AAS, AES, XRF and NMR techniques. Principle instrumentation and application of chromatography and MS techniques. Classical Method of Analysis

UNIT-IV SAMPLING ASND MODELING

Measurement and sampling technique of air pollutants using air monitors in selected atmospheric receptors. Statistical approach in environmental monitoring and analysis using selected parameters (correlation and regression analysis, factor analysis etc.) and graph ploting (Boxplot, histogram etc.)

UNIT-V STATISTICAL ANALYSIS

Various types of errors – precision and accuracy- significant figures, various statistical tests on the accuracy of results, positive and negative deviation from accurate results the binomial distribution, the Gaussian distribution - the normal distribution of random errors, mean value, variance and standard deviation, reliability interval, deviations, from the Gaussian law of error distribution, student's t-distribution, and t-test- comparison of the mean with the expected value, comparison of the results of two different methods, comparison of the precision of two methods by F-test, Gross errors and elimination of outlying results, graphical methods- Linear regression line, standard deviation, correlation coefficient-Multiple linear regression (one variable with two other variables).

BOOK SUGGESTED:

1. Thesis and Assignment Writing – J. Anderson, B.H. Dursten and M.Poole, Wiley Eastern (1977).
2. A Hand Book of Methodology of Research – P. rajamal and P. Devadoss, R.M.M.Vidya Press (1976).
3. instrumental Methods of Analysis – H.H. Willard, L.L.Merritt, J.a.Dean, F.A. Settle, CBS Publishers & Distributors, 1986.
4. Practical Process, Research and Development – Neal G. Anderson, Amazow

COURSE – II

MEDICINAL AND PHYSICAL ORGANIC CHEMISTRY

M.M. - 100

UNIT – I

Classification of drugs, Identification of active part: Pharmacophore, drug likeliness. Binding Forces: covalent bonds, ionic bonds, hydrogen bonds and van der waal's bonds.
Lipid, Membrane and Cell coats: Liped structure, Membrane Structure, Membrane Proteins, transport of molecules through Membrane, the extracellular matrix and cell walls.

UNIT – II

Chemistry of Drug (and related compound) Metabolism: General Pathway, Sites of drug biotransformation, oxidative reactions : of aromatic moieties, olefins, benzylic carbon atoms, allylic carbon atoms, oxidation of carbon atom to carbonyls and imines, aliphatic and alicyclic carbon atoms, oxidation involving carbon-heteroatom systems. Reductive reactions of aldechydes, ketones, nitro and azo compounds. Hydrolytic reactions of esters and amides.
Conjugation reactions of sulfate, glycine, glutamine. Acetylation and methylation reactions, during metabolism.

UNIT – III

MICELLAR CHEMISTRY

Physical and chemical properties of surfactants and micelles in aqueous solutions, micelle formation and structure thermodynamics, miceller effects on hydrophobic interactions of protein structure, effect of additives on the CMC ,principle of micellar catalysis, micellar catalysis of hydrolysis, solvolysis , micellar enzymology.

UNIT –IV

STRUCTURAL EFFECTS ON REACTIVITY : Linear free energy relationships (LFER). The Hammett equation, substituent constants, theory of substituent effects. Interpretation of - values.Reaction constant . Devotions from Hammett equation. Dual parameter correlations, Inductive substituent constant. The Taft model, $\square_I$-and $\square_R$-scales.

KINETIC ISOTOPE EFFECT : Theory of isotope effect. Primary and secondary kinetic isotope effects. Heavy atom isotope effect. Tunneling effect, Solvent effects and solvent isotope Effects

UNIT –V

SOLVATION AND SOLVENT EFFECTS : Qualitative understanding of solvent solute effects on reactivity, Classification of solvents, Solvation, Thermodynamics of Solvation, effects of solvation on Reaction Rates and Equilibria, Various Empirical indexes based on Physical properties, Dielectric Constant, Grunwald- Winstein Parameters. Koppel Palm Treatment, Solvent sensitive Reaction Rates, Spectroscopic parameters and Scales for Specific Solvation, use of solvation Scales in Mechanistic studies, solvent effect from curve Crossing models

BOOK SUGGESTED:

1. Introduction to Medicinal Chemistry, A Gringuage, Wiley – VCH.
2. Wilson and Gisvold's Test Book of organic Medicinal and Pharmaceutical Chemistry, Robert F. Dorde.
3. An Introduction to Drug Design, S.S. Pandeya and J.R. Dimmock, New Age International.
4. Burger's Medicinal Chemistry and Drug Discovery, Vol – 1(Chapter – 9 and Ch-14), Ed. M.E. Wolff, John Wiley.
5. Goodman and Gilman's Pharmacological Basis of Therapeutics, Mc Graw – Hill
6. The Organic chemistry of Drug Synthesis and Design Action, R.B. Silverman, Academic Press.
7. Strategies for Organic Drug Synthesis and Design, D. Lednicer, John Wiley.
8. Medicinal Chemistry, Alex Cringauz, Wiley-VCH, NY.
9. Comprehensive Medicinal Chemistry, Ed. Corwin Hanch, Vol. 1-6, Elsevier.
10. Biochemistry, the Chemical Reactions of Living Cells, David E. Metzler, Vol. I, Harwart Academic Press.
11. Micells & Y.Moroi
12. Mechanism and Theory in Organic Chemistry, T H Lowry and KS. Richardson, harper and Row.
13. Physical Organic Chemistry, N.S.Isaacs
14. The physical Basis of Organic chemistry, H.Maskil.
15. Text book of Organic, Medicinal and Pharmaceutical Chemistry, J.L.Delgado and W.A.Remers, Lippincott Williams of Williams.

COURSE – III

ADVANCED ENVIRONMENTAL CHEMISTRY

M.M. - 100

UNIT-I

HEAVY METAL TOXICOLOGY: concept, heavy metals in environment (i.e. Arsenic, Selenium, Cadmium, Mercury, Thallium, Lead), sources, toxicity, transformations, biochemical effects, remedial measures

ORGANIC POLLUTANT TOXICOLOGY: introduction, application potential, limitation of pesticides uses, toxicology of major pesticides, environmental impacts of pesticides, pesticide persistence, bioaccumulation and biomagnifications pesticide resistance

RADIATION HAZARDS: introduction, atomic radiations, natural radiations, effects of radiations, radioactivity and effects on man, impacts of radioactive radiations, radioactive waste, ionizing radiation and effects, radiation protection

UNIT-II

INDUSTRIAL AND SLUDGE WASTE MANAGEMENT: Municipal, sediment, steel plant, cement plant and thermal power plant.

HEALTH IMPACTS: human disease (i.e. infection disease, chemicals, diet, water born pathogens, vector born, Minamata disease), radiation damage, climate hange and human health, respiratory hazards.

RISK ASSESSMENT: Concept, risk evaluation (i.e. hazard identification, exposure assessment, hazard assessment and risk characterization), public perception of risk, risk communication.

UNIT-III

STANDARD FOR ENVIRONMENTAL QUALITY ASSESSMENT AND MONITORING: Introduction, Environmental Protection standards in India, international standards, environmental quality monitoring: ISO14000, ISO14000-impact on developing countries

ENVIRONMENTAL IMPACT ASSESSMENT: concept, process, evaluation methodology, and approaches

ENVIRONMENTAL AUDIT: Concept, setting an audit programme, typical audit process, carrying out the audit, benefits of environmental auditing, environmental audit programmed in India

UNIT-IV

Biotechnological approach of environment, Biodegradation of pollutants, toxic site reclamation, removal of spilled oil & grease deposits, reducing environmental impacts of herbicides and pesticides, biosensors.

Biotechnological energy and agricultural production management.

Biomass, biogas, bioethanol, biohydrogen, biofertilizers, biopesticides.

BIOLOGICAL ENERGY: Biofuels, natural vegetations, energy tree plantations, specific energy crops, power from biomass, biomass programmes, biomass and the environment.

UNIT-V

SUSTAINABILITY : Concept, sustainable uses of natural resourced materials and waste management, sustainability in agriculture

MODELS : Mathematical models, approaches, model applications in air, aquatic and land environments.

NATURAL DISASTERS : Earthquakes, Tsunami, windstorms, floods, drought, volcanoes, el-nino, ozone hole, smog, pollen and their allergens, atmospheric turbidity.

BOOK SUGGESTED:

1. Perry, G. 1980. Introduction of Environmental Toxicology, Elsevier, Netherland.
2. Santra, S.C. 1994, Ecology; Basic and Applied , M.D. Publication, New Delhi (India).
3. Santra, S.C. 2001, Enviromental Science, New Central Book Agency (P) Ltd. Calcutta (India).

Course -IV

CHEMISTRY OF NANOMATERIALS

UNIT I: GENERIC METHODOLOGIES FOR NANOCHEMISTRY AND NANOTECHNOLOGY:

Introduction and classification - What is nanotechnology? - Classification of nanostructures - Nanoscale architecture; Summary of the electronic properties of atoms and solids - The isolated atom - Bonding between atoms - Giant molecular solids - The free electron model and energy bands - Crystalline solids - Periodicity of crystal lattices -Electronic conduction; Effects of the nanometre length scale - Changes to the system total energy - Changes to the system structure - How nanoscale dimensions affect properties?

UNIT -II. MATERIAL CHEMISTRY :

Preparation and Properties of Nanoparticles, Materials-Metals, Ceramics (Oxide, carbides, sulphides, nitrides).physical and chemical Methods, Size and Shape controlled Synthesis, Sol-gel methods, Optical Properteis, Electrical and Magnetic Properties, Application of Nanoparticles.

UNIT-III . CHARACTERIZATION METHODS.

X-ray diffraction - Debye-Scherer formula – dislocation density – micro strain – Synchrotron Radiation – Principle and Applications –Raman Spectroscopy and its Applications – Dynamic Light Scattering (DLS). Electron microscopes: scanning electron microscope (SEM) – transmission electron microscope (TEM); atomic force microscope(AFM) – scanning tunneling microscope (STM) - XPS – Working Principle, Instrumentation and Applications. Differential scanning calorimeter (DSC) – Thermogravimetric/Diffferential Thermal Analyzer (TG/DTA) – UV – Visible Spectrophotometer - FTIR – Principle and Applications – Photoluminescence (PL) Spectroscopy.

UNIT-IV APPLICATIONS ON NANOCHEMISTRY

Nanobiology - Introduction - Bio-inspired nanomaterials - Interaction Between Biomolecules and Nanoparticle Surfaces - Different Types of Inorganic Materials Used for the Synthesis of Hybrid Nano-bio Assemblies -

UNIT-V APPLICATIONS OF NANO IN BIOLOGY

Applications of Nano in Biology -Nanoprobes for Analytical Applications - Current Status of Nanobiotechnology - Future Perspectives of Nanobiology; Nanosensors, Electrochemical , Nanobiosensors - Smart Dust; Nanomedicines, Nanodrug Administration Diagnostic and Therapeutic Applications.

References:

1. Nanoparticles: From Theory to Application Edited by Gu¨nter Schmid, @ 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
2. Nanoparticles and Catalysis Edited by Didier Astruc @ 2008 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim
3. Peter Atkins, Tina Overton, Jonathan Rourke, Mark Weller, Fraser Armstrong, Mike HagermanShriver and Atkin's Inorganic Chemistry, Fifth Edition, Oxford, 2010.
4. Nanoscale Science and Technology, Robert W. Kelsall, Ian W. Hamley and Mark Geoghegan, John Wiley & Sons, Ltd., UK, 2005.
5. Introduction to Nanotechnology, Charles P. Poole Jr and Frank J. Owens, Wiley Interscience,
   2003.
6. Nano:The Essentials: Understanding Nanoscience and Nanotecnology, T.Pradeep, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2008.

SYLLABUS

PRE - Ph.D. COURSE

IN

CHEMISTRY

2017-2018

PT. RAVISHANKAR SHUKLA UNIVERSITY
RAIPUR - 492 010, CHHATTISGARH

PRE - Ph.D. COURSE

DURATION : SIX MONTHS **M.M. :** 200

COURSES		MARKS
COURSE I	1. RESEARCH METHODOLOGY	20
	2. LITERATURE SEARCH TECHNIQUE	20
	3. INSTRUMENTATION TECHNIQUES	20
	4. SAMPLING & MODELING	20
	5 STATISTICAL ANALYSIS	20
COURSE II	6. PROJECT BASED ON REVIEW OF RESEARCH WORK	50
	7. SEMINAR	50
	TOTAL	**200**

PRE - Ph.D. COURSE

COURSE – I

RESEARCH METHODOLOGY IN CHEMISTRY

M.M. - 100

UNIT-I RESEARCH METHODOLOGY

Purpose of research; Research project Conceptualization, choice of methods; Elements of a research proposal, operationalization choices and illustrations. Research design: formulation, pre-testing of research instruments and procedures, units of analysis, time dimension.Experimental design and use of indicators in research. Survey Research: Guidelines for asking question and questionnaires construction, Self-administered questionnaires, Interview and other survey methods; their strength and weaknesses. Sampling: the logic of sampling , concepts and terminologies , population and Sampling frames , types of sampling design .Field studies : steps in the conducting field study ; evaluation research: how to carry out evaluation research , Patent and IPR.

UNIT-II LITERATURE SEARCH TECHNIQUE

IUPAC rule for nomenclature –Introduction to chemical abstracts –Subject Index, Substance Index, Author Index, Formula Index and other indices-Uses of these indices with examples- current contents –organization –methods of using the titles and index –other similar abstracts for special topics related to chemistry. Use of computer browsing for literature search and downloading –basics of internet services –various sources of abstracts ,articles and papers of browsing and downloading , Techniques of conversion from one format to another Structure drawing programs and their uses –searches through structure . Use of Literature, Knowledge of National and International Journals, Impact Factor, Citation-Index, h Index,SCI Journals, Plagiarism

UNIT-III INSTRUMENTAL TECHNIQUES

Principle, instrumentation and application of electro-analytical, spectrophotometry, fluorimetry, AAS, AES, XRF and NMR techniques. Principle instrumentation and application of chromatography and MS techniques. Classical Method of Analysis

UNIT-IV SAMPLING AND MODELING

Mesearment and sampling technique of air pollutants using air monitors in selected atmospheric receptors. Statistical approach in environmental monitoring and analysis using selected parameters(correlation and regression analysis, factor analysis etc.) and graph ploting (Boxplot ,histogram etc.)

UNIT-V STATISTICAL ANALYSIS

Various types of errors – precision and accuracy- significant figures, various statistical tests on the accuracy of results, positive and negative deviation from accurate results the binomial distribution, the Gaussian distribution - the normal distribution of random errors, mean value, variance and standard deviation, reliability interval, deviations, from the Gaussian law of error distribution, student's t-distribution, and t-test- comparison of the mean with the expected value, comparison of the results of two different methods, comparison of the precision of two methods by F-test, Gross errors and elimination of outlying results, graphical methods- Linear regression line, standard deviation, correlation coefficient-Multiple linear regression (one variable with two other variables).

COURSE - II **M.M. :** 100

I. PROJECT BASED ON REVIEW OF RESEARCH WORK M.M.-50

II. SEMINARS M.M.-50

BOOK SUGGESTED:

1. Ahuja & Jespersen, Modern Instrumental Analysis, 1st Edition, Elsevier Science, 2006.
2. Douglas A. Skoog; F. James Holler; Stanley R. Crouch, Principles of instrumental Analysis, Cole Pub Co., 2006.
3. John Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (Hardcover), 2008
4. John W. Creswell, Qualitative Research & Evaluation Methods , 2008
5. Thesis and Assignment Writing – J. Anderson, B.H. Dursten and M.Poole, Wiley Eastern (1977).
6. A Hand Book of Methodology of Research – P. rajamal and P. Devadoss, R.M.M.Vidya Press (1976).
7. instrumental Methods of Analysis – H.H. Willard, L.L.Merritt, J.a.Dean, F.A. Settle, CBS Publishers & Distributors, 1986.
8. Practical Process, Research and Development – Neal G. Anderson, Amazow

(Semester System)

M.A. Philosophy

For SOS and Colleges

There shall be four semesters, each semester shall consist four papers Each paper shall carry 100 marks.(80 theory+20 internal.)

Semester -I

July-December, 2017 (w.e.f. Session 2017-18)

Paper-I Indian Ethics

Unit -I Presuppositin of Indian, Dharma asethical code, Concepts of Rta, Rina and Yajna.
Unit -II Law of Karma and its mporal implication ,Karma Yoga
Unit-III Nishkam Karma, Swadharma and LokaSamgraha of Gita, Triratna of Jaina Ethics.
Unit-IV Ashtanga Yoga of Patanjali and Eight fold path of Buddha.
Unit -V Sadhana Chatushtaya -means of ethical life.

Paper-II Indian Logic.

Unit -I Nature of Indian logic,Relation of logic with Epistemology and Metaphysics, Concept of Purvapaksha, Siddhanta paksha,and Anvikshiki.
Unit-II Definition and constituents of Anumana--Nyaya ,Buddhist and Advaitic perspective.
Unit-III Types of Anumana- Nyaya ,Buddhist and Advaitic perspective.
Unit-IV Vyapti,Paksha and Paramarsha,Jaina theory of Anumana.
Unit-V Hetvabhasas.

Paper-III. Indian Epistemology.

Unit I Definition and nature of Cognition, Prama and Aprama, Nature of Indriyas.
Unit-II Origin and ascertainment of validity,Swatah and Paratah pramanya.
Unit-III Debate about validity and invalidity of dream and memory

cognitions, meaning of khyativada, Sadkhyati and asadkhyati.

Unit-IV Akhyativada, Anyatha khyativada, Atma khyativada, Anirvachaniyakhyativada Sadasadkhyativada,Viparitakhyativada.

Unit-V Breif study of Pratyaksha,Shabda,Arthapatti and Anupalabdhi pramanas.

Paper-IV. Indian Metaphysics.

Unit-I Nature of metaphysics, Concept of Reality, Appearance and Relation.

Unit-II Monism, Dualism, Advaitism--debates regarding Reality.

Unit-III Theories of cause and effect,Parinamavada , vivartavada, Maya in different schools of Vedanta.

Unit-IV Shunyavada,Brhmavada,Theism ,Naterialism.

Unit-V Cosmology--Advata, Visishtadvaita and Dvaita.

Semester -II

January-June, 2018 (w.e.f. Session 2017-18)

Paper-I Western Ethics.

Unit-I Definition, nature and scope of ethics, Difference between Ethical and social values.

Unit-II Emotivism--A.J.Ayer. Prescriptivism--R.M.Hare.

Unit-III Utilitarianism-for and against, Neo-naturalism.

Unit-IV Kantianism-for and against.

Unit-V Righst, Duties, Responsibilities and Justice.

Paper-II Western Logic

Unit-I Definition and nature of logic,Trtuth and validity, Induction and Deudction.

Unit-II Categorical proposition,Categorical syllogism, validity test by Vein diagram.

Unti-III Fallacies--Formal and informal.Explaination and Hypothesis--Scientific.

Unit-IV Techniques of symbolization, Formal proof of validity--10 rules.

Unit-V Rules of inference (10+9==19 rules.)

Paper-III. Western Epistemology.

Unit-I Knowledge and belief--their definition, nature and relation.
Unit-II Scepticism and possibility of knowledge of other mind.
Unit-III Theories of truth--Correspondence, Coherence and Pragmatic.
Unit-IV Evaluation of Rationalism , Empiricism and Criticalism.
Unit-V Meaning and reference , Knowledge of knowledge, limits of knowledge.

Paper-IV. Western Metaphysics.

Unit-I Metaphysics--Definition, Scope,Possibility and Concerns.
Unit-II Appearence and Reality,Realism--for and against, Universals.
Unit-III Substance--Rationalism,Empiricism and Process veiw of Reality.
Unit-IV Causal theories , Space and Time.
Unit-V Mind and Body--Dualism, Materialism, Self-knowledge and self-identity.

Semester-III

July-December, 2018 (w.e.f. Session 2017-18)

Paper-I Indian Philosophy of Language.

Unit-I Problem of meaning--Abhidha, Classes of words , Brief account of Akritivada,Vyaktivada,Apohavada,Shabda Bodha.
Unit-II Sphota-Patanjali and Bhartrihari, Arguments against Sphota.
Unit-III Conditions of knowing sentence- meaning(Vakyartha) Akanksha ,Yogyata, Sannidhi,Tatparya jnana; Comprehension of sentence meaning Anvitavidhanavada , Abhihitanvayavada.
Unit-IV Mimamsaka's theory of Bhavana and its criticism.
Unit-V Metaphysical basis of language--Shabda Brahamn of Bhartrihari.

Paper II Analytical Philosophy

Unit I Definition,Nature and Necessity of Anlytical Philosopjhy.
Unit-II Logical Positivism and Verification Principle - A.J.Ayer
Unit-III Ludwing Wittgenstivin - Atomic facts, Elementary proposition, Picture theory, Use theory , Language game.

Unit-IV Theories of meaning- relation between meaning and truth,
Proper names and definite description.
Unit-V Elimination of metaphysics - A.J.Ayesr, Witt and M. Schlick.

Paper III Modern Indian Thought

Unit- I Characteristic features,Indian Philosophy today -
Problems & direction. Swami Vivekanand - Universal
Religion, Practical,Vedanta.
Unit-II Rabindra Nath Tagore-Man and God ,
Religion of Man.
Mahatma Gandhi- Non-violence, Criticismof modern civilization.
Unit-III Dr.S.Radhakrishnan- Intellect and Intuition
Synthesis of East and West.
Sri Aurobindo- Reality as Sat-Cit-Anand ,thleory of evolution.
Unit-IV M.N. Roy - Criticism of communism, Radical Humanism.
K.C.Bhattacharya-Grads of Consciousness, Interpretation of Maya.
Unit-V B.R. Ambedkar- Criticism of social evil.
Acharya Rajnish(Osho)- Concept of Education.

PAPER-IV. Phenomelogy & Existentialism

Unit-I Phenomenology : Meaning and methodology.
Unit-II Husserl Natural world thesis, Essence and essential .
Unit-III Heidegger-- Being : Dasein.
Merleau Ponty : Phenomenology perception.
Unit-IV Existentialism: Characteristics, common grounds and
diversities among existentialist.
Unit- V Freedom : decision and choice.
Authentic and non-authentic existen.

SEMESTER-IV

January-June, 2019 (w.e.f. Session 2017-18)

Paper I A. Advaita Vedanta

Unit-I Theories of Adhyasa, Maya,Avidya and Vivartavada.
Unit-II Concept of Brahman, Atman, Jiva, Jagat and Moksha.
Unit-III Tarkapada of Sharirak Bhashya--Criticism of Samkhya

and Vaiseshika by Shankara.
Unit-IV Criticism of Jainism and Buddhism by Shankara.
Unit-V Criticism of Shankara by Ramanuja.

OR

Paper I B. Philosophy of Gandhi

Unit-I Life sketch, Contemporary conditions and religions influencing Gandhi's thoughts, Sarvodaya.
Unit-II Nature of God, Jiva, Jagat, quality of Religions (Sarvadharmasamabhava).
Unit-III Satyagraha and Ahimsa--a socio-ethical interpretation.
Unit-IV Varna system, Trusteeship.
Unit-V Relevance of Gandhi's philosophy--with special reference to Peace, Globalization and Swadeshi.

Paper-II A. Philosophy of Yoga.

Unit-I Definitions ,need of Yoga in modern living, Concept of Chitta and Vrittis.
Unit-II Ashtanga Yoga- Yma,Niyama, Asana Pranayam, Pratyahara, Dharana, Dhyana and Samadhi.
Unit-III Two types of Samadhi,Attainment of samadhi through meditating on God,
Unit-IV Five Kleshas and their nature,Conjunction of Drishta and Drishya-the root cause of ignorance,Kaivalya -removal of Avidya.
Unit-V Eight siddhis resulting from contol over chitta and thier description, Kaivalya only when siddhis are transcended.

OR

Paper-II B. Nyaya Philosophy.

Textual study of any one of the following--
1. Selection from Tattvachintamani of Gangesha.
2. Tarksamgrah of Annambhatta.
3. Tarkabhasha of Keshav Misha.
4. Nyayasutra bhashya of Vatsyayana.

Paper III A. Applied Ethics.

Unit -I Nature and Scope of Applied Ethics. Teleological Approach to moral actions.
Unit -II Valukes - Value and disvalue , Value neutrality and culture, Specific values.
Unit -III Public and private morality, Applied ethics and Politics.
Unit-IV Professional ethics - Morals and laws of profession, Ethical codes of conduct for various professions and their professionals.
Unit-V Social justice-Philosophical perspectives and presuppositions, Limits of Applied Ethics.

OR

PAPER III (B) ETHICS AND SOCIETY

Unit -I Individual and Social morality, Purushartha, Sadharana Dharma.
Unit -II Varna Dharma , Ashrama Dharma, Nishkama Karma.
Unit -III Kant - The ethics of Duty, Respect for person, Bradley-Station and its duties.
Unit -IV Sexual morality, Abortion, Gender Discrimination and Caste- base reservation-for and against.
Unit -V Human rights, Feminism, Secularism, Humanism

PAPER - IV (A) COMPARATIVE RELIGION

Unit -I Problem and methods of study of Religions : Comparative Religion Need and Possibility.
Unit -II Critical study of Myths, Rituals and Cult,Functionalism and Structuralism.
Unit -III Hinduism, Tribal Religions of India (Specially Chattishgarh)
Unit -IV Islam and Crischians .
Unit -V Inter-religious dialogues , Religion and secular society, Possibility of Universal Religious.

OR

PAPER - IV (B) Philosophy of Swami Vivekanand

Unit -I Impact of Traditional Vedantaon Vivekanand,General Introduction of Navya Vedanta.

Unit -II Vedanta ofVivekanand,- Bramhan ,Maya , Jiwa , and Moksha.

Unit -III Dharma Darshan of Vivekanand - Nature of Religion, Religious tolerance, Universal Religion.

Unit-IV Four Yogas of Vivekananda - Jnana, Bhakti , Karma , and Raja yogas.

Unit-V Social Philosophy of Vivekanand- Concept and relevance of Indian Society, Social Justice.

(Annual System)

एम.ए. (पूर्व) दर्शनशास्त्र

(सत्र 2017–18 से प्रभावी)

एम. ए. (पूर्व) दर्शनशास्त्र परीक्षा के लिये चार सैद्धान्तिक प्रश्नपत्र निर्धारित किये गये है। प्रत्येक प्रश्न पत्र पांच इकाइयों में विभाजित है। एक इकाई में एक प्रश्न से हल करना आवश्यक होगा। प्रत्येक प्रश्न पत्र का पूर्णांक 100 होगा।

एम. ए. पूर्व ''दर्शनशास्त्र'' के निम्नलिखित चार प्रश्नपत्र होगे–

क्र.	प्रश्नपत्र	प्रश्नपत्र का नाम	अंक	पेपर कोड
1.	प्रथम	नीतिशास्त्र (भारतीय एवं पाश्चात्य)	100	0430
2.	द्वितीय	तर्कशास्त्र (भारतीय एवं पाश्चात्य)	100	0431
3.	तृतीय	ज्ञान मीमांसा (भारतीय एवं पाश्चात्य)	100	0432
4.	चतुर्थ	तत्व मीमांसा (भारतीय एवं पाश्चात्य)	100	0433

प्रथम प्रश्न पत्र
नीतिशास्त्र (भारतीय एवं पाश्चात्य)
(पेपर कोड – 0430)

इकाई–1
1. कठोपनिषद के नैतिक विचार
2. कर्म सिद्धांत– उसके नैतिक फलितार्थ
3. साधारण धर्म

इकाई–2
1. ऋत, ऋण तथा यज्ञ
2. कर्मयोग, स्वधर्म तथा लोकसंग्रह (भगवद्गीता के अनुसार)
3. त्रिरत्न (जैन धर्मानुसार)

इकाई–3
1. योग के यम तथा नियम
2. संवेगवाद– ए.जे. एयर, सी.एल. स्टीवेन्सन
3. परामर्शवाद– आर. एम. हेयर, नावेल स्मिथ

इकाई–4
1. नव प्रकृतिवाद– फिलिप्पा फुट, जी, जे. वार्नाक,
2. कांट का कठोरतावाद
3. उपयोगितावाद– स्वरूप एवं प्रासंगिकता

इकाई–5
1. अधिकार और कर्त्तव्य–स्वरूप तथा मूल्य, न्याय और दण्ड का सिद्धान्त
2. व्यावहारिक नीतिशास्त्र–राजनैतिक एवं व्यावसायिक नैतिकता

ENGLISH VERSION

PAPER – I
ETHICS (INDIAN AND WESTERN)
(Paper Code – 0430)

UNIT-I
1. Moral thoughts of Kathopnishad
2. Law of Karma. Its implications

3. Sadharana Dharma

UNIT-II 1. Rta, Rna and Yajna
2. Karma Yoga, Swadharma and Lokasangraha of the Bhagwad Gita
3. Triratna of Jainism

UNIT-III 1. Yama and Niyam of Yoga
2. Emotivism- A.J. Ayer and C.L. Stevension
3. Prescriptivism- R.M. Hare

UNIT-IV 1. Neo-Naturalism- Philippa Foot and S.J. Warnack
2. Rigourism of Kant
3. Utilitarianism- Nature and Relevance

UNIT-V 1. Rights and Duties- Nature and Value. Theory of Justice & Punishment
2. Applied Ethics- Political and Business Ethics

BOOKS RECOMMENDED :

1. Gita Rahasya - B.G. Tilak
2. Ethical Philosophy of India - I.C. Sharma
3. Aspects of Hindu Mortality - Saral Jhingarn
4. Sabar Bhasy Mimansa sutra (Sutra 1-5)
5. Ethical Theory - Classical and Contemporary Readings (Ed. Louis Pojmen)
6. Ethics - History, Theory and Contemporary Issue (Ed. strean M. Cahm and peter Markin)
7. कांट का नीति दर्शन - डॉ. छाया राय
8. अधिनीति शास्त्र के सिद्धान्त - वेद प्रकाश वर्मा
9. अधिनीति शास्त्र - शिवभानुसिंह
10. नीतिशास्त्र के सिद्धान्त - हृदय नारायण मिश्र
11. नीतिशास्त्र की समकालीन प्रवृत्तियां - सुरेन्द्र वर्मा

द्वितीय प्रश्न पत्र
तर्कशास्त्र (भारतीय और पाश्चात्य)
(पेपर कोड – 0431)

इकाई–1 1. तर्कशास्त्र की परिभाषा व प्रकृति
2. भारतीय परम्परा में तर्क, ज्ञान मीमांस और तत्वमीमांस में संबंध
3. आगमन व निगमन

इकाई–2 1. अनुमान की परिभाषा एवं प्रकार – नैयायिक एवं बौद्धमत
2. अनुमान के अवयव – नैयायिक एवं बौद्धमत
3. हेत्वाभास

इकाई–3 1. वेन रेखा – पद्धति द्वारा वैधता परीक्षण
2. आकारिक तर्कदोष
3. मिल की विधियॉ

इकाई–4 1. प्रतीकीकरण – विधि
2. परिमाणीकरण सिद्धांत : विशिष्ट और सामान्य प्रतिज्ञप्ति परिमाणीकरण नियम
3. वैधता के आकारिक नियम (10 सूत्र)

इकाई–5 1. अनुमान के नियम (19 सूत्र)
2. अनाकारिक तर्कदोष :
1. प्रासंगिक
2. अप्रासंगिक

PAPER – II
LOGIC (INDIAN AND WESTERN)
(Paper Code – 0431)

UNIT-I 1. Nature and definition of Logic
2. The relationship of logic with Metaphysics and Epistemology in Indian tradition.
3. Deduction and Induction

UNIT-II 1. Anuman (Inference) – Definition and types (Nyaya and Buddhist perspectives)
2. Parts (constituents) of Inference (Nyaya and Buddhist perspectives)
3. Hetwabhasa

UNIT-III 1. Validity-test by Vein diagram
2. Formal fallacies
3. Methods of Mill

UNIT-IV 1. Techniques of Symbolization
2. Quantification theory: singular and general propositions, Quantification rules
3. Formal proofs of validity (10 rules)

UNIT-V 1. Rules of Inference (10+9=19 rules)
2. Informal Fallacies – 1. Relevant 2. Irrelevant.

BOOKS RECOMMENDED :

1. Symbolic logic : I.M. Copi
2. प्रतीकात्मक तर्कशास्त्र : अविनाश तिवारी
3. अनुमान प्रमाण : बलिराम शुक्ल
4. भारतीय दर्शन में अनुमान : ब्रजनारायण शर्मा
5. Logic, Language and Reality : A.B.K. Matilal
6. Fundamentals of logic : A. Singh C. Goswami
7. Modern Introduction to Indian logic : S.S. Barlinge
8. तर्कशास्त्र का परिचय : आइ. एम. कोपी, अनु. संगम लाल पाण्डेय

तृतीय प्रश्न पत्र
ज्ञान मीमांसा (भारतीय और पाश्चात्य)
(पेपर कोड–0432)

इकाई–1 1. भारतीय परम्परा में ज्ञानः प्रमा, अप्रमा, प्रामाण्य
2. स्वतः प्रामाण्यवाद और परतः प्रामाण्यवाद

इकाई–2 1. प्रमाण–प्रत्यक्ष, अनुमान, उपमान, शब्द, अर्थापत्ति, अनुपलब्धि
2. प्रमाण व्यवस्था तथा प्रमाण सम्प्लव

इकाई–3 1. ख्यातिवाद–अख्यातिवाद, आत्मख्यातिवाद, अन्यथाख्यातिवाद, असत्ख्यातिवाद, विपरीत–ख्यातिवाद, सदासत् ख्यातिवाद, अभिनव–अन्यथा ख्यातिवाद, अनिर्वचनीय

ख्यातिवाद, सद्ख्यातिवाद

इकाई–4
1. पाश्चात्य परम्परा में ज्ञान की उत्पत्ति तथा स्वरूप– बृद्धिवाद, अनुभववाद, समीक्षावाद
2. विश्वास और ज्ञान–परिभाषा एवं स्वरूप
3. प्रत्यक्ष के सिद्धान्त (पाश्चात्य दर्शन के अनुसार)

इकाई–5
1. सत्य के सिद्धांत–स्वतः प्रमाणित, संवादिता, संसक्तता, फलवाद
2. प्रागनुभाविक ज्ञान – विश्लेषणात्मक एवं संश्लेषणात्मक

ENGLISH VERSION **PAPER – III**

EPISTEMOLOGY (INDIAN AND WESTERN)

(Paper Code – 0432)

UNIT-I
1. Cognition in Indian – Valid, Invalid and validity
2. Svatahpramanyavada and paratahpramanyavada

UNIT-II
1. Pramanas – Pratyaksa, Anuman, Sabda, Upmana, Arthapatti, Anupalabdhi
2. Pramana Vyavastha and pramana samplava

UNIT-III
1. Khyativada – Akhyati, Anyathakhyati Viparitakhyati, Atmakhyati, Aniravacaniya khyati, Abhinava – anyath a khyati, Sadastkhyati

UNIT-IV
1. Origin and Nature of knowledge in western tradition- Rationalism, Empiricism, Criticalism
2. Belief and Knowledge
3. Theories of perception (According to western philosophy)

UNIT-V
1. Theories of truth – Self evidence, Correspondence, Coherence, Pragmatic
2. Apriori knowledge – Analytic and Synthetic

BOOKS RECOMMENDED :

1. D.M. Dalta : The six ways of knowling
2. Debabrata sen : The Concept of Knowledge
3. Srinivasa Rao : Perceptual Error, Indian theories
4. J.L. Pollock : Contemporary theories of knowledge
5. S. Bhattacharya : Doubt, belief and knowledge
6. एस. राधाकृष्णन् : भारतीय दर्शन, भाग 1 एवं भाग 2
7. संगम लाल पांडेय : भारतीय दर्शन
8. पाश्चात्य दर्शन : याकूब मसीह

चतुर्थ प्रश्न पत्र
तत्वमीमांसा (भारतीय एवं पाश्चात्य)
(पेपर कोड – 0433)

इकाई–1
1. तत्वमीमांसाः संभावना, विषय वस्तु, क्षेंत्र।
2. मानव : आत्मवाद, नैरात्मवाद, आत्मा और जीव, जीव–कर्ता भोक्ता और ज्ञाता के रूप में जीव के विभिन्न आयाम।
3. परम सत्: – सत् और ब्रहम।

इकाई–2
1. ईश्वर : भक्ति सम्प्रदाय में ईश्वर की मुख्य भूमिका–रामानुज के विशेष संदर्भ में। ईश्वर

अस्तित्व सिद्धि–पक्ष तथा विपक्ष। कर्माध्यक्ष के रूप में ईश्वर।

2. भौतिक जगत : पंचभूत का सिद्धान्त, त्रिगुण और पंचीकरण का सिद्धान्त, व्यावहारिक और पारमार्थिक सत्।

इकाई–3

1. सामान्य : विभिन्न भारतीय सम्प्रदायों के मत।
2. कारणता : विभिन्न भारतीय मत एवं विवाद।
3. कोटि विषयक संशयवाद : नागार्जुन एवं श्री हर्ष के संदर्भ में।

इकाई–4

1. आभास और सत् (पाश्चात्य परम्परा में)।
2. सत् एवं संभूति (पाश्चात्य परम्परा में)।
3. द्रव्यः लाइवानिज, हयूम।

इकाई–5

1. कारणता
2. देश और काल (सभी पाश्चात्य परम्परा में)
3. मनस् और शरीर

ENGLISH VERSION

PAPER – IV

METAPHYSICS (INDIAN AND WESTERN)

(Paper Code – 0433)

UNIT-I

1. Possibility scope and concern of metaphysics
2. Man : Self as Atman, Nairatmavada, Atma and Jiva
   Jiva as Karta, Bhokta and Jnata-different perspectives
3. Ultimate reality: Sat and Brahman

UNIT-II

1. God: The central role of God in Bhakti School with special reference to Ramanuja. Proofs for and against the existence of God, God as karmadhyaksha.
2. Physical world: Theories of five elements gunas and Panchi Karana

UNIT-III

1. Universals : The debate amongst the different Indian Schools
2. Causation : Different Indian Views and debates
3. Scepticism about categories : Nagarjuna and Shriharsha.

UNIT-IV

1. Appearance and reality (In western tradition)
2. Being and becoming
3. Substance. Leibnitz and Hume

UNIT-V

1. Causation
2. Space and time
3. Mind and body (All in western tradition)

BOOKS RECOMMENDED :

1. Stephen H. Phillips : Classical Indian Metaphysics
2. P.K. Makhopadhya : Indian Realism
3. Harsh Narayan : Evolution of Nyaya Vaisheshik Categories
4. Richarch Taylor : Metaphysics
5. David Hales (ed) : Metaphysics: Contemporary Readings
6. F.H. Bradley : Appearance and Reality
7. पाश्चात्य दर्शन : याकूब मसीह
8. भारतीय दर्शन : संगम लाल पांडेय

एम.ए. (अंतिम) दर्शनशास्त्र

(सत्र 2017–18 से प्रभावी)

एम.ए. अंतिम परीक्षा हेतु कुल चार प्रश्न पत्र होंगे जिनमें प्रत्येक के 100 अंक होंगे। निम्नलिखित दो प्रश्न पत्र अनिवार्य होंगे :–

अनिवार्य प्रश्न पत्र

क्र.	प्रश्न पत्र का शीर्षक	पूर्णांक	पेपर कोड
1.	समकालीन पाश्चात्य दर्शन	100	0434
2.	आधुनिक भारतीय दर्शन	100	0435

वैकल्पिक प्रश्न पत्र

एम.ए. अंतिम दर्शनशास्त्र परीक्षा हेतु निम्नलिखित प्रश्न पत्रों के समूह में से किन्हीं दो वैकल्पिक प्रश्न पत्रों का चयन परीक्षार्थियों को करना होगा :–

क्र.	प्रश्न पत्र का शीर्षक	पूर्णांक	पेपर कोड
3.(अ)	धर्म दर्शन	100	0436
3.(ब)	छत्तीसगढ़ की संत परम्परा का दर्शन	100	0437
3.(स)	योग दर्शन	100	0438
4.(अ)	शंकराचार्य का अद्वैत दर्शन	100	0439
4.(ब)	विवेकानंद का दर्शन	100	0440
4.(स)	गांधी दर्शन	100	0441
4.(द)	अघोरेश्वर भगवान राम का दर्शन	100	

PAPER – I
CONTEMPORARY WESTERN THOUGHT
(Paper Code – 0434)

UNIT-I
1. F.H. Bradley - Idealism
2. G.E. Moore - Reaslim
3. Russell
   a. Knowledge by Acquaintance and knowledge by Description
   b. Logical Atomism

UNIT-II **Ludwig Wittgenstein**
a. Propositions (Atomic facts, Elementary Proposition, Truth Functions, Logical Atomism)

b. Picture Theory
c. Language game
d. Other mind

UNIT-III **A.J. Ayer**

a. Verification Theory
b. Elimination of Metaphysics
c. The Nature of Philosophical analysis
d. Critique of Ethics and Theology

UNIT-IV Pragmatism : 1. James, Dewy,
2. Karl Marx

UNIT-V 1. Existentialism : Sartre, Keirkagaard
2. Phenomenology

BOOKS RECOMMENDED :

1. Philosophical studies : G.E. Moore
2. Problems of Philosophy : B.Russell
3. अस्तित्ववाद के प्रमुख विचारक : लक्ष्मी सक्सेना, सभाजीत मिश्र
4. समकालीन पाश्चात्य दर्शन : जगदीश सहाय श्रीवास्तव
5. समाकलीन पाश्चात्य दर्शन : बसंत कुमार लाल
6. अस्तित्ववाद पक्ष और विरोध : पाल रूविचेक
7. फिलासाफिकल इन्वेस्टिगेसन्स : विटगेन्स्टाइन (अनु, अशोक वोहरा)
8. भाषा, सत्य एवं तर्कशास्त्र : ए.जे. एयर, (अनु, भूपेन्द्र)

PAPER – II
MODERN INDIAN THOUGHT
(Paper Code – 0435)

UNIT-I (i) Background
a. Characteristic Features
b. Indian Philosophy today : Problems and direction
(ii) Swami Vivekananda
c. Universal religion
d. Practical Vedanta
e. Four kinds of yoga

UNIT-II (i) Rabindranath Tagore
a. Man and God
b. Religion of man
(ii) Mahatma Gandhi
c. Truth and Satyagraha
d. Non-Violence
e. Criticism of modern civilization.

UNIT-III (i) Dr. S.Radhakrishnan
a. Intellect and intuition
b. Synthesis of East and West
(ii) Sri Aurobindo
c. Reality as “sat-cit-ananda”

d. Theory of Evolution
e. Super mind.

UNIT-IV (i) M.N. Roy
a. Criticism of communism
b. Radical Humanism
(ii) K.C. Bhattacharya
c. Concept of Philosophy
d. Grades of Consciousness
e. Interpretation of maya.

UNIT-V (i) Bal Gangadhar Tilak :
Interpreatation of the Gita, yogah Karmasu Kausalam.
(ii) B.R. Ambedkar:
Criticism of social evil
(iii) J. Krihnamurti :
Concept of freedom
(iv) D.M. Datta :
Knowledge, Reality and the unknown
(v) Acharya Rajneesh (OSHO)
Concept of Education

BOOKS RECOMMENDED :

1. विवेकानंद साहित्य
2. Complete works of Swami Vivekananda
3. बाल गंगाधर तिलक : गीता रहस्य
4. Sri Aurobindo : The life Divine.
5. R.N. Tagore : The Religion of Man
6. K.C. Bhattacharya : Studies in Philosophy
7. Radhakrishnan : An Idealist view of life
8. J. Krishnamurty : Freedom from the known
9. डॉ. रामजी सिंह : गांधी दर्शन
10. B.R. Ambedkar : Writings and Speeches Vol. I
11. डॉ. बी. कार्णिक : मानवेन्द्र नाथ राय
12. डॉ. डी. डी. बंदिष्टें : नवमानववाद
13. ओशो : शिक्षा में क्रांति

वैकल्पिक प्रश्न पत्र – तृतीय (अ)
धर्म – दर्शन
(पेपर कोड – 0436)

इकाई–1 धर्म दर्शन का महत्व तथा स्वरूप, धर्म की परिभाषा एवं उसका विज्ञान तथा दर्शन से संबंध, धार्मिक चेतना का स्वरूप।

इकाई–2 धर्म की उत्पत्ति के सिद्धांत एवं धर्म की आवश्यकता।

इकाई–3 धर्म का मनोवैज्ञानिक आधार, धर्म दर्शन के प्रकार।

इकाई–4 ईश्वर का स्वरूप एवं गुण, ईश्वर की सत्ता सिद्ध के प्रमाण, अशुभ की समस्या।

इकाई–5 धार्मिक अनुभूति का स्वरूप : हिंदू, बौद्ध, जैन, इसाई, इस्लाम धर्म का सामान्य ज्ञान।

अनुशंसित पुस्तके –

1. धर्म दर्शन – डॉ. रामनारायण व्यास, मध्य प्रदेश हिन्दी ग्रंथ अकादमी
2. धर्म दर्शन – डॉ. लक्ष्मीनिधि शर्मा
3. धर्म दर्शन – हृदय नारायण मिश्र
4. धर्म दर्शन – दुर्गादत्त पांडेय

वैकल्पिक प्रश्न पत्र – तृतीय (ब)
छत्तीसगढ़ की संत परम्परा का दर्शन
(पेपर कोड – 0437)

इकाई–1
1. भारतीय संत परंपरा
2. छत्तीसगढ़ की संत परंपरा का सर्वेक्षण

इकाई–2 **कबीरदास**
1. कबीरदास की पृष्ठभूमि
2. कबीर दर्शन
3. छत्तीसगढ़ में कबीर पंथ की दार्शनिक एवं साहित्यिक परंपरा

इकाई–3 **वल्लभाचार्य**
1. छत्तीसगढ़ में वल्लभाचार्य की जन्म स्थली चंपारण : वल्लाभाचार्य की बैठक
2. वल्लाभाचार्य का दर्शन : ब्रह्मा, आत्मा, जीव, जगत्, माया, मोक्ष
3. पुष्टिमार्ग

इकाई–4 **गुरू घासीदास**
1. गुरू घासीदास का धर्म : सतनाम पंथ
2. गुरू घासीदास का दर्शन

इकाई–5 संत कबीरदास, श्रीमद् वल्लाभाचार्य एवं गुरू घासीदास के धार्मिक एवं दार्शनिक विचारों की तुलना

अनुशंसित पुस्तके –

1. परशुराम चतुर्वेदी : उत्तर भारत की संत परंपरा
2. आचार्य रामचन्द्र शुक्ल : हिन्दी साहित्य का इतिहास
3. डॉ. हजारी प्रसाद द्विवेदी : कबीर
4. डॉ. रामकुमार वर्मा : संत कबीर
5. डॉ. श्याम सुंदर दास : कबीर ग्रंथावली
6. अयोध्यासिंह उपाध्याय : कबीर रचनावली
7. डॉ. सत्यभामा आडिल : संत धर्मदास : कबीर पंथ के प्रवर्तक
8. डॉ. सालिक राम अग्रवाल : संत कबीर एवं कबीर पंथ
9. वल्लभाचार्य : अणुभाष्य
10. वल्लभाचार्य : तत्वदीप निबंध
11. दीनदयाल गुप्त : अष्टछाप और वल्लभ सम्प्रदाय
12. सीताराम चतुर्वेदी : महाप्रभु श्रीमद् वल्लभाचार्य एवं पुष्टि मार्ग
13. हीरा लाल शुक्ल : गुरू घासीदास : संघर्ष, समन्वय और सिद्धान्त

वैकल्पिक प्रश्न पत्र – तृतीय (स)
(पेपर कोड – 0438)
YOGA DARSHAN

UNIT-I Cittavritti : yoga as cittavrittinirodhah, vrittis : pramana, viparyaya, vikalpa, nidra, smriti; their control through abhyasa and vairagya

UNIT-II Two types of Samadhi (samprajnata and asamprajnata) and their characteristics ; attainment of Samadhi through meditating on Isvara (God); nature of Isvara; cittaviksepas and the manner of overcoming them: sabija and nirbija Samadhi

UNIT-III Five klesas and their nature; conjunction drasta and drisya as the root cause of ignorance; kaivalya results from removal of avidya; the eight-fold path leading to kaivalya : yama, niyama, asana, pranayama, pratyahara, dhyana, dharana, Samadhi; the varieties and characteristics of each one of the above eight elements.

UNIT-IV Concentration of citta on various entities and the resulting consequences : eight siddhis resulting from control over citta and their description : kaivalya as Resulting only when the siddhis are transcended

UNIT-V The nature of nirmanacitta : kinds of karmas and vasanas produced by it :ending of beginning less vasanas : dharmaneghasamadhi : nature of kaivalya.

SUGGESTED READINGS:

1. M.N. Dvidedi (Tr.) : Patanjali's Yogasutra, Adyar, 1947
2. Ganganatha Jha (Tr.) : Patanjali's Yogasutra with Vyasa's Bhasya, Vijnana Bhiksu's Yogavarttika and notes from Vacaspati Misra's Tattvavaisardi, Bombay, 1907
3. J.H. Woods (Tr.) : Patanjali's Yogasutra with Vyasa's Bhasya and Vacaspati Misra's Tattvavaisaradi, Delhi, 1966
4. Surendranath Dasgupta : The study of Patanjali, Calcutta, 1920
5. Mircea Eliade : Yoga : Immortality and Freedom (Tr. From French by Willard R. Trask) Princeton, 1970
6. Sri Aurobindo : The Synthesis of yoga
7. T.S. Rukmani (Tr.) Yogavartika of Vijnana Bhiksu. Vols. I to IV, Delhi, 1985.

वैकल्पिक प्रश्न पत्र – चतुर्थ (अ)
शंकर का अद्वैत वेदांत
(पेपर कोड – 0439)

इकाई–1 अध्यास, माया, अविद्या, विवर्तवाद।

इकाई–2 ब्रह्म, आत्मा, जीव, जगत, मोक्ष।

इकाई–3 चतुः सूत्री।

इकाई–4 तर्कपाद – शंकराचार्य द्वारा सांख्य, वैशेषिक, जैन एवं बौद्ध दर्शन की आलोचना।

इकाई–5 रामानुज द्वारा शंकर की आलोचना।

सहायक पुस्तके :–

1. शांकर – भाष्य, सत्यानंदी दीपिका : ब्रह्मा सूत्र
2. रामस्वरूप सिंह नौलखा : शंकर का ब्रह्मावाद
3. राधाकृष्णन : भारतीय दर्शन, भाग–2
4. जगदीश सहाय श्रीवास्तव : अद्वैत वेदांत की तार्किक भूमिक
5. एन.के. देवराज : भारतीय दर्शन
6. एस.एन. दासगुप्ता : भारतीय दर्शन

वैकल्पिक प्रश्न पत्र – चतुर्थ (ब)
स्वामी विवेकानंद का दर्शन
(पेपर कोड – 0440)

इकाई–1 स्वामी विवेकानंद का जीवन परिचय, रामकृष्ण परमहंस क प्रभाव, तत्कालीन सामाजिक–धार्मिक रिस्थितियां एवं उनका विवेकानन्द पर प्रभाव, पारंपरिक वेदान्त का विवेकानन्द पर प्रभाव, नव्य वेदान्त का सामान्य परिचय।

इकाई–2 विवेकानन्द का वेदांत दर्शन : ब्रह्मा, माया, जीवन, मोक्ष। पारंपरिक वेदांत और नव्य वेदान्त में अंतर।

इकाई–3 विवेकानन्द का धर्म दर्शन : धर्म का स्वरूप, धार्मिक सहिष्णुता, सार्वभौम धर्म, विभिन्न धर्मो पर विवेकानन्द की तुलनात्मक दृष्टि, धर्म और आध्यात्मिकता, वर्तमान में धर्म की प्रासंगिकता।

इकाई–4 विवेकानन्द का योग : ज्ञानयोग, कर्मयोग, भक्तियोग, राजयोग।

इकाई–5 विवेकानन्द का समाजदर्शन : भारतीय समाज का स्वरूप, जाति एवं वर्ण–व्यवस्था, सामाजिक न्याय, संस्कृति राष्ट्रवाद।

वैकल्पिक प्रश्न पत्र – चतुर्थ (स)
गांधी दर्शन
(पेपर कोड – 0441)

इकाई–1 मोहनदास करमचन्द गांधी : जीवन परिचय, गांधी दर्शन को प्रभावित करने वाली तत्कालीन परिस्थितियॉ एवं विभित्र धर्म। सर्वोदय विचार।

इकाई–2 गांधी दर्शन : ईश्वर का स्वरूप, जीव, जगत, भक्ति, धर्म का स्वरूप, सर्व–धर्म समभाव।

इकाई–3 सत्याग्रह और अहिंसा : नैतिक सामाजिक आध्यात्मिक दृष्टि से विवेचन।

इकाई–4 समाज दर्शन : वर्ण व्यवस्था, ट्रस्टीशिप, बुनियादी शिक्षा, एकादश वव्र का नैतिक तथा सामाजिक महत्व और समाजवाद।

इकाई–5 गांधी दर्शन की प्रासंगिकता : युद्ध और शान्ति, धर्म और राजनीति, साम्प्रदायिकता, हिन्दू मुस्लिम सम्बन्ध, उदारीकरण, वैश्वीकरण और स्वदेशी आदि के संदर्भ में।

सहायक ग्रन्थ :

1. गांधी बाडमय (संदर्भित अंश)
2. महात्मा गांधी का समाज दर्शन : डॉ. महादेव प्रसाद
3. Gandhian Philosophy of Sarvoday : S.N. Sinha
4. सत्य के प्रयोग (गांधी : आत्मकथा)
5. गीता माता (गीता पर गांधी की टीका)
6. प्रार्थना प्रबंधन : सस्ता साहित्य मण्डल

प्रश्न–पत्र–चतुर्थ (द)
''अघोरेश्वर भगवान राम का दर्शन''

नोट– यह प्रश्न–पत्र अन्य प्रश्न पत्रो की तरह 100 अंको का होगा और इसे सत्र 2015–16 (जुलाई 2015 से– जिसकी परीक्षा 2016 में होगी) से लागू माना जायेगा ।

1. अघोर–परम्परा का परिचय–

क. अघोर एवं अवधूत के अभिप्राय.
ख. अघोर परम्परा का संक्षिप्त इतिहास.
ग. अघोर परम्परा के त्रिरत्न
  अ. अवधूत दत्तात्रेय
  आ. अघोराचार्य कीनाराम
  इ. अघोरेश्वर भगवान् राम

2. ज्ञान–मीमांसा एवं तत्त्व–मीमांसा–

- प्रत्यक्ष प्रमाण
- अनुमान प्रमाण
- शब्दप्रमाण
- अपरोक्षानुभूति
- परम तत्व : सर्वेश्वरी
- प्राण
- आत्मा
- जगत

3. नीति दर्शन एवं साधना–पक्ष

- नीति दर्शन
  - समदर्शिता व समवर्तिता का समन्वय
  - प्राण साधना
  - नैतिक आचरण
  - प्राण नियंत्रण
  - ध्यान–समाधि
- शव–साधना–समत्व योग
- मानवता के व्रत

- साधना पक्ष
    - दीक्षा
    - मात्र जप
    - सत्संग
    - स्वधर्म
    - अघोर–घोर

4. समाज–दर्शन

अ.

- समाज दर्शन के आधार
    - अभेद
    - अघृणा
    - अभय
- मानववाद
- योग्यताधारित श्रम विभाजन
- मानव–धर्म–साम्प्रदायिकता का विरोध
- राष्ट्र, युवा, नारी–शक्ति

ब.

- अघोर–दर्शन का व्यावहारिक अनुवर्तन
    - आश्रमों की स्थापना
    - सामाजिक कुरीतियों का विरोध एवं समाधान
    - कुष्ठ–रोग निवारण
    - पर्यावरण–संरक्षण

5. तुलनात्मक अध्ययन

- उपनिषद एवं अघोरवाद
- बौद्व दर्शन एवं अघोरवाद
- योग दर्शन एवं अघोरवाद
- समकालीन मानववाद एवं अघोरवाद

सन्दर्भ ग्रन्थ :

1. औघड़ भगवान राम– पं.यज्ञ नारायण चतुर्वेदी– श्री सर्वेश्वरी समूह,
2. अघोरेश्वर स्मृति वचनामृत– सं.लक्ष्मण शुक्ल– श्री सर्वेश्वरी समूह,
3. अघोर गुरू गुह– सं.लक्ष्मण शुक्ल– श्री सर्वेश्वरी समूह,
4. अघोरेश्वर संवेदनशील– सं.लक्ष्मण शुक्ल– श्री सर्वेश्वरी समूह,
5. अघोर वचन शास्त्र– अघोरेश्वर भगवान राम– श्री सर्वेश्वरी समूह,
6. अघोर विचार दर्शन– सं.मान बहादुर सिंह– श्री सर्वेश्वरी समूह,
7. अघोरेश्वर भगवान राम का दर्शन– डॉ.राम प्रकाश सिंह– श्री सर्वेश्वरी समूह,
8. अघोड़–मत : सिधांत एवं साधना– डॉ.सरोज कुमार मिश्र– क्र. 01 से 08 तक उल्लेखित ग्रंथो के प्रकाशक एवं प्राप्ति स्थान– अघोर शोध संस्थान एवं गंथालय, अवधूत भगवान राम कुष्ट सेवा आश्रम, पड़ाव, वाराणसी है ।
9. संत–मत का सरभंग सम्प्रदाय– डॉ.धर्मेन्द ब्रहाचारी शास्त्री– बिहार राष्ट्र भाषा परिषद् पटना
10. तुलनात्मक धर्म–दर्शन– डॉ.याकूब मसीह– मोतीलाल बनारसी दास, वाराणसी
11. भारतीय दर्शन– डॉ.नंद किशोर देवराज–उत्तर प्रदेश हिंदी संसथान, लखनऊ
12. अघोर पंथ और संत कीनाराम– डॉ.सुशीला मिश्र– विश्वविद्यालय प्रकाशन वाराणसी

(Semester System)
P.G. Diploma in Yoga Education and Philosophy

There shall be two theory papers and one Practical (Three parts) in each semester.

SEMESTER-I

July-December, 2017 (w.e.f. Session 2017-18)

Paper-I. Theoritical Yoga Vijnan **M.M.-50.**

Unit-I Introductio to Yoga : The concept,meaning ,definition and tradition of Yoga, Guru-Shishya (types and meaning)

Unit-II Basic texts of Yoga --Yoga Sutra(Samadhi and Sadhana Padas), Hathyoga Pradipika.

Unit-III Kinds of yoga : Bhakti yoga ,Karma yoga, Mantra yoga and Raj yoga.

Unit-IV Study of Ida,Pingala, Sushumna,Seven Chakras ,Five Koshas, and Five Pranas.

Unit-V Contemporary Yogis --Shri Aurobindo,Satyananda and Shivananda.

Paper-II. Applied Yoga Vijnan. **M.M.-50.**

Unit-I Meaning ,definition and importance of Yoga and Health in life. Theories of Health,Various exercises benefits of Yoga- asanas and their values vis-a-vis other systems.

Unit -2 Practice of Yoga - Preparation . Food , Dress, Sequence, Climatic Changes daily routine Vratas for health, positive and negative factors.

Unit -3 Life pattern and Yoga --Effects of yoga upon bodily functions,Role of yoga asanas in modern living.

Unit-4 Physiology- Constitution Nervous system , Respiratory system, Circulatory system and ESndocrine glands

Unit- 5 Aspects of Mind (Topograficals and Dynamic) Id,Ego and Super Ego, Concious, Sub-concious and Un-concious . Yogic concept of mind and mental process.

Practicals

Practice Teaching (indoor) **M.M.-50.**

Asanas

Kriyas

PranayamasClass arrangement.

Meditation

Practical(1-6) **M.M.-50.**

1. Pawanmuktasana Part-1,2 & 3
2. Asanas :,Relaxation,Pre-meditative,backward and forward bending, Spinal Cord Twisting and balancing, Asanas of Vajrasana group & Standing pose
3. Nadishodhan and Pranayamas : Sheetali Pranayama, Sheetakari Pranayama, Ujjayi Pranayama & Bhramari Pranayama.
4. Mudra : Hastmudra, Manmudra and Kayamudra.
5 Bandha : Moolbandha & Jalandhar Bandha.
6. Shawaasana.

Practical record : **M.M.-25.**

Viva-Voce **:** **M.M.-25.**

Total Marks 250.

SEMESTER-II

January-June, 2018 (w.e.f. Session 2017-18)

Paper-I. Yoga Philosophy. **M.M.-50.**

Unit-I The subject matter of Yoga philosophy-
Samkhya: Prakriti,Purusha and Cosmology.
Vedanta :Brahman Soul and Maya.
Unit-II Different systems of philosophy :
Pancha Mahavrata -- Jainism.
Ashtang Marg -- Buddhism
Integral Yoiga -- Shri Aurobindo
Unit-III Yoga Sutra : Nature of Chitta, Chitta vrittis and Bhoomis
Unit-IV Kinds of Yoga : Hatha Yoga, Kundalini, Jnana,Laya.
Unit-V Psychosomatic disorders(meaning and types) their management through Yoga, Aging --Its problems and management through Yoga.

Paper II. Hatha Yoga. **M.M.-50.**

Unit-I Introduction to the HathPradipika and Gherand Samhita.
Unit-II Pranayama--Its meaning methods,kinds,Precaution and benifits.
Unit-III Shuddhi kriya--Shatkarma,its method and utility.
Unit-IV Bandha and Mudras --methods and benifits.
Unit-V Samadhi , Different systems of Meditation.

Practicals.
Practice Teaching (Indoor) **M.M.-50.**
Asanas, Kriyas, Pranayamas,
Class arrangement & Meditation.
Practicals (1-8) **M.M.-50.**
1. Balancing Asanas.
2. Asanas of Higher group.
3. Surya Namaskar.
4. Pranayama : Suryabheda Pranayama, Bhastrika Pranayama, Kapalabhati Pranayama & Moorchha Pranayama.
5. Bandha : Uddiyaan Bandha & Mahaabandha.
6. Mudra : Bandha Mudrayen & Aadhaar Mudrayen.
7. Shatkarma.
8. Dhaayana & Yoganidra.

Practical records **M.M.-25.**
Viva-voce **M.M.-25.**
Total Marks Semester -II --- 250
==========
Grand Total I & II Sem. ---- 500

(Annual System)
M.Phil. Comparative Religion and Philosophy.
Revised Syllabus w.e.f. Session 2014-15

Note : All the three papers are compulsory.

Paper-I : Research Methodology.

Definition of Research, Nature of research in Religion and philosophy,
Research methodology in Social Sciences and Philosophy.
Selection of Research topic, Preparation of Synopsis and Review of research available in the field.
Data collection.
Standard format of Bibliography and References in thesis.
Different methods of Research : Analytic --Language analysis.
Synthetic, Inductive, Deductive methods,
Hypothesis, Verification and Falsification, Explanation.
Method/Technique of writing Abstract, Research paper and Dissertation.
Computer Application : Use of Search Engines, useful Websites,
Use of Microsoft word and Excel.

Paper –II : Study of Religions.

Vedic Religions --God and Liberation.
Jainism and Buddhism : Ethics and Liberation.
Sikh , Satnam : Basic concepts.
Christianity , Islam : Basic concepts.
Comparative evaluation of Religions of Indian and Non-Indian origin.

Paper-III : Comparative Study of Religions.

Definition of religion, Nature of Religion, Religion and Culture, Dharma and religion.
Definition and Nature of Philosophy of religion.
Aspects of Comparative study of Religion: Human nature, Need of Faith, Religious Practices.
Atheism, Theism, Inter- Religious Dialogue.
Concept of God, Cosmology and Liberation as per :
Radhakrishnan, R.N.Tagore ;
Vivekanand, M.K. Gandhi ;
Kierkegaard, Paul Tillich.

(Annual System)

एम.फिल. : तुलनात्मक धर्म एवं दर्शन
(संशोधित पाठ्यक्रम सत्र 2014–15 से प्रभावी)

नोट : सभी तीन प्रश्न पत्र अनिवार्य है.

प्रथम प्रश्नपत्र : शोध प्रविधि

शोध की परिभाषा, रिलीजन और दर्शन में शोध का स्वरूप, समाज विज्ञान और दर्शन में शोध प्रतिधिया.
शोध विषय का चयन, रूपरेक्षा (सिनोप्सिस) निर्माण और सम्बंधित क्षेत्र में उपलब्ध शोध कार्य का पुनरावलोकन, सामग्री–संकलन, ग्रंथ–सूची और संदर्भ–अंकन का मानक रूप.
शोध की विभिन्न विधियॉ : विश्लेषणात्मक विधि – (भाषा विश्लेषण), संश्लेषण, आगमन, निगमन विधिया.
प्राक्कल्पना–सत्यापन और मिथ्यापन, व्याख्या.
शोध संक्षेपिका, शोध आलेख और लघुशोध प्रबंध लेखन विधियॉ/तकनीक.
कंप्यूटर प्रयोग : सर्च इंजिन, वेबसाईट, **Microsoft Word** तथा **Excel** का प्रयोग.

द्वितीय प्रश्नपत्र : विभिन्न पंथों का अध्ययन

1. वैदिक : ईश्वर एवं मुक्ति.
2. जैन, बौद्ध : मुक्ति एवं उसके साधन.
3. सिक्ख, सतनाम : मूल अवधारणाएं
4. ईसाई एवं इस्लाम की मूल अवधारणाएं
5. भारतीय एवम अभारतीय उद्‌गम के पंथों का तुलनात्मक मूल्यांकन.

तृतीय प्रश्नपत्र : पंथों का तुलनात्मक अध्ययन

रिलीजन की पिरभाषा और स्वरूप. रिजीजन और संस्कृति, धर्म और रिलीजन,
धर्म दर्शन की परिभाषा और स्वरूप.
रिलीजन के तुलनात्मक अध्ययन के विविध पक्ष–मानव स्वभाव,आस्था की आवश्यकता, उपासना पद्धति, अनीश्वरवाद, ईश्वरवाद, पंथों में परस्पर संवाद.
अग्र लिखित के अनुसार ईश्वर की संकल्पना, सृष्टि एवम मुक्ति––
राधाकृष्णन्, टैगोर;
विवेकानन्द, एम.के.गॉधी;
कीर्केगार्ड, पॉल तीलिख.

Course Work for Ph.D. in Philosophy.

(w.e.f. Session 2017-18)

S. No.	Paper	Marks
1	Theory Paper	**100**
2	Practical a. Review / Project Work b. Seminar	 50 50
	Total	**100**
	Grand Total	**200**

Theory Paper : Research methodology :

The candidate must be aware of the following topics --

i. Definition, Aim and Nature of Research,
ii. Selection of topic and preparation of Synopsis,
iii. Formation of Hypothesis. Types of Research,
iv. Matter/data collection, classification and use.,
v. Different methods--Dialectical, Analytical, Synthetic, Inductive, Deductive and Pragmatic.
vi. Preparation of Bibliography, Footnotes, and References.
vii. Computer application

Recommended books.

1. Anusandhan Pravidhi Aur Prakiya-- Vinay Pathak,Bhavana Prakashan Delhi.
2. Studies in Philosophical Methods--Chhaya Rai University of Jabalpur.

The candidate shall prepare a project/Review and shall present the summary in written form in seminar as per instructions given in revised Ordinance 45 of the University.

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SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF COMPUTER APPLICATIONS

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA101	Object Oriened Programming With 'C++'	3	2	-	4	100	50	-	150	40	30	-	70
MCA102	Mathematical Foundations Of Computer Science	3	2	-	4	100	50	-	150	40	30	-	70
MCA103	Essentials of Information Technology	3	2	-	4	100	50	-	150	40	30	-	70
MCA104	Data Structure through algorithms With 'C'	3	2	-	4	100	50	-	150	40	30	-	70
MCA105	Communication Skill	3	2	-	4	100	50	-	150	40	30	-	70
MCA106	Programming Lab 'C++"	-	-	3x2	3	-	25	100	125	-	15	50	65
MCA107	Data Structure through Algorithms "Lab"	-	-	3x2	3	-	25	100	125	-	15	50	65
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

FIRST SEMESTER : MCA-101
Object Oriented Programming with 'C++ '

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Language Fundamental

Advantages of OOP, The Object Oriented Approach, and Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, and Polymorphism. OMT.

Overview of C++ : History of C++, Data Types - int, float, char, double, void. Constants and Variables. Operators and Expressions. Control constructor: if , if-else, nested if-else, while(), do-while() , for(;;), break, continue, switch, goto. Storage class.

UNIT - II : Structure, Function & Array

Structures : A Simple structures ,specify the structures, Defining a structure variable, Accessing structures member, Enumeration data type.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, Passing struct variable, Overloaded Function, Inline Function, Default Argument, return statement, returning by reference.

Array: Defining array, array element, initiation array, multi dimensional array, passing array to function.

UNIT - III : Object Classes and Inheritance

Object and Class, Using the class, class construct, class destructors, object as function argument, struct and classes , array as class member, operator overloading. Type of inheritance, Derive class, Base class. Access specifier: protected. Overriding, member function, String, Templates.

UNIT - IV : Pointers

Pointers : & and * operator pointer variables, pointer to void, pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, pointer to pointer.

UNIT - V : Virtual Function and File & Stream

Virtual Function : Virtual Function, Virtual member function, accesses with pointer, Late binding, pure virtual function, Friend function, Friend class, static function, this pointer.

File and Stream : C++ streams, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, File pointer, Disk I/O.

RECOMMENDED BOOKS :

1. Object Oriented Programming : McGregor and Sykes S A, 1992 Van Nostrand.
2. The C++ Programming Language : Strustrp B,Addision Wasley.
3. Object Oriented Programming in C++ : Lafore R, Galgotia Publications.
4. Introduction to Object Oriented Programming : Witt KV, Galgotia Publications.
5. Object Oriented Programming : Blaschek G, Springer Verlag
6. Object Data Management : Cattel R, Addison Wasley.

FIRST SEMESTER : MCA-102
Mathematical Foundation Of Computer Science

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Mathematical Logic, Sets Relations and functions

Mathematical Logic : Notations, Algebra of Propositions & Propositional functions, logical connectives, Truth values & Truth table Tautologies & Contradictions, Normal Forms, Predicate Calculus, Quantifiers.

Set Theory: Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cardinality, relations: Cartesian Products, relational Matrices, properties of relations equivalence relation functions: Injection, Surjection, Bijection, Composition, of Functions, Permutations, Cardinality, the characteristic functions recursive definitions, finite induction.

UNIT – II : Lattices & Boolean Algebra

Lattices : Lattices as Algebraic System, Sub lattices, some special Lattices(Complement, Distributive, Modular).

Boolean Algebra : Axiomatic definitions of Boolean algebra as algebraic structures with two operations, Switching Circuits.

UNIT – III : Groups Fields & Ring

Groups : Groups, axioms, permutation groups, subgroups, co-sets, normal subgroups, free subgroups, grammars, language).

Fields & Rings : Definition **,** Structure, Minimal Polynomials, Irreducible Polynomials, Polynomial roots & its Applications.

UNIT - IV : Graphs

Graphs : Simple Graph, Multigraph & Psuedograph, Degree of a Vertex, Types of Graphs, Sub Graphs and Isomorphic Graphs, Operations of Graphs, Path, Cycles and Connectivity, Euler and Hamilton Graph, Shortest Path Problems BFS(Breadth First Search, Dijkastra's Algorithm, Representation of Graphs, Planar Graphs, Applications of Graph Theory.

UNIT - V : Trees

Trees : Trees, Properties of trees, pendant vertices in a tree, center of tree, Spanning tree, Binary tree, Tree Traversal, Applications of trees in computer science.

BOOKS RECOMMENDED :

1. A text book of Discrete Mathematics – By Swapan Kumar Sarkar.(S.Chand & company Ltd.).
2. Discrete Mathematical structure with applications to computer science - By J.P Trembly & R.P. Manohar.
3. Discrete Mathematics -By K.A Ross and C.R.B writht.
4. Discrete Mathematics Structures for computer science -By Bernard Kohman & Robert C. Bushy.
5. Discrete Mathematics -By Seymour Lipschutz Mare Lipson. Tata McGraw-Hill Edition.

FIRST SEMESTER : MCA-103
Essentials Of Information Technology

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction –

Basics concept of IT, concept of data and information, **History** of computer, **Generations** of Computers, organization of computers, Input and Output devices, storage devices, Data processing and file organization.

UNIT - II : Software concept -

Software and its need, Types of Software- System software, application software; Utility Programs; compilers, interpreters and Assemblers; Linker and Loader; Debugger; Operating system, elementary command of DOS, UNIX and WINDOWS (file handling directory, management and general purpose user interfacing command).

UNIT – III : Computer languages –

Introduction of Programming Languages, Types of Programming Languages, Generations of Programming Languages, Programming Paradigms, ,general purpose and concept of oop and SQL, Functional Programming; Process oriented Programming.

UNIT - IV : Communication and network technology -

Communication process, Communication and system elements, communication mode (Analog and Digital, Synchronous and Asynchronous, Simplex, Half duplex, Full duplex, circuit switching), communication media (Speed and capacity, twisted pair, coaxial cable, optics, wireless), communication protocols, Computer Network, Types of Network, Topology, protocols (ISO/OS, reference model, TCP/IP), Medias- NIC, NOS, Bridges, HUB, Routers, Gateways.

UNIT - V : Internet

Technical foundation of Internet, Internet Service Provider, Anatomy of Internet, ARPANET and Internet History of World Wide Web, Services Available on Internet; Basic Internet Terminologies, Net Etiquette, Applications of Internet. Client server computing, Distributed Computing, Domain naming system, DNS Server, Internet Security – Fire walls, Encryptions etc.

Internet Applications - E-mail, WWW, E-commerce, Teleconferencing,

Application of Information Technology - State of Art Application of IT, Application of IT in business, Industry, home, education and training entertainment, science and engineering and medicine.

RECOMMENDED BOOKS :

1. Fundamental of Computer - V.Rajaraman
2. Computer today - Sanders D.H
3. Information technology today - S.Jaiswal

FIRST SEMESTER : MCA-104
Data Structure Through Algorithms with C

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction, Preliminaries, String Processing and Arrays -

Introduction, Basic terminology, Elementary data organization, Data structure and its operation. Algorithms : complexity, time-space Tradeoff. Mathematical Notation and functions, Algorithmic Notation. Basic Terminology of Strings, String operations, Word Processing, Pattern Matching Algorithms. Linear Array, Representations of Array in Memory, Traversing, Insertion and Deletion in Linear Array, Multidimensional Array. Pointers: Pointer Array, Records: Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Sparse Matrices.

UNIT - II : Linked Lists –

Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation; Garbage Collection, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists, Circular Linked List.

UNIT - III : Stacks, Queues, Recursion -

Stacks, Array Representation of Stack, Arithmetic Expressions; Polish Notation, Quick sort, an application of Stacks, Recursion, Tower of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Dequeues, Priority Queues, Circular Queues.

UNIT - IV : Trees & Graphs -

Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree, Heap; Heap sort, Path Lengths; Huffman's Algorithms, General Tree. Graph Theory Terminology, Sequential Representation of Graph; Adjacency Matrix, Path Matrix, Linked Representation of Graph.

UNIT - V : Sorting And Searching –

Sorting: Bubble Sort, Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort. Searching : Linear Search, Binary Search, Searching and data modification, hashing.

BOOKS RECOMMENDED :

1. Data Structure - **Seymour Lipschutz (Schaum's Series).**
2. Data Structure & Program Design - **Robert L. Kruse, 3rd Ed., Prentice Hall.**

FIRST SEMESTER : MCA-105
Communication Skills

Max Marks : 100 **Min Marks : 40**

Meaning and Process of communication, importance of effective communication, communication situation and communication skills, barriers to communicate, objective of communication, Types of communication, principles of communication, essentials of effective communication, media of communication - written, oral, face to face, visual, audio visual, merits and demerits of written and oral communication prepared for oral presentation, conditional presentation, developing communication skill.

Interview - how to face and how to conduct, preparation of bio-data, seminars, pair, bibliography, graph discussion, official correspondence.

Mechanics of writing, paragraphing precise, report writing, technical reports, length of written report, organizing report, writing technical report.

BOOKS RECOMMENDED :

1. Essentials of business Communication - by Rajendra Pal, & J.S.Karlahalli & S.Chand publication
2. Business Communication - by U.S.Rai & S.H.Rai , Himalaya publishing house,
3. Writing technical paper - by Menzal nad, D.H.Jones,McGraw Hill 1961
4. Business communication, Strategy and skill, -Pentice Hall, New Jersey.

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF COMPUTER APPLICATIONS

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA201	Program Based Numerical Analysis in C++	3	2	-	4	100	25	-	125	40	15	-	55
MCA202	Computer System Architecture	3	2	-	4	100	25	-	125	40	15	-	55
MCA203	RDBMS & ORACLE	3	2	-	4	100	25	-	125	40	15	-	55
MCA204	Operating System	3	2	-	4	100	25	-	125	40	15	-	55
MCA205	Financial Management & Accountancy	3	2	-	4	100	25	-	125	40	15	-	55
MCA206	Programming Lab on MCA203	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA207	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA208	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA209	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

SECOND SEMESTER : MCA - 201
Program Based Numerical Analysis

Max. Marks: 100 **Min Marks:40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. **Simple/Scientific calculators are allowed.**

UNIT – I : Solution of Polynomial and Transcendental Algebraic Equations

Bisection method, Regulafalsi method & Newton's method, Solution of Cubic & Biquadrate Equation, Complex roots of polynomial equations.

UNIT – II : Simultaneous Equations and Matrix

Gauss-Jordan method, Cholesky's method, Reduction to lower or upper Triangular forms, Inversion of matrix, method of partitioning, Characteristics equation of matrix, Power methods, Eigen values of matrix, Transformation to diagonal forms.

UNIT - III : Curve-Fitting from Observed Data

Divided difference table for evenly or unevenly spaced data, polynomial curve-fitting - Newton's, Gauss and Langranges form of interpolation and Divided Differences, method of least square for polynomials,.

UNIT - IV : Numerical Differentiation and Integration

Forward and Backward differential operators, Newton - cotes integration formula: Trapezoidal Rule, Simpson's Rule, Boole's Rule, Weddle Rule, Legendre's rule, method of weighted coefficients.

UNIT - V : Solution of Differential Equations

Numerical Solution of ordinary differential equations, one step method-Taylor's Series, Predictor-Corrector Method, Euler's Method, Runga-Kutta Method, Milne's method.

BOOKS RECOMMENDED

1. *Garewal* : Numerical methods
2. *Gupta & Mallic* : Numerical Methods
3. *Hamming R.W.* : Numerical methods for scientist & Engineers. (McGraw Hill)
4. *Conle S.D.* : Elementary numerical analysis
   Carl De Boor (International Book Company London)
5. *Jain M.K.* : Numerical methods for Science and Engineering
   Iyengar S.R.K Calculations (John Willey & Sons)

SECOND SEMESTER: MCA – 202
Computer System Architecture

Max Marks: 100 **Min Marks: 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Representation of Information

Number system, Integer & Floating point representation Character code (ASCII, EBCDIC), Error Detect and Correct code, Basic Building Blocks, Boolean Algebra, MAP Simplification, Combination Blocks: Gates, Multiplexers, Decoders etc. , Sequential building block: flip-flop, registers, counters, ALU, RAM etc.

UNIT - II : Register transfer language and micro operations

Register Transfer Language, Register Transfer, Concepts of bus, Bus and Memory transfers, data movement along registers, a language to represent conditional data transfer, data movement from its memory, arithmetic and logic Micro operations Register Files, Realization of Gates through transistors, IC fabrication.

UNIT - III : Basic Computer Organization and Design

Instruction codes, Computer Instructions, Timing and Control, Instruction Cycle, Execution of Instruction, Memory Reference Instructions, Input-Output and Interrupt, Design of Basic Computer.

UNIT - IV : Computer Software

Programming Language, Assembly Language, Assembler, Program Loops, Input /Output Programming, System Software. Central Processor Organization: - Processor Bus Organization, Arithmetic Logic Unit, Stack Organization, Instruction Formats, Addressing modes, Data transfer and Manipulation, Program Control, Microprocessor Organization, Parallel Processing.

UNIT - V : Input –Output & Memory Organization

Input –Output Organization : Peripheral Devices, Input/output Interface, Asynchronous Data Transfer, Direct Memory Access (DMA), Priority Interrupt, Input-Output Processor, Multiprocessor System Organization, and Data Communication Processor**.**

Memory Organization : Auxiliary Memory, Micro Computer Memory, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

BOOKS RECOMMENDED:

1. Computer System Architecture - M. Morris Mano (PHI).
2. Digital Computer Electronics - Malvino.
3. Digital Computers and Logic Design - M.Morris Mano (PHI).
4. Structured Computer Organization - Andrew M. Tanenbanm (PHI).
5. Modern Digital Electronics - R.P.Jain(Tata Mcgraw-Hill)
6. Fundamental of microprosessor and Microcomputer -6th Edition - B. Ram

SECOND SEMESTER : MCA - 203
RDBMS & ORACLE

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Overview of Database Management -

Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases, Client/Server databases, Object-oriented databases, Object-relational databases, Introduction to ODBC concept.

UNIT - II : Relational Model & Relational Algebra -

Entity - Relationship model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Concept of keys; Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features, Introduction to UML, Representation in UML diagram (Class Diagram etc.).

Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages.

UNIT - III : SQL and Relational Database Design

Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….), INSERT, DELETE, UPDATE, DROP, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces. Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization, Clustering of tables, Clustering indexes

UNIT - IV : PL/SQL -

Introduction to PL/SQL variables – literals – data types – advantages of PL/SQL; Control statements **:** if ; iterative control – loop, while, for , goto ; exit when; Cursors : Types – implicit, explicit – parameterized cursors – cursor attributes; Exceptions: Types – internal , user-defined , handling exceptions – raise statement; PL/SQL tables and records: Declaring PL/SQL tables - referring PL/SQL tables, inserting and fetching rows using PL/SQL table, deleting rows; records - declaration of records - deleting records; Sub programs: Functions - procedures - in, out, inout parameters; purity functions - packages - package specification - advantages of packages - private and public items - cursors in packages.

UNIT - V : Query Processing, Protecting Database and Data Organization -

Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.

Data Organization - File Organization: -Fixed length records, variable length records, Organization of records in files, Indexing: - indexed files -B-tree, B+-tree, and Hashing Techniques.

BOOKS RECOMMENDED :

1. Database system concept - **H. Korth and A. Silberschatz, TMH**
2. Data Base Management System - **Ivan Bayross**
3. Data Base Management System - **James Matin**
4. Principles of Database System - **Ullman**
5. An Introduction to database systems - **Bipin Desai, Galgotia Publication.**
6. Database Management System - **A. K. Majumdar & P.Bhattacharya, TMH**

SECOND SEMESTER : MCA - 204
Operating System

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction:

What is operating system, basic concept, terminology, batch processing, spooling, multiprogramming, time sharing, real time systems, protection, multiprocessor system, operating system as resource manager, process view point, memory management, process management, device management and information management, other views of operating system, historical, functional job control language and supervisor service control.

UNIT - II : Memory Management -

Preliminaries of memory management, memory handling in M/C, relocation, swapping and swap time calculation, multiple partitions, partitioned allocation MFT, fragmentation, MVT, compaction, paging, job scheduling implementation of page tables, shared page, virtual memory-overlays, concepts of virtual memory demand page, memory management and performance, page replacement and page replacement algorithms. Allocation algorithms. Storage hierarchy disk and drum scheduling - physical characteristics fcfs scheduling SCAN, short of seek time first disk scheduling algorithms sector queuing.

UNIT - III : Information Management (File System) -

File concept, file type, typed based system, disk based system, general model of file system, file directory maintenance, symbolic file system, basic file system, physical file system, file support device directory, access methods free space management contiguous, linked allocation and indexed allocation performances.

UNIT - IV : Processor Management (CPU Scheduling) -

Reviewing of multiprogramming concept, scheduling concept, basic concept, CPU I/O burst cycle process state, PCB (Programme Control Block) scheduling queries, schedulers, scheduling algorithms - performance criteria, first-come - first served shortest job - first priority, preemptive algorithm, round robin, multilevel queues and multilevel feedback queues, algorithm evolution, multiprocessor scheduling, separate system, coordinated job scheduling, master / slave scheduling.

UNIT - V : Dead Locks and Device Management

The dead lock problem - dead lock definition, dead lock detection, detection algorithm usage, dead lock characterization, resource allocation graph, dead lock prevention, mutual exclusion, hold and wait, no preemption and circular wait, dead lock avoidance-bankers algorithm. Recovery from deadlock process termination, resource preemption, combined approach to deadlock handling.

Device Management: Dedicated, shared and virtual devices, sequential access and direct access device, channel and control units, I/O schedulers. Introduction to assembly language programming, introduction to I/O programming. Introduction to interrupts and their programming.

BOOKS RECOMMENDED :

1. Principles of Operating System - **Peterson.**
2. Operating System - **Mandinick & Donovan**

SECOND SEMESTER : MCA – 205
Financial Management & Accountancy

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

1. Financial Accounting
Meaning and Nature, Accounting Principles underlying the preparation of financial statements.

2. Preparation of Financial Statements
A Synoptic view-Profit and Loss account, Balance Sheet

UNIT - II

3. Financial statement Analysis
Ratio analysis (Liquidity, Solvency, Profitability, Efficiency), Statement of Changes in financial position-working capital basis.

4. Conceptual Framework of Cost Accounting
Meaning nature and need of cost accounting, Elements of cost, Preparation of cost – sheet, Cost concept –Fixed and variable costs, sunk costs, Out of pocket costs, Relevant and irrelevant costs, Opportunity and imputed costs.

UNIT - III

5. Cost – volume Profit (CVP) relationship
Break-even analysis; (single and multiple products), Determination of sales volume to attain desired profits, Cash break-even point. Graphic presentation of CVP relationship. Assumptions and limitation of break-even analysis

UNIT - IV

6. Budgeting
Definition and objective. Preparation of various types of budgets including cash budget. Fixed and flexible budgets.

UNIT - V

7. Cost Accumulation System
Job and Process (simple treatment)

8 **Variable and absorption costing systems**
Comparison for income determination (simple treatment), Variable costing as a tool of decision-making

BOOKS RECOMMENDED :

1. Accounting for Management - Bhattacharya S.K. and Deardan John
2. The essence of financial accounting - Chadwick

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF COMPUTER APPLICATIONS

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA301	Programming in VB & VC++	3	2	-	4	100	25	-	125	40	15	-	55
MCA302	Computer Network & Data Communication	3	2	-	4	100	25	-	125	40	15	-	55
MCA303	Operation Research	3	2	-	4	100	25	-	125	40	15	-	55
MCA304	A.I. & Expert System	3	2	-	4	100	25	-	125	40	15	-	55
MCA305	System Analysis Design & MIS	3	2	-	4	100	25	-	125	40	15	-	55
MCA306	Programming Lab VB/VC++	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA307	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA308	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA309	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

THIRD SEMESTER : MCA - 301

Programming in VB & VC++

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction to Visual Basic : Windows and DOS; hardware; windows, icons and menus; Event Driven Programming; terminology; the working screen; controls and events; the menu systems; the programming language.

Designing and Creating Programs : Program Design; the launch program; the form and the controls; writing the code; save your work; running and testing; making an EXE file; printouts.

Program Flow : Logical testing; branching with if; Select Case; Go To; For…Next; Do Loops; While… Wend.

UNIT - II

Interacting with user : Msg boxes, the input box function, scroll bars, frames, options, check boxes, menus and various components. (Like timer, dbgrid, dbcombo, msflex Grid, etc)

Testing and Debugging : Errors and error spotting, debugging tools, break points and watches, keeping watch, stapping through, error trapping.

Graphics : Objects and properties for drawing, the drawing methods, working with imported graphics, animation.

UNIT - III

Procedures, Functions and Forms : Procedures and Functions, creating a procedures, creating a function, recursive functions, multiple forms (MDI), startup forms, starting from sub main, transferring between forms, procedures and modules.

Arrays : Dimensions, elements and subscripts, arrays and loops, control arrays, creating a control arrays.

Sequential Files : Saving data to files, basic filing, data analysis and file, the extended text editor.

UNIT - IV

Records and Random Access Files : Record structures, random access files, the staff database, design and coding, MDI Forms - parent and child.

Accessing Data - Data Manager and Data Control : Creating database, what is database, planning your database, using the data manager, adding an index, using the data manager to enter data, creating a form with data aware controls, what is data control, what are data aware controls, creating a menu bar.

ADO & RDO controls and introduction to ActiveX control

UNIT – V : Visual C++

Introduction to VC++- C under windows, Overview of VC++, VC++ workspace & projects, creating source code file, adding C++ code to a program.

Introduction to MFC - The part of VC++ programs, the application object, the main window object, the view object, the document object, Windows event oriented programming, What is device context., Windows Application using MFC.

OLE (object linking and embedding technique), Features of OLE, introduction to ActiveX controls, introduction to COM and DLL.

BOOKS RECOMMENDED :

1. Programming in Visual Basic - SAHU By BPB Publications.
2. Unreleased Visual Basic Guide

VC++

1. The complete Reference VC++ : Chris H.Pappas & William H.Murray, Tata McGraw
2. Visual C++ in Record time : Steven Holzner
3. Visual C++ Programming : Yashwant P. Kanetkar

THIRD SEMESTER : MCA - 302
Computer Networks And Data communication

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction to Computer Networking : The Concept of Networking, Data Communication, Required network elements, The role of Standards Organization. Line Configuration, Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks.

The OSI and TCP/IP Reference Model : The Concept of Layered Architecture, Design Issues for the Layers. Interfaces and services, Detailed Functions of the Layers. Comparison between OSI and TCP/IP Reference model.

UNIT - II

Transmission of Digital Data : Shannon's and Nyquist theorems for maximum data rate of a channel. Transmission media- Co-axial, UTP, Fiber optic and wireless. Analog and digital data Transmission- parallel and serial transmission. DTE-DCE interface using RS-232C. Study of modems- 56k and Cable Modem. Modem standards.

Multiplexing and Switching : The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching.

UNIT - III

Data Link Layer and Routing Algorithms : Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- ALOHA, Slotted ALOHA, CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, and its header. IP address classes and subnet mask.

The concept of ICMP, ARP, RARP, RSVP, CIDR and Ipv6. : Routing algorithms- shorted path first, Distance Vector, Link State. Congestion Control-The leaky bucket and Token bucket Algorithms.

UNIT - IV

Transport Layer : The Concept of client and Server in terms of Socket addressing in Transport layer. Two way and three-way handshaking. TCP header.
Network Performance Issues. The Concept of Domain Name System, Various Resource Records. Architecture and services of E-mail (RFC-822 and MIME). The Concept of WorldWide Web- server side and client side.

ATM : The concept of ATM, ATM Adoption layers- AAL1, AAL2, AAL3/4, AAL5, Comparison of AAL protocols. Cell formats for UNI and NNI. Service Categories, Quality of service, Congestion Control in ATM.

UNIT - V

Comparative study of Networking Technologies : X.25, Frame Relay, ATM, SONET, SMDS, ISDN.

Network Security : The Importance of Security in Networking. Traditional Cryptography, Data Encryption Standards, RSA algorithm.

Formatted

BOOKS RECOMMENDED :

1. Computer Networks - A S Tanenbaum
2. Data Communication and Networking - Forouzan

THIRD SEMESTER : MCA - 303
Operation Research

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Linear Programming -

L P formulations, Graphical method for solving LP's with 2 variables, Simplex method, Duality theory in linear programming and applications, Special Linear Programming Problems, Transportation Problem (Stepping Stone Method), Assignment problem (Hungarian Method)

UNIT - II

Network Analysis -

Examples of network flow problems, Shortest –route problems, Dijkstras Algorithm, Applications of shortest – route problems, Max flow problem, Flow network, Labeling routine, Labeling algorithm for the max flow problems, Min-cut and max –cut theorem.

UNIT - III

Project Scheduling by PERT/CPM -

Project management origin and the use of PERT origin and use of CPM, Application of Pert and cpm; Project network - Diagram representation, Critical path calculations by linear programs, Critical path calculations by network analysis and critical path method (cpm), Determinations of floats, Constructions of time chart and resource labeling, Project cost curve and crashing in project management, Program evaluation and Review technique (pert).

UNIT - IV

Dynamic Programming -

Basic concepts - Bellman's optimality principles, Examples of D.P. models and computations. Examples to be taken from Different areas of allocations, replacement, sequencing, and scheduling, networks and other related O>R areas.

Queuing Models -

Notations and assumptions, Queuing models with Poisson input and Exponential Service,(M/M/1): (∞/FIFO), (M/M/1) : (∞/SIRO), (M/M/1):(N/FIFO), Birth -Death Model, (M/M/C) : (N/FIFO) (M/M/C) : (C/FIFO)), Power Supply Model.

UNIT - V

Sequencing Models -

Sequencing Problem, Johnson's algorithm for processing n jobs through 2 machines, Johnson's Algorithm for processing n jobs through 3 machines, Processing 2 jobs through n machines, graphical solution.

Inventory Models -

Introduction to the inventory problem, Deterministic models - The classical EOQ (Economic Order Quantity) model, Non- zero lead time, The EOQ with shortages allowed.

BOOKS RECOMMENDED:

1. Operation Research : By Giltte.
2. Operation Research : Gupta and Kumar.
3. Operation Research : Gupta and Manmohan.

THIRD SEMESTER : MCA - 304
Artificial Intelligence And Expert Systems

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

General Issues and overview of AI :

The AI problems; what is an AI technique; Characteristics of AI applications.

Problem solving, search and control strategies :

General problem solving; production systems; control strategies: forward and backward and backward chaining Exhaustive searches: Depth first Breadth first search.

UNIT - II

Heuristic Search techniques :

Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/Or Graphs; problem reduction and AO* algorithm; constraint satisfaction problems.

Game playing :

Minimax search procedure; Alpha-Beta cutoffs; Additional Refinements.

UNIT - III

Knowledge Representation :

First order predicate calculus; Skolemization Resolution principle and unification; Inference Mechanisms; Horn's clauses; semantic Networks; frame systems and value inheritance. Scripts; conceptual dependency.

AI Programming Languages :

Introduction to Lisp, Syntax and Numeric functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

UNIT - IV

Natural language processing :

Parsing technique; context—context- free grammar; Recursive Transition Nets (RTN); Augmented Transition Nets ((ATN); case and logic grammars; semantic analysis.

Planning :

Overview- An example Domain: The Blocks Word; Component of planning systems: Goal Stack Planning (linear planning); Non-linear planning using goal sets; probabilistic reasoning and Uncertainty; probability theory; Bayes Theorem and Bayesian networks; certainty factor.

UNIT - V

Expert Systems :

Introduction to expert systems and Applications of expert systems; various expert system shells: vidwan; frame work; knowledge acquisition; case studies; MYCIN.

Learning :

Role learning; learning by induction; Explanation based learning.

BOOKS RECOMMENDED :

1. Elaine Rich and Kevin knight: Artificial Intelligence-Tata McGraw hill.
2. Dan W. Patterson: Introduction to Artificial Intelligence and Expert Systems. Prentice hall of India.
3. Nills j. Nilson: Principles of Artificial Intelligence; Narosa publishing house.
4. Clocksin & C.S. Melish ; Programming in PROLOG – Narosa publishing house.
5. M.sasikumar ,S.Ramani. etc : Rule based expert system (A practical Introduction) narosa publishing house.

THIRD SEMESTER : MCA - 305
System Analysis Design & MIS

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction : Systems Concepts and the information systems environment - Definition of system, Characteristics of system, elements of system, types of system, The system Development life cycle : consideration of candidates system. The Role of system Analyst - Introduction, the multiphase role of the analyst, the analyst / user interface, the place of the analyst in the MIS Organization.

UNIT - II

System Analysis and its Tools :

System Planning and initial investigation : basis for planning in systems analysis, fact finding, fact analysis, Feasibility study. Information Gathering Tools & technique, System Planning and initial investigation : basis for planning in systems analysis, fact finding, fact analysis, Feasibility study. Information Gathering Tools & technique,

Structured Analysis, DFD, Data Dictionary, Decision Tree, Decision Table. Cost-benefit Analysis.

UNIT – III

System Design : The process of Design Methodologies, Audit Consideration. Input Design, Output Design, Form Design, File Structure, Database structure.

System Implementation -

System Testing, the test plan, quality assurance, data processing auditor. Conversion, Post Implementation review, Software Maintenance. Computer Industry, the software Industry, A procedure for Hardware Software Selection, Project scheduling & Software. System Security, disaster/recovery planning, ethics in system development.

UNIT - IV

Introduction to MIS : Definition of MIS, Benefits of MIS, Function of MIS, Characteristics of MIS, Operating Elements of Information System, Components of Information System, Three Dimension of Information System; MIS and Other Subsystems – Information Generator, Information System Levels, Open and Closed Loop System, MIS Organizations, Types of Information System, Establishing MIS. Introduction of Transaction Processing Systems.

UNIT - V

The strategic impact of the internet and E-commerce : About internet, an overview of internet Application. Business uses of Internet, Electronic marketing and on-line communities of worldwide web.

Information Technology Assets : Managing Hardware Assets, Managing Software Assets, Managing Data Resources, MIS and Decision Support System, Strategic Information System.

RECOMMENDED BOOKS –

1. System Analysis and Design – M. Awad
2. System Analysis and Design – V. Rajaraman
3. Management Information System – D.P.Goyal

MCA-307 DATA COMMUNICATION AND NETWORKING

1. Running the Diagnostic utility for NIC provided with the Driver Floppy/CD.
2. Demonstration of UTP Flat and Cross Cable Crimping.
3. Configuration of Windows 98 Peer-to-Peer Networking.
4. Installation of Windows 2000 server along with Common Software Installations.
5. Concept of Active Directory and DNS with their Configuration in Windows 2000.
6. User and Group Administration in Windows 2000 Server.
7. Implementation of NTFS File and Folder permission and Security.
8. Windows 2000 Server as a DHCP Server Installation and Configuration.
9. Windows 2000 Server as a WINS Server Installation and Configuration.
10. Implementation of Monitoring Tools.
11. Interconnectivity with Windows 98, Linux 8.0.
12. Implementation of Terminal Services on Windows 2000 Server.
13. Installation of Oracle 8i on 2000 Server and Network Client on WIN98 and Connectivity between them.

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SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF COMPUTER APPLICATIONS

FOURTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA401	Programming in Java	3	2	-	4	100	25	-	125	40	15	-	55
MCA402	Software Engineering	3	2	-	4	100	25	-	125	40	15	-	55
MCA403	Interactive Computer Graphics	3	2	-	4	100	25	-	125	40	15	-	55
MCA404	Unix / Linux	3	2	-	4	100	25	-	125	40	15	-	55
MCA405	Elective : 1. Compiler Designing 2. Advanced Computer Architecture	3	2	-	4	100	25	-	125	40	15	-	55
MCA406	Programming Lab JAVA	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA407	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA408	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA409	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

FOURTH SEMESTER – MCA401
Programming in JAVA

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction to java programming

An overview of Java: Object Oriented Programming, Features of Java, Java Virtual Machine, Java Environment: Java Development Kit, Java Standard Library, Data Types, Variables: Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting: Narrowing and Widening Conversions, Numeric Promotions, Type Conversion Contexts; Operators: Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [ ] and instance of operator. Control Statements: Java's Selection statement, Iteration Statement, Jump Statement, Array: Declaring Array variables, Constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.

UNIT - II : Define the Class and interface

Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining Methods, method overloading, Using objects as parameter, Constructors, Garbage collection, finalize () method. Inheritance: Inheritance basic, method overloading, object reference this and super, Chaining constructor using this () and super (), Member accessibility modifier: public, protected, default accessibility of member, private protected, private, Package: Define package, CLASSPATH, importing package, Interface: Define an interface, implementing interface, extending interface, variable in interface, Overview of nested class: Top level nested class and interface, Non static inner class, Local class, Anonymous class.

UNIT - III : Exception handling and Multithreading

Exception Handling: Exception types, Uncaught Exception, Using try and catch, multiple catch, nested try block, throw, and throws, finally.

Multithreading: creating thread, Thread priority, synchronization, thread Scheduler, Running & yielding, sleeping and waking up, waiting and notifying, suspend and resume, miscellaneous method in thread class.

UNIT - IV : Input output, Networking and Fundamental class of java

Object class, String class, String Buffer class, Wrapper class, Math class, Collection: Collection interface, List interface, Set interface sorted interface, Array List class, Liked List class, Tree Set, Comparator, Vector, Stack.

Input output classes and interface: File, Buffer Stream, Character Stream, and Random Access for files, Object Sterilization.

Networking: Socket overview, Client/Server, Proxy Server, Network class and interface, TCP/IP client socket, TCP/IP Server socket, URL Connection, Datagrams, Datagram Packets.

UNIT - V : Applet programming and AWT

Applet : Applet and Application program, Creating Applets, Applet Life Cycle, Applet and Thread, Supplying Applet parameter, Using Images and Sound in Applets, JAR files, Applet Security.

Introducing the AWT : Overview of the java.awt package, Component and Containers: Component, Container, Panel, Applet, Window, Frame, and Dialog classes. Working with Graphics, Working with Fonts, Working with Colors. *GUI Control Components* : Button, Canvas, Checkbox and Checkbox Group, Choice, List, Label, Scrollbar, Text Field and Text Area, Frame, Menu Bars and Menu. *Layout Management*: Layout Management Policies, Flow Layout, Grid Layout, Border Layout, Card Layout, Grid Bag Layout, Customized Layout.

Event Handling: Overview of Event Handling, Event Hierarchy, Event Delegation Model, Event Adapters, Low Level Event Processing.

BOOKS RECOMMENDED :

1. The Complete Reference Java 2 - Herbert Schildt, Publisher- TMH
2. A Programmer Guide to Java - Khlid A. Mughal, R.W. Rasmussen.
3. Introduction to HTML by - Kamlesh N. Agarwala, O.P.Vyas, P A. Agarwala.
4. Web Enabled Commercial Application Java 2 - Ivan Bayross Publisher- B.P.B.

FOURTH SEMESTER : MCA - 402
Software Engineering

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Software Engineering Fundamentals :

Definition of software product; types of Software; introduction to Software Engineering; Need of Software Engineering; Software Crisis; Software Engineering principles (Layers); Software Engineering problems; SDLC; Waterfall Model, Prototype Model, Incremental Model, Spiral Model, RAD Model; Role of management in software development (4P).

UNIT - II

Software Analysis and Design:

software requirements specification (SRS); Structure of SRS; Requirement Engineering; Analysis Model-Data Flow Diagram, Data Dictionary, E-R Diagram, Decision Table, Pseudocode, Software Design, Design Objectives, Strategy of Design, Abstraction, Partitioning and Projection, Process Oriented Design (Gane, Sarson and Yourdon), Data Oriented Design(Warnier-orr), Object Oriented Design (Booch Method), Cohesion and Coupling.

UNIT - III

Software Quality and Case Tools :

Software Matrices, Categories of Matrices, Software quality assurance, McCall's Quality factors, Software Maturity model, ISO Model, Software Reliability, case tools and its scope, Architecture of case tools, case objectives, case classification, categories of case tools, cyclomatic complexity.

UNIT - IV

Coding and Testing :

Choice of Programming Languages; Coding Style; Structured Programming; Coding Standard; Internal Document; Software Testing-Verification and Validation; Testing Techniques -white box, black box; Levels of Testing - Unit, integration, validation and system; Test Plan; Debugging - Debugging Process, Error, Fault and Failure.

UNIT - V

Software Maintenance and Project Management :

Introduction to Maintenance; Categories of Maintenance; Belady and Lehman Model, Boehm Model, Software Project Team; Software Project Planning; Project monitoring and controls; Software Project Estimation, Cost Estimation Model (COCOMO Putnam-slim, Watson and fellix).

RECOMENDED BOOKS:

1. Software Engineering: A Practitioner's Approach – by Essman Roger, Tata McGraw Hill
2 . An Integrated approach to Software Engineering - by Jalote Pankaj, Narosa: New delhi. 1991.
3. Software Engineering, An Integrated Approach – By S.M.Ghosh.
4. Software Engineering – By Bahrat Bhushan Agrawal.
5. Software Engineering – By K.K. Agraw

FOURTH SEMESTER : MCA - 403
Interactive Computer Graphics

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Display Devices

Refresh Cathode ray tubes, Random Scan and raster Scan Monitors, Direct view storage tubes, continual refresh and storage display, plasma panel displays, LED & LCD devices, color display techniques, shadow marking and penetration, hard copy devices-printer and plotters.

UNIT - II : Output Primitives

Points and Lines, Line drawing algorithms - vecgen and Bresenham Antialiasing. Circle generating Algorithms, Bresenham Circle Algorithms Ellipse, Character generating and text display. Matrix and Stork fonts, output command for various geometrical shapes, fill areas horizontal scan for Polygons. Attribute of outputs primitives, line style, text style, bundled attributes, fill colors and patterns Program in Java or c++ for related Algorithms.

UNIT - III : Display Description

Word/user coordinates, device coordinate, normalized device coordinates, two dimensional viewing. Transformation - Translation, scaling rotation, reflection, shearing. Matrix representation of transformation and homogenous coordinates, Concatenation of transformation. Viewing algorithms- windows and viewpoints, windowing and clipping, line, area text clipping, blanking windows to view point transformation zooming and planning. Segment, concepts and file, segment attributes.

UNIT - IV : Interactive Graphics

Physical Input devices, logical classification, interactive picture construction techniques, input function.

3-D Transformation

Translation, Scaling, Rotation about standard and arbitrary axis, transformation commands.

UNIT - V : 3-D Projection

Viewing Pipeline, Viewing transformation and clipping, Normalized view volume, viewing Pipeline, hidden line and surface elimination algorithms backface removal, depth buffer method, scan line method, depth sorting method, area subdivision and octree method.

Design for User Interface

Components and user model, command language, memorization user help, backup and error handling, response time, command language style, menu design, feedback, output formats. Development of graphics in Matlab

RECOMMENDED BOOKS :

1. Computer Graphics - Hearn D. & Baker P.M.
2. Computer Graphics : A Programming Approach - Harringron S.
3. Procedural Elements for Computer Graphics - Rogers D.F.

FOURTH SEMESTER : MCA – 404
Unix / Linux

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction : Introduction to Multi-user System, Emergency and history of Unix, Feature and benefits, Versions of Unix. **System Structure:-**Hardware requirements, Kernel and its function, introduction to System calls and Shell.

File System : Feature of Unix File System, Concept of i-node table, links, commonly used commands like who, pwd, cd, mkdir, rm, ls, mv, lp, chmod, cp, grep, sed, awk, pr, lex, yacc, make, etc. Getting started (login / logout), File system management, file operation, system calls, buffer cache **.Vi Editor:-**Intro to text processing, command and edit mode, invoking vi, command structure, deleting and inserting line, deleting and replacing character, searching strings, yanking, running shell command, command macros, set windows, set auto indent, set number, intro to exrc file.

UNIT - II

Shell Programming : Introduction to shell feature, wild card characters, i/out redirections, standard error redirection, system and user created shell variables, profile files, pipes/tee, background processing, command line arguments, command substitution, read statement, conditional execution of commands, special shell variables $ #, #?, $* etc. Shift commands, loops and decision making- for, while and until, choice making using case…esac, decision making if ….fi, using test, string comparison, numerical comparison, logical operation, using expr.

UNIT - III

Introduction to Shell : Features, changing the login shell, cshrc, login, logout files, setting environment, variables, history and alias mechanism, command line arguments, redirection/appending safely, noclobber, noglob, ignore eof, directory stacks (pushd, popd), feature of other shell (rsh, vsh).

Process Control : Process management, process states and transition, regions and control of process, sleep and waking, process creation, process killing, signals, system boot and init process, traps, sitting process priorities.

UNIT - IV

Inter-process Communication : I/O Sub system, terminal drives, disk drives, messages, shared memory, semaphores, memory management, swapping, demand paging.

System Calls and Unix -C Interface : File handling calls like - access (), open(), create(), read(), write(), close(), fseek(), process control system calls like kill(), exec(), fork(), wait(), signal(), exit(), comparing stdio library and calls.

UNIT - V

System Administration : Process and Scheduling, Security, Basic System Administration:- Adding a User, User Passwords, Delete of a User, Adding a Group, Deleting a Group, Super User, Startup and Shutdown. Advanced System Administration:-Managing Disk Space, Backup and Restore, Managing System Services. Xwindows:- Introduction to Xwindows concept.

BOOKS RECOMMENDED :

1. Design of Unix Operating System - Maurice Bach
2. Advanced Unix - Stephan Prata
3. The Unix Programming Environment - Kennighan and Pike
4. Unix Programmers Guide - P. P. Selvester
5. Introduction to Unix System - Rachell Morgan
6. Complete Reference Red Hat Linux - Richard Peterson
7. Complete Reference Unix

FOURTH SEMESTER : MCA – 405

Elective – 1 : Compiler Design

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction to Compiling and one pass compiler :

Compilers & translators, Phases of compilers, Compiler writing tools, Bootstrapping; overview of one pass compiler.

Finite Automata and Lexical Analysis –

Role of Lexical Analyzer; specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata, DFA and NFA, Implementation of lexical analyzer; tools for lexical analyzer -LEX.

UNIT - II

Syntax analysis & Parsing Technique -

Context free grammars; Bottom up parsing, Shift reduce parsing, Operator Precedence parsing, Top down parsing, elimination of left recursion; recursive descent parsing, Predictive parsing.

Automatic Construction of Efficient parsers –

LR parser, construction of SLR and canonical LR parser table, Using ambiguous grammar, An automatic parser the generator, YACC, Using YACC with ambiguous grammar, creating YACC lexical analyzer with LEX, Error recovery in YACC.

UNIT - III

Syntax Directed Translation –

Syntax directed schema, Construction of syntax tree, Translation with top down parser.

Run Time Environment –

Source Language issues, Storage organization and allocation strategies, Parameter passing, Implementation of block-structured language.

UNIT - IV

Intermediate Code Generation –

Intermediate languages; Postfix notation, Three-address code, Quadruples and triples, Translation of assignment statements, Boolean expression, and Procedure call.

Error Detection & recovery –

Lexical & syntactic phase error, semantics error.

UNIT - V

Code Optimization –

Optimization of basic block, Loop optimization global data flow analysis, Loop in variant computation.

Code Generation –

Issue and design of code generator, the target machine, a simple code generator.

BOOKS RECOMMENDED :

1 Principles of Compiler Designing **- by Alfred V. Aho and J.D. Ullman.**

2.Principles of Compiler-Principles, Technique and Tools **- Alfred V. Aho, Ravi Sethi**

FOURTH SEMESTER : MCA – 405
Elective – 2 : Advanced Computer Architecture

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT I:

Introdution - Feng's and Flynn's classification scheme, Multiprocessor and Multicomputer, UMA, NUMA, COMA, NORMA, memory models, parallel computer and its type. Applications of Parallel Computers.

UNIT II:

System Interconnect Architecture – Static and Dynamic, Hypercube Interconnection network, multistage interconnection networks-architecture and routin, design consideration, throughput delay, blocking and non-blocking properties. Performance Metrics and Benchmarks.

UNIT III:

Principle of pipelining-overlapped parallelism, Linear and non-linear pipelining, reservation table, calculation of MAL. Types of Instruction Pipeline. Arithmetic pipeline designs example –Floating point adder, pipelined multiplier.

UNIT IV:

Advanced processor Technology – RISC, CISC, VLIW architectures, Hazard detection and resolution, case study of CRAY 1.

UNIT V:

Exploring parallelism in program- multidimensional arrays. Parallel Algorithm-Matrix addition, subtraction, multiplication –block and SIMD. Bitonic sort, sorting on linear array processors. Bernstein's condition, iso efficiency concept.

Text Books:

1 Computer Architecture & Parallel Processing by Kai Hwang and F.A. Briggs-Mc Graw Hill.
2 Advanced Computer Architecture By Kai Hwang –Mc Graw Hill.
3 Parallel Computing by M.R. Bhujade – New Age Publication.

Reference Books:

Parallel Computing Theory and practice by Michael J. Quinn –Tata Mc-Graw Hillal & Yogesh Singh.

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF COMPUTER APPLICATIONS

FIFTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
MCA501	Advanced Programming Tools - **Java**	3	2	-	4	100	25	-	125	40	15	-	55
MCA502	Introduction to .Net Technology & C#	3	2	-	4	100	25	-	125	40	15	-	55
MCA503	Data Mining and Data Warehouse	3	2	-	4	100	25	-	125	40	15	-	55
MCA504	Electives : 1. **Soft Computing** 2.Simulation & Modeling 3.OOAD 4.Introduction to I SO & CMM	3	2	-	4	100	25	-	125	40	15	-	55
MCA505	Electives : **Satellite & Mobile Communication** 1. Embedded Programming 2. Robotics 3. Artificial Neural Network & fuzzy logic	3	2	-	4	100	25	-	125	40	15	-	55
MCA506	Programming Lab	-	-	3x2	3	-	50	100	150	-	30	50	80
MCA507	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA508	Common Software / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
MCA509	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	20	26	500	300	200	**1000**	200	180	100	**480**

FIFTH SEMESTER : MCA – 501
Advanced Programming Tools – JAVA

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : JDBC

Introduction to JDBC, JDBC Drivers Type, Connection, JDBC URLs, Driver Manager, Statement – Creating, Executing, Closing, Result Set – Data Types and Conversions. Prepared Statement, Callable Statement, Mapping SQL and Java Types, JDBC-ODBC Bridge Driver

UNIT - II : RMI

Distributed Applications, Introduction to RMI, Java RMI Architecture, Writing an RMI Server, Designing a Remote Interface, Implementing a Remote Interface, Creating a Client Program, Compiling the Programs, Running the Programs

UNIT - III : Servlets

Movement to Server Side JAVA, Overview of Servlets, Common Gateway Interface (CGI), The JAVA Servlet Architecture, Generic Servlet and HTTP Servlet, The Servlet Interface, Requests and Responses, The Life Cycle of a Servlet, Retrieving Form Data in a Servlet, Session Tracking, Cookies.

UNIT - IV : Java Beans

Java Beans Concepts and the Beans Development Kit, Using the Bean Box, Writing a Simple Bean, Properties, Manipulating Events in the BeanBox, The BeanInfo Interface, Bean Customization, Bean Persistence.

UNIT - V : Java Server Pages (JSP) & J2ME

Overview of JSP, JSP Scripting elements, Compare and Contrast JSP with CGI and Servlet Technologies, List JSP directives, Integrate JSP with Java Beans Components, Handle JSP exceptions, Develop a basic Java Server Pages, Deploy Java Server Pages, Compare two-tier and multi-tier web application architectures, Database Connectivity. Introduction of J2ME, Variable declaration and syntax, Application, documentation and implementation of Java apps.

Text Books

1. The Complete Reference Java 2 (Updated to Cover J2SE 1.4) - Herbert Schildt, Tata McGraw-Hill publishing company Ltd. New Delhi, India.
2. Core Java 2 Volume-I Fundamentals - Cay S. Horstmann Gary Cornell, PEARSON Education, Singapore Pte. Ltd., Indian Branch, New Delhi, India 2005.

Reference Books

1. Java 2 for Professionals Developers - Michael Morgan, SAMS, Techmedia, New Delhi, India 2000.
2. Thinking in Java, The Definitive Introduction to Object-Oriented Programming in the Language of World-Wide-Web - Bruce Echel, PEARSON Education, Singapore Pte. Ltd., Indian Branch, New Delhi, India 2005.
3. Java 2 Developer's Hand Book - Philip Heller and Simon Roberts,BPB Publication, New Delhi

FIFTH SEMESTER : MCA – 502

Introduction to .NET Technology

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Inside the .NET framework :

Overview of .net framework, Managed Execution process, CLR, common language specification, JIT Compilation , MSIL, Namespaces, Assemblies, metadata, Common Type System, cross language, interoperability, Garbage collection.

UNIT - II : Programming with .NET Framework

Windows form : working with Visual Studio IDE, creating a .NET solution, MDI application, components and controls, Data types, variables, Type conversions, Operators, Control Structures : conditional statements, loops, arrays, types of methods, method data, Introduction to exception handling-exception statements.

UNIT - III : XML, Windows process and File Handling

Types, structures, Enumerations, classes, Interfaces, Working with files-Files and directories, streams, Readers and writers, Reading and writing XML files, XML serialization, processing Transaction, Monitoring and Managing Windows Process, retrieving information about process.

UNIT - IV : Building .NET Framework Applications

Introduction to ASP .NET, Differentiate classic ASP and ASP .NET, Web application, Web forms, Form validations – Client side, Server side, controls in web forms, Events in Web form.

UNIT - V : Advanced concepts and Database Programming

Delegates, ADO .NET Architecture, .NET dtat provider, dataset components, creating database applications using Window forms and web forms (Database connectivity through ADO .NET), Introduction to web services, web services for Mobile application, Remote overview.

BOOKS RECOMMENDED

1. MSDN online – by Microsoft
2. Visual Basic .NET Complete - By BPB Publications, New Delhi.
3. The Complete Reference VB .NET – By Jeffery R. Shapiro, Tata Mcgraw Hill.
4. Professional VB .NET 2003 – by bill Evjen & others, Wiley Dreamtech India (P) Ltd. New Delhi.

FIFTH SEMESTER : MCA – 503
Data Mining & Data Warehousing

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction & Data Warehousing and OLAP Technology for Data Mining –
What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

UNIT - II : Data Preprocessing, Data Mining Primitive, Languages and System Architecture –
Why preprocess the data?, Data cleaning ,Data integration and transformation, Data reduction, Discrimination and concept hierarchy generation, Data Mining Primitive, Data Mining Query Language, Architecture of data mining system.

UNIT - III : Mining Association Rules in Large Databases-
Association rule mining, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databases, Mining multidimensional association rules from transactional databases and data warehouse, From association mining to correlation analysis, Constraint-based association mining.

UNIT - IV : Classification and Prediction & Cluster Analysis –
What is classification? What is prediction? Issues regarding classification and prediction, Classification by decision tree induction, Bayesian Classification, Classification by back propagation, Classification based on concepts from association rule mining, Other Classification Methods ,Prediction, Classification accuracy, What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT - V : Mining Complex Types of Data & Applications and Trends in Data Mining -
Multidimensional analysis and descriptive mining of complex data objects, Mining spatial databases, Mining multimedia databases, Mining time-series and sequence data, Mining text databases, Mining the World-Wide Web, Data mining applications, Data mining system products and research prototypes, Additional themes on data mining, Social impact of data mining, Trends in data mining.

BOOKS RECOMMENDED

1. Data Mining: Concepts and Techniques -
- Jiawei Han and Micheline Kamber
2. Data Mining Concepts - H. Marget
3 . Introduction to Data Mining- -Pang – Ning Tan, Michael Steinbach, Vipin Kumar

FIFTH SEMESTER : MCA – 504
Elective 1 : : Soft Computing

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction to Fuzzy Logic System

Fuzzy Sets Operation Of Fuzzy Sets, Properties Of Fuzzy Sets, Fuzzy Relations, Fuzzy Arithmetic, Membership Functions, Fuzzy To Crisp Conversion. Fuzzy Logic, Fuzzy Rule Based Systems, Fuzzy Decision Making, Fuzzy Database, Fuzzy Intelligent System.

UNIT - II : Introduction to Artificial Neural Networks

Introduction to Artificial Neural Network, Artificial Neuron, Classification of Artificial Neural Network, Architecture of a Artificial Neural Network, Activation Function, Training an Artificial Neural Network, Application of Artificial Neural Network.

UNIT - III : Perceptron and Associative Memories

Amari General Learning Rule, HEBB Learning Rule, ADLINE, Perceptron Layer Network, Associative memory: Auto associative Memory, Bi-directional memory, Back-propagation Network: Architecture, Training Algorithm Application of Back-propagation algorithm

UNIT - IV : Machine Learning

Regression And Classification, Decision Tree, SPRINT, Gini Index, Entropy, Pruning, C4.5, Active Learning - Feature Selection, Clustering, Models And Methods, Neural Networks, Markov Chain/Processes, Hidden Markov Models (HMM).

UNIT - V : Soft Computing Tools

Introduction to MATLAB, Features, Matrix Operations, Curve Plotting, Toolbox Introduction, Introduction to Simulink.

RECOMMENDED BOOKS:

1. Fuzzy systems and Fuzzy Logic, Klir and Uuna, PHI Publications.
2. Introduction to Artificial Neural Networks, S. N. Sivanandam and M. Paulraj, Vikas publication.
3. Neural Network Design by Hagan & Demuth, Vikas Pub. Comp.
4. Fundamentals of Artificial Neural Networks, M.A.Hassaoun.
5. Fuzzy sets, uncertainty and information George J. Kir, & TA Folger.
6. Fuzzy sets, Decision making and Expert system, HJ Zimmerman, Kluwer, Boston.
7. Fuzzy set theory and its applications, H. J. Zimmerman, Kluwer, Boston.

FIFTH SEMESTER : MCA – 505

Elective 1 : Satellite & Mobile Communication

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Introduction.

Introduction to Mobile Communication, Short history of wireless communication, Applications, Vehicles, Emergency, Business, Replacement of wired network, Location dependent services, infotainment, Mobile and Wireless devices, A Simplified reference model, some open research topics in mobile communication.

UNIT - II : Satellite Systems

History of satellite system, Applications of satellite systems, Type of satellite systems, characteristics of satellite systems, satellite system infrastructure, satellite system architecture, Global Positioning system (GPS), Limitations of GPS. Beneficiaries of GPS, Applications of GPS

UNIT - III : Mobile Communication Systems

Introduction, Cellular System Infrastructure,, Registration, Handoff Parameters and Underlying support, Roaming Support Using System Backbone, to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign Network, Home Agent , Foreign Agent, Care-of Address, IP Packet Delivery, Agent Discovery, Agent Solicitation , Registration, Tunneling , Dynamic host configuration protocol.

UNIT - IV : Wireless LANs and PANs

Introduction to IEEE 802.11, Ricochet, Ricochet Wireless Modem, Services Provided by Ricochet , Home RF, Home RF Technology, Hiper LAN, Blue tooth , Advantages and disadvantages of Wireless LAN, Infra red vs radio transmission , introduction to MAC. Technologies influence WLANs / WPANs in future.

UNIT - V : Mobile Adhoc Network

Introduction to Mobile Adhoc Network(MANET), Characteristics of MANET, Applications of MANET, Routing, Need for Routing, Routing Classification, Table-Driven Routing Protocol – Destination Sequenced Distance Vector Routing Protocol, Cluster-Head Gateway Switch Routing, Wireless Routing Protocol. Source initiated On-demand Routing- Adhoc On Demand Distance Vector Routing, Dynamic Source Routing, Temporarily Ordered Routing Algorithms, Hybrib Protocol – Zone Routing Protocol.

RECOMMENDED BOOKS :

1. Mobile Communication: Jochen H. Schiller, Pearson Education Publication
2. Introduction to Wireless and Mobile Systems: D.P. Agrawal , Qing-An Zing , Vikas Publishing House

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF COMPUTER APPLICATIONS

SIXTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+(T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Sessional Marks of Project Work	Project Viva-Voce	Pr	Total	Sessional Marks of Project Work	Project Viva-Voce	Pr	Total
MCA601	System Development Project (System Design & Implementation)	5	-	30	20	200	200	-	400	120	100	-	220
	TOTAL	5	-	30	20	200	200	-	400	120	100	-	220

Note : Major Project will include Research Project as well during which candidate may publish Research Paper.

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SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN COMPUTER SCIENCE

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+ (T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Tot
Paper 1	Mathematical Foundation of Computer Science	3	2	-	4	100	50	-	150	40	30		70
Paper II	Advance Operating System	3	2	-	4	100	50	-	150	40	30		70
Paper III	Data Structure through algorithms using 'C'	3	2	-	4	100	50	-	150	40	30		70
Paper IV	Object Oriented Programming using 'C++'	3	2	-	4	100	50	-	150	40	30		70
Paper V	Computer System Architecture	3	2	-	4	100	50	-	150	40	30		70
Practical I	Programming Lab Based on Paper III			3x2	3		25	100	125		15	50	65
Practical II	Programming Lab Based on Paper- IV	-	-	3x2	3	-	25	100	125	-	15	50	65
TOTAL		15	10	12	26	500	300	200	**1000**	200	180	100	480

FIRST SEMESTER : M.Sc.(CS)
Paper I : Mathematical Foundation of Computer Science

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Mathematical Logic, Sets Relations and functions

Mathematical Logic : Notations, Algebra of Propositions & Propositional functions, logical connectives, Truth values & Truth table Tautologies & Contradictions, Normal Forms, Predicate Calculus, Quantifiers.

Set Theory: Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cardinality, relations: Cartesian Products, relational Matrices, properties of relations equivalence relation functions: Injection, Surjection, Bijection, Composition, of Functions, Permutations, Cardinality, the characteristic functions recursive definitions, finite induction.

UNIT – II : Lattices & Boolean Algebra

Lattices : Lattices as Algebraic System, Sub lattices, some special Lattices(Complement, Distributive, Modular).

Boolean Algebra : Axiomatic definitions of Boolean algebra as algebraic structures with two operations, Switching Circuits.

UNIT – III : Groups Fields & Ring

Groups : Groups, axioms, permutation groups, subgroups, co-sets, normal subgroups, free subgroups, grammars, language).

Fields & Rings : Definition **,** Structure, Minimal Polynomials, Irreducible Polynomials, Polynomial roots & its Applications.

UNIT - IV : Graphs

Graphs : Simple Graph, Multigraph & Psuedograph, Degree of a Vertex, Types of Graphs, Sub Graphs and Isomorphic Graphs, Operations of Graphs, Path, Cycles and Connectivity, Euler and Hamilton Graph, Shortest Path Problems BFS(Breadth First Search, Dijkastra's Algorithm, Representation of Graphs, Planar Graphs, Applications of Graph Theory.

UNIT - V : Trees

Trees : Trees, Properties of trees, pendant vertices in a tree, center of tree, Spanning tree, Binary tree, Tree Traversal, Applications of trees in computer science.

BOOKS RECOMMENDED :

1. A text book of Discrete Mathematics – By Swapan Kumar Sarkar.(S.Chand & company Ltd.).
2. Discrete Mathematical structure with - By J.P Trembly & R.P. Manohar.
   Applications to computer science
3. Discrete Mathematics -By K.A Ross and C.R.B writht.
4. Discrete Mathematics Structures -By Bernard Kohman & Robert C. Bushy.
   for computer science
5. Discrete Mathematics -By Seymour Lipschutz Mare Lipson. Tata McGraw-Hill Edition.

FIRST SEMESTER : M.Sc.(CS)
Paper II : Advance Operating Systems

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT-I

Introduction

What is operating system, basic concept, terminology, batch processing, spooling, multiprogramming, time sharing, real time systems, protection, multiprocessor system, operating system as resource manager, process view point, memory management, process management, device management and information management, other views of operating system, historical, functional job control language and supervisor service control.

UNIT-II

Advanced Processor Management Features

Multi- threaded operating system architecture micro-kernels operating system architecture multiple operating system- subsystem and environments, client-server architecture, protected mode software architecture ,visual machine- JAVA virtual machine and virtual 8086 mode, hard and soft real time operating system, pre-emptive and non-pre-emptive multitasking and scheduling inter process communication shared memory semaphore message queues, signals sessions management, multiprocessor and distributed process synchronization, symmetric multiprocessing systems.

UNIT-III

Advanced Memory Management

Virtual address space, description of user process and kernal, virtual memory architecture of Pentium group of processor. Translation Lookaside Buffers, implementation of file mapping, shared memory through virtual memoryviortual swap space.

UNIT - IV

Advanced Device Management Feature

Device driver framework classifying devices and driver, invoking driver code, devices switch table and driver entry points,dynamic loading and unloading of device drivers

UNIT V

Advanced File Management Features

Virtual file systems and v-node architecture, distributed file system, network file system, remote procedure call

RECOMMENDED BOOKS

1. Principles of Operating System - Peterson.
2. Operating System - Mandinick & Donovan.

FIRST SEMESTER : M.Sc.(CS)

Paper III : Data Structure through algorithms using 'C'

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction and Preliminaries -

Introduction, Basic terminology, Elementary data organization, Data structure, Data structure operation, Algorithms : complexity , time-space Tradeoff.. Mathematical Notation and functions, Algorithmic Notation, Control Structures, Complexity of Algorithms, Sub algorithms, Variables, Data Type.

UNIT - II : String Processing, Arrays, Records And Pointers –

Basic Terminology, Storing String, Character Data Type, String Operations, Word Processing, Pattern Matching Algorithms. Linear Array, Representation of linear Array in Memory, Traversing Linear Arrays, Inserting And Deleting, Sorting; Bubble Sort, Searching; Liner Search, Binary Search, Multidimensional Array, Pointers; Pointer Array, Records; Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Sparse Matrices.

UNIT - III : Linked Lists, Stacks, Queues, Recursion -

Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation; Garbage Collection, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists. Stacks, Array Representation of Stack, Arithmetic Expressions; Polish Notation, Quick sort, an application of Stacks, Recursion, Tower of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Dequeues, Priority Queues.

UNIT - IV : Trees & Graphs -

Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree, Heap; Heap sort, Path Lengths; Huffmans Algorithms, General Tree. Graph Theory Terminology, Sequential Representation of Graph; Adjacency Matrix, Path Matrix, Linked Representation of Graph.

UNIT - V : Sorting And Searching –

Sorting, Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and data modification, hashing.

BOOKS RECOMMENDED :

1. Data Structure **- Seymour Lipschutz (Schaum's Series).**

2. Data Structure & Program Design **- Robert L. Kruse, 3rd Ed., Prentice Hall.**

FIRST SEMESTER : M.Sc.(CS)

Paper IV : Object Oriented Programming using 'C++'

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Language Fundamental

Advantages of OOP, The Object Oriented Approach, and Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, and Polymorphism.

Overview of C++: History of C++, Data Types, Constants and Variables, Operators and Expression. Control structures : if , if-else, nested if-else, while(), do-while() , for(;;), break, continue, switch, goto, String, Storage class.

UNIT - II : Structure, Function & Array

Structures : A Simple structures ,specify the structures, Defining a structure variable, Accessing structures member, Enumeration data type.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, Passing struct variable, Overloaded Function, Inline Function, Default Argument, return statement, returning by reference.

Array: Defining array, array element, initiation array, multi dimensional array, passing array to function.

UNIT - III : Object Classes and Inheritance

Object and Class, Using the class, class construct, class destructors, object as function argument, struct and classes , array as class member, operator overloading. Type of inheritance, Derive class, Base class. Access specifier: protected. Overriding, member function.

UNIT - IV : Pointers

Pointers : & and * operator pointer variables, pointer to void ,pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, pointer to pointer.

UNIT - V : Virtual Function and File & Stream

Virtual Function : Virtual Function, Virtual member function, accesses with pointer, Late binding, pure virtual function, Friend function, Friend class, static function, this pointer, Templates.

File and Stream : C++ streams, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, File pointer, Disk I/O.

RECOMMENDED BOOKS :

1. Object Oriented Programming : McGregor and Sykes S A, 1992 Van Nostrand.
2. The C++ Programming Language : Strustrp B,Addision Wasley.
3. Object Oriented Programming in C++ : Lafore R, Galgotia Publications.
4. Introduction to Object Oriented Programming : Witt KV, Galgotia Publications.
5. Object Oriented Programming : Blaschek G, Springer Verlag
6. Object Data Management : Cattel R, Addison Wasley.

FIRST SEMESTER : M.Sc.(CS)
Paper V : Computer System Architecture

Max Marks: 100 **Min Marks: 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Representation of Information

Number system, Integer & Floating point representation Character code (ASCII, EBCDIC), Error Detect and Correct code, Basic Building Blocks, Boolean Algebra, MAP Simplification, Combination Blocks, Gates, Multiplexers, Decoders, etc Sequential building block, flip-flop, registers, counters, ALU, RAM etc.

UNIT - II : Register transfer language and micro operations

Concepts of bus, data movement along registers, a language to represent conditional data transfer, data movement from its memory, arithmetic and logical operations along with register transfer timing in register transfer

UNIT - III : Basic Computer Organization and Design

Instruction code, Computer Instructions, Timing and Control, Execution of Instruction, Input and Output Interrupt, Design of Computer.

UNIT - IV : Computer Software

Programming Language, Assembly Language, Assembler, Program Loops, Input /Output Programming, System Software. Central Processor Organization: - Processor Bus Organization, Arithmetic Logic Unit, Stack Organization, Instruction Formats, Addressing modes, Data transfer and Manipulation, Program Control, Microprocessor Organization, Parallel Processing,.

UNIT - V : Input –Output & Memory Organization

Input –Output Organization : Peripheral Devices, Input/Output Interface, Asynchronous Data Transfer, Direct Memory Access (DMA), Priority Interrupt, Input-Output Processor, Multiprocessor System Organization, and Data Communication Processor**.**

Memory Organization : Auxiliary Memory, Micro Computer Memory, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

BOOKS RECOMMENDED:

1. Computer System Architecture - M. Morris Mano (PHI).
2. Digital Computer Electronics - Malvino.
3. Digital Computers and Logic Design - M.Morris Mano (PHI).
4. Structured Computer Organization - Andrew M. Tanenbanm (PHI).

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN COMPUTER SCIENCE

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P	L+ (T+P)/2	Th	Ses	Pr	Total	Th	Ses	Pr	Tot
Paper 1	RDBMS (SQL Programming with Oracle)	3	2	-	4	100	50	-	150	40	30		70
Paper II	Advanced Computer Networks	3	2	-	4	100	50	-	150	40	30		70
Paper III	Programming in Visual Basic	3	2	-	4	100	50	-	150	40	30		70
Paper IV	Principles of Compiler Design	3	2	-	4	100	50	-	150	40	30		70
Paper V	Numerical Analysis	3	2	-	4	100	50	-	150	40	30		70
Practical I	Practical Based on Paper I			3x2	3		25	100	125		15	50	65
Practical II	Practical Based on Paper III	-	-	3x2	3	-	25	100	125	-	15	50	65
TOTAL		15	10	26	26	500	300	200	**1000**	200	180	100	480

SECOND SEMESTER : M.Sc.(CS)
Paper I : RDBMS (SQL Programming with Oracle)

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Overview of Database Management -
Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases, Client/Server databases, Object-oriented databases, Object-relational databases, Introduction to ODBC concept.

UNIT - II : Relational Model & Relational Algebra -
Entity - Relationship model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Concept of keys; Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features, Introduction to UML, Representation in UML diagram (Class Diagram etc.).
Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages.

UNIT - III : SQL
Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….), INSERT, DELETE, UPDATE, DROP, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.
Introduction to PL/SQL variables – literals – data types – advantages of PL/SQL; Control statements **:** if ; iterative control – loop, while, for , goto ; exit when; Cursors : Types – implicit, explicit – parameterized cursors – cursor attributes; Exceptions: Types – internal , user-defined , handling exceptions – raise statement.

UNIT - IV : PL/SQL
PL/SQL tables and records: Declaring PL/SQL tables - referring PL/SQL tables, inserting and fetching rows using PL/SQL table, deleting rows; records - declaration of records - deleting records; Sub programs: Functions - procedures – input-output parameters; purity functions - packages - package specification - advantages of packages - private and public items - cursors in packages.

UNIT - V : Relational Database Design-
Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of De-normalization, Indexing, Clustering indexes. Data Organization - Fixed length records, variable length records, Organization of records in files, Indexing: - indexed files -B-tree, B+-tree, and Hashing Techniques.

BOOKS RECOMMENDED :

1. Database system concept - **H. Korth and A. Silberschatz, TMH**
3. Data Base Management System - **Ivan Bayross**
4. Data Base Management System - **James Matin**
5. Database Management System - **Leon & Leon, Vikas Publication**
6. An Introduction to database systems - **Bipin Desai, Galgotia Publication.**
7. Database Management System - **A. K. Majumdar & P.Bhattacharya, TMH**

SECOND SEMESTER : M.Sc.(CS)
Paper II : Advanced Computer Networks

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction to Computer Networking : The Concept of Networking, Data Communication, Required network elements, The role of Standards Organization. Line Configuration, Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks.

The OSI and TCP/IP Reference Model : The Concept of Layered Architecture, Design Issues for the Layers. Interfaces and services, Detailed Functions of the Layers. Comparison between OSI and TCP/IP Reference model.

UNIT - II

Transmission of Digital Data : Shannon's and Nyquist theorems for maximum data rate of a channel. Transmission media- Co-axial, UTP, Fiber optic and wireless. Analog and digital data Transmission- parallel and serial transmission. DTE-DCE interface using RS-232C. Study of modems- 56k and Cable Modem. Modem standards.

Multiplexing and Switching : The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching.

UNIT - III

Data Link Layer and Routing Algorithms : Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- ALOHA, Slotted ALOHA, CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, and its header. IP address classes and subnet mask.

The concept of ICMP, ARP, RARP, RSVP, CIDR and Ipv6. : Routing algorithms- shorted path first, Distance Vector, Link State. Congestion Control-The leaky bucket and Token bucket Algorithms.

UNIT - IV

Transport Layer : The Concept of client and Server in terms of Socket addressing in Transport layer. Two way and three-way handshaking. TCP header.
Network Performance Issues. The Concept of Domain Name System, Various Resource Records. Architecture and services of E-mail (RFC-822 and MIME). The Concept of World Wide Web- server side and client side.

ATM : The concept of ATM, ATM Adoption layers- AAL1, AAL2, AAL3/4, AAL5, Comparison of AAL protocols. Cell formats for UNI and NNI. Service Categories, Quality of service, Congestion Control in ATM.

UNIT - V

Comparative study of Networking Technologies : X.25, Frame Relay, ATM, SONET, SMDS, ISDN.
Network Security : The importance of Security in Networking, traditional cryptography, Data Encryption standards, RSA Algorithm.

BOOKS RECOMMENDED :

Computer Networks - A S Tanenbaum
Data Communication and Networking - Forouzan

SECOND SEMESTER : M.Sc.(CS)
Paper III : Programming in Visual Basic

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction to Visual Basic : The Visual Basic Program Development Process; The Visual Basic Environment; Opening a Visual Basic Project; Saving a Visual Basic Project; Running a Visual Basic Project;

Visual Basic Fundamentals : Numeric Constants; String Constants; Variables; Data Types and Data Declarations; Operators and Expressions; Hierarchy of Operations; String Expressions; Library functions , Branching and Looping Statements, Relational Operators and Logical Expressions; Logical Operators; Branching with the if-Then Block; Branching with if-Then -Else Blocks; Selection: Select-case; Looping with for-Next; Looping With Do-Loop; Looping with While-Wend

UNIT - II

Visual Basic Control Fundamentals : Visual Basic Control Tools; Control tool Categories; Working with controls; Naming Forms and Controls; Assigning Property Values to Forms and Controls; Executing Commands(Event Procedures and Command Buttons); Display Output Data (Labels and Text Boxes);Entering Input data(Text Boxes); selecting Multiple Features(Check Boxes); selecting Exclusive Alternatives(Option Button and Frames);Assigning Properties Collectively(The With Block); Generating Error Messages(The MsgBox Function);Creating Times Events; Scrollbars;

Menus and Dialog Boxes : Building Drop-down Menus; accessing a Menu from the Keyboard; Menu Enhancements; Submenus; Pop-up Menus; Dialog Boxes; Input Box;

UNIT - III

Executing and Debugging a New Project : Syntax Errors; Logical Errors; Setting break Points; Defining Watch Values; Stepping Through a Program; User- Induced Errors; Error Handlers;

Procedures : Modules and Procedures; Sub Procedure; Event Procedures; Function Procedures; Scope; Optional Arguments

Arrays : Array Characteristics; Array declarations; Processing Array Elements; Passing Arrays to Procedures; Dynamic Arrays; Array-Related Functions; Control Arrays;

Using Class Modules : Object Oriented Principles; Creating Class Modules; Using Class Modules Adding Properties and Events and Methods.

UNIT - IV

Using COM Components : Introduction to ActiveX Components and Component Object Model; Benefits of COM; Clients and Servers; Types of ActiveX Components Available in Visual Basic; Creating user defines ActiveX Components; Managing Components; The Visual Component Manager; Registering and UnRegistering Components.

ActiveX Controls : Creating an ActiveX Control; Benefits of ActiveX Control; Adding Properties; Methods and Events to the Control; Managing and Distribution of the Control; Built-in Active X Controls.

ActiveX EXE and ActiveX DLL : Introduction to ActiveX DLL and EXE; Creating ActiveX EXE Component; Creating ActiveX DLL Component

UNIT - V

Data Access using ADO : Data Access Technology with VB ; The ActiveX Data Object Model; Advantages of ADO and OLEDB; Connecting to a Data Source; Retrieving from a Data Source; Sorting and Searching Data; Updating Data; Creating Dynamic Record Sets; Using Cursors; Cursor Types; Locking; Accessing ADO Data Control.

Data Environment and Data Report : Introduction; Data Environment Designers; Working with Data Reports; Cut different types of Data Reports.

BOOKS RECOMMENDED :

1. Programming in Visual Basic - SAHU By BPB Publications.

SECOND SEMESTER : M.Sc.(CS)
Paper IV : Principles of Compiler Design

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT-I

Introduction to Compilers : Overview, Structure, implementation. Programming Language Grammars: Inter Language grammars, derivation, reduction, syntax tree, ambiguity, regular grammars & expressions.

UNIT-II

Scanning and Parsing Techniques : The Scanner, parser, translation, elementary symbol table organization, structures.

UNIT-III

Memory Allocation: Static and dynamic memory allocation, array allocation and access, allocation for strings, structure allocation, common & equivalence allocation. Introduction to Compilation of expressions.

UNIT-IV

Compilation of Control Structures : Control transfers, procedural calls, conditional execution, interation control constructs. Error detection, indication & recovery.

Compilation of I/O Statements: Compilation of I/O list, compilation of FORMAT list, IOSUB, file control.

UNIT-V

Code Optimization: Major issues, optimizing transformations, local optimizations, program flow analysis, Global Optimization, writing compilers.

BOOKS RECOMMENDED :

1. Compiler Construction -D.M.Dhandhere (M)
2. Compiler Writing -Tremble-Sorenson (TMH)
3. Computers : Princ, Techniques cools by Aho -Person.
4. The Essence of Compilers by Hanter -Pearson.

SECOND SEMESTER : M.Sc.(CS)
Paper V : Numerical Analysis

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Solution of Polynomial and Transcendental Algebraic Equations

Bisection method, Regulafalsi method & Newton's method, Solution of Cubic & Biquadrate Equation, Complex roots of polynomial equations.

UNIT – II : Simultaneous Equations and Matrix

Gauss-Jordan method, Cholesky's method, Reduction to lower or upper Triangular forms, Inversion of matrix, method of partitioning, Characteristics equation of matrix, Power methods, Eigen values of matrix, Transformation to diagonal forms.

UNIT - III : Curve-Fitting from Observed Data

Divided difference table for evenly or unevenly spaced data, polynomial curve-fitting - Newton's, Gauss and Langranges form of interpolation and Divided Differences, method of least square for polynomials,.

UNIT - IV : Numerical Differentiation and Integration

Forward and Backward differential operators, Newton - cotes integration formula: Trapezoidal Rule, Simpson's Rule, Boole's Rule, Weddle Rule, Legendre's rule, method of weighted coefficients.

UNIT - V : Solution of Differential Equations

Numerical Solution of ordinary differential equations, one step method, Taylor's Series, Predictor-Corrector Method, Euler's Method, Runga-Kutta Method, Milne's method.

BOOKS RECOMMENDED

1. Garewal : Numerical methods
2. Gupta & Mallic : Numerical Methods
3. Hamming R.W. : Numerical methods for scientist & Engineers. (McGraw Hill)
4. Conle S.D. : Elementary numerical analysis
   Carl De Boor (International Book Company London)
5. Jain M.K. : Numerical methods for Science and Engineering
   Iyengar S.R.K Calculations (John Willey & Sons)

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN COMPUTER SCIENCE

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P	L+ (T+P)/2	Th	Ses	Pr	Total	Th	Ses	Pr	Tot
Paper 1	Programming in Java	3	2	-	4	100	50	-	150	40	30		70
PaperII	Computer Graphics	3	2	-	4	100	50	-	150	40	30		70
PaperIII	LINUX	3	2	-	4	100	50	-	150	40	30		70
Paper IV	Image processing	3	2	-	4	100	50	-	150	40	30		70
Paper V	Object Oriented Analysis and Design	3	2	-	4	100	50	-	150	40	30		70
Pretical I	Practical Based on Paper I			3x2	3		25	100	125		15	50	65
Prectical II	Practical Based on Paper III	-	-	3x2	3	-	25	100	125	-	15	50	65
TOTAL		15	10	12	26	500	300	200	**1000**	200	180	100	480

THIRD SEMESTER : M.Sc.(CS)
Paper I : Programming in Java

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT-I

Introduction: History and features of Java, Difference between C, C++ & JAVA. JAVA and Internet, WWW, Web Browsers, java supports system, Java Environment. JDK, JVM, Byte code Java
Programming Basics: Structure of Java program, JAVA tokens and Statements, Constants & Variables, Data types, Operators, Command line arguments. Java Statements & Arrays: if and switch statement. while, do-while and , for. Introduction to arrays, types of arrays, new operator, Strings. String class & its methods, Vectors. Classes & Objects: Specifying classes, Methods and fields, creating objects. Passing objects to methods, returning objects, static fields & methods. Constructors, Garbage collection, Overloading methods & constructors, this keyword.

UNIT-II

Inheritances: Specifying sub class, types of inheritance, visibility control: public, private, protected, package. super keyword, Overriding methods, Dynamic method dispatch, Abstract methods and classes, final methods & classes,
Packages & Interfaces : Introduction to packages, naming conventions, package statement, creating packages, import statement, accessing package, use of CLASSPATH, adding class to package, hiding classes. Interface, implementing interfaces, multiple interfaces.
Multithreading: Creation threads, Extending Thread class, implements Runnable interface, stopping and blocking thread, Thread life cycle, thread priorities & Thread synchronization, using Thread methods.

UNIT-III:

Exception Handling: Managing errors, types of errors, exceptions, syntax of exception handling code. try, catch, throw, throws and finally statements, multiple catch & nested try statements.
Java Input Output: Java I/O package, Byte/Character Stream, Buffered reader / writer, File reader / writer, File Sequential / Random. Reading numeric, character & strings data from keyboard.
Applet programming: Applet Vs. Application, Creating applets, life cycle, local & remote applets. <APPLET> tag & its attributes, adding applet to HTML file, Running applet.

UNIT-IV:

Abstract Windows Toolkit (AWT): Components and Graphics, Containers, Frames and Panels, Layout Managers, Border layout, Flow layout, Grid layout, Card layout, AWT components. Event delegation Model, Event source and handler, Event categories, Listeners, Interfaces, Controls such as text box, radio buttons, checkboxes, lists, choice, command buttons, text area etc.
JDBC: Java database connectivity, Types of JDBC drivers, Writing JDBC applications, Types of statement objects(Statement, PreparedStatement and CallableStatement), Types of resultset, Inserting and updating , records, JDBC and AWT,

UNIT-V:

Networking with Java : Networking basics, Sockets, port., Internet addressing, java.net – networking classes and interfaces, Implementing TCP/IP based Server and Client
Servlets: Introduction Servlet API Overview, Writing and running Simple Servlet, Servlet Life cycle, Generic Servlet, HTTPServlet, ServletConfig, ServletContest, Writing Servlet to handle Get and Post methods.

BOOKS RECOMMENDED

1. Horstman Cay, Cornell Gary, Core JavaTM2, Vol.1&2, 7edition, Pearson Education.
2. Herbert Schildt, The Complete Reference, seventh edition, [TMH]
3. Programming with JAVA – A Primer by E. Balguruswamy (TMH)
4. Steven Holzner, JAVA 2 Programming Black Book, Wiley India.
5. Ivor Horton, Beginning Java 2, JDK 5 Ed, Wiley India.
6. Java 2 from scratch by Steven Haines the – PHI
7. Java database Programming – Maithew Siple – THM

THIRD SEMESTER : M.Sc.(CS)
Paper II : Computer Graphics

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

Unit-I

Introduction of computer Graphics and its applications, Overview of Graphics systems, Video display devices, Raster scan display, Raster scan systems, video controller, Raster scan display processor, Random scan display, random scan systems, color CRT monitor, Flat panel display, Interactive input devices, Logical classification of input devices, Keyboard, mouse, Trackball and spaceball, Joysticks, Image scanner, Light pens, Graphics software, Coordinates representations, Graphics functions.

Unit-II

Line drawing algorithms, DDA, Bresenham's, Circle generating, Mid-point circle algorithm, Ellipse generating, Polynomials, Scan-line polygon fill, Boundary fill.

Unit-III

Basic transformation's, Translation, Rotation, Scaling, Matrix representation's & homogeneous co-ordinates, Composite transformation's, Reflection, Two dimensional viewing, Two dimensional clipping, Line, Polygon, Curve, Text. 3D-transformation, Projection, Viewing, Clipping.

Unit-IV

Spline representation, Cubic spline, Bezier curve, Bezier surfaces, Beta spline, B-spline surfaces, B-spline curve, Hidden surfaces, Hidden lines, Z-buffer.

Unit-V

Fractal's geometry Fractal generation procedure, Classification of Fractal, Fractal dimension, Fractal construction methods. Color models, XYZ, RGB, YIQ, CMY & HSV, Shading algorithms, Shading model, Illumination model, Gouraud shading, Phong shading.

BOOKS RECOMMENDED

1. Computer Graphics by M. Pauline Baker, Donald Hearn PHI.
2. Mathematical Element for Computer Graphics By. David F. Roger., J. Alan Adams nd
3. Principles of Interactive Computer Graphics By. William. M. Newmann.
4. Procedural Element for Computer Graphics By. David F. Roger. Mc. Graw Hill.
5. Computer Graphics By A.P. Godse, TPPublication,
6. Computer Graphics By V.K. Pachghare, Laxmi Publication

THIRD SEMESTER : M.Sc.(CS)
Paper III : LINUX

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Introduction : Introduction to Multi-user System, Emergency and history of Unix, Feature and benefits, Versions of Unix. System Structure:-Hardware requirements, Kernel and its function, introduction to System calls and Shell.

File System : Feature of Unix File System, Concept of i-node table, links, commonly used commands like who, pwd, cd, mkdir, rm, ls, mv, lp, chmod, cp, grep, sed, awk, pr, lex, yacc, make, etc. Getting started (login / logout), File system management, file operation, system calls, buffer cache .Vi Editor:- Intro to text processing, command and edit mode, invoking vi, command structure, deleting and inserting line, deleting and replacing character, searching strings, yanking, running shell command, command macros, set windows, set auto indent, set number, intro to exrc file.

UNIT - II

Shell Programming : Introduction to shell feature, wild card characters, i/out redirections, standard error redirection, system and user created shell variables, profile files, pipes/tee, background processing, command line arguments, command substitution, read statement, conditional execution of commands, special shell variables $ #, #?, $* etc. Shift commands, loops and decision making- for, while and until, choice making using case…esac, decision making if ….fi, using test, string comparison, numerical comparison, logical operation, using expr.

UNIT - III

Introduction to Shell : Features, changing the login shell, cshrc, login, logout files, setting environment, variables, history and alias mechanism, command line arguments, redirection/appending safely, noclobber, noglob, ignore eof, directory stacks (pushd, popd), feature of other shell (rsh, vsh).

Process Control : Process management, process states and transition, regions and control of process, sleep and waking, process creation, process killing, signals, system boot and init process, traps, sitting process priorities.

UNIT - IV

Inter-process Communication : I/O Sub system, terminal drives, disk drives, messages, shared memory, semaphores, memory management, swapping, demand paging.

System Calls and Unix -C Interface : File handling calls like - access (), open(), create(), read(), write(), close(), fseek(), process control system calls like kill(), exec(), fork(), wait(), signal(), exit(), comparing stdio library and calls.

UNIT - V

System Administration : Process and Scheduling, Security, Basic System Administration:- Adding a User, User Passwords, Delete of a User, Adding a Group, Deleting a Group, Super User, Startup and Shutdown. Advanced System Administration:-Managing Disk Space, Backup and Restore, Managing System Services. Xwindows:- Introduction to Xwindows concept

RECOMMENDED BOOKS:

1. Arnold Robbins, “Linux Programming by Examples The Fundamentals”, Pearson Education, 2Ed., 2008.
2. Cox K, “Red Hat Linux Administrator’s Guide”, PHI, 2009.
3. R. Stevens, “UNIX Network Programming”, PHI, 3Ed., 2008.
4. Sumitabha Das, “Unix Concepts and Applications”, TMH, 4Ed., 2009.

THIRD SEMESTER : M.Sc.(CS)
Paper IV : Image Processing

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

Digital Image fundaments: Introduction, An image model, sampling & quantization, basic relation ships between Pixels, imaging geometry.

UNIT - II

Image Transforms: Properties of 2 – D Fourier transform, FFT algorithm and other separable image transforms. Walsh transforms. Hadamard, Cosine, Haar, Slant transforms, KL transforms and their properties.

UNIT - III

Image Enhancement: Background, enhancement by point processing, histogram processing, spatial filtering and enhancement in frequency domain, color image processing.

Image filtering and restoration : degradation model, diagnolisation of circulant and block circulate matrices, Algebraic approach to restoration, inverse filtering, least mean squares and interactive restoration, geometric transformations.

UNIT - IV

Image compression: Fundamentals, image compression modes, error free compression, lossy compression, image compression standards.

Image segmentation: Detection of discontinuities, edge linking and boundary detection thresholding, region – oriented segmentation, use of motion in segmentation.

UNIT - V

Representation and description: Various schemes for representation, boundary descriptors, and regional descrip

Image reconstruction from Projections, Radon Transforms; Convolution/Filter back – Project Algorithms.

Reference:

1. Fundamentals of Digital Image Processing - A. K. Jain, Prentice Hall
2. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods

THIRD SEMESTER : M.Sc.(CS)
Paper V : Object Oriented Analysis And Design

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

Unit-I

Introduction: Two views of software Developments: SSAD and OOAD, Why Object –Orientation? Object and classes, Abstraction and encapsulation, Methods and Message, Interfaces, Inheritance and Polymorphism, Access Control, The Business case for OO Developments.

Object Oriented Methodologies: Object Oriented Design –Booch, Object Modeling Techniques-Rumbaugh, Object – Oriented Analysis – Coad-Yourdan, Object – Oriented Software Engineering – Ivar Jacbson,

Unit-II

Unified Approach: Diagramming and Notational Techniques using the UML, UML Notation, {Analysis Diagramming Techniques.} == Introduction to all (ten) Diagram, {Design Diagramming Techniques}, Generalization/Specialization, Aggregation and composition, Association, Cardinality, Navigability, Icons, relationships and adornments.

Object-Oriented Systems Development Process:

Rational Unified Process, Four Major phases: Inception, Elaboration, Construction, Transition, Requirements Engineering: Problem analysis, Understanding Stockholders need, Type of requirements, Use-case Model : Writing Requirements

Unit-III

Analysis: Behavioral Analysis, Domain Analysis or Business Object Analysis, Use-case Driven Object Oriented analysis : The UML approach., Develop use-case Model, Use-case Description, Documentation, Activity Diagram, Identify the classes., Introduction to different approaches for identifying classes, “Noun Phrase” approach OR ,“Conman Class Pattern” approach Or , “CRC” approach Or, Use case Driven Approach. Containment and Composition, Aggregation, Inheritance, SubTypes and IS-A Hierarchies, Association and Link Relationships, Diagramming System Events.

Unit IV

Design Phases: Translating Analysis Concept into Design, Optimizing classes and Objects: The Multi-tiered Architecture View, ,Mapping System functions to objects., Object to Object Visibility, Collaboration Diagram, Sequential Diagram, Specification Class Diagram, Specifying Object Interfaces, Designing the Data Access layer, Design User Interface layer, Designing System Interfaces, Controls and Security.

Unit V

Design Refinement : Designing for Extensibility, Design for reusability, Portioning class space, Checking Completeness and correctness.

Persistent Object and Database Issues: The Cood Data Management Domain, Object Persistence, Object-oriented Database Management System, Object-Oriented verses Relational Database, Mapping object to Relational Data structure. **Testing:** Introduction to Testing Strategies, Impact of Object Orientation on Testing. Testing Business Process, Design Matrix, Discovering reusable pattern.

RECOMMENDED BOOKS

1. Object Oriented Analysis and Design with Applications - Grady Booch, Benjamin/Cummings.
2. Object Oriented Modeling and Design. – J Rumbaugh, M Blaha, W .Premerlani
3. Principles of Object-Oriented Software Development - Anton Eliens, Addison Wesley.
4. Object Oriented System Development - Ali Bahrami McGRAW-HILL.
5. Object Oriented Software Engineering – Ivar Jacobson Pearson Education INC
6. Design Object-Oriented Software - Rebecea Wrifs-Brock. Brian Wilkerson, Lauren Wiener,

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN COMPUTER SCIENCE
FORTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P	L+ (T+P)/2	Th	Ses	Pr	Total	Th	Ses	Pr	Total
Paper 1	Software Engineering	3	2	-	4	100	50	-	150	40	30		70
Paper II	Artificial intelligence and Expert System	3	2	-	4	100	50	-	150	40	30		70
Paper III	Elective : 1. Data Mining & Data Warehousing 2. Advanced Computer Architecture	3	2	-	4	100	50	-	150	40	30		70
Project	Major Project	-	-	6x2	6	-	50	300	350		30	150	180
TOTAL		09	06	15	18	300	200	300	**800**	120	120	150	390

Note : Major Project will include Research Project as well during which candidate may publish Research Paper.

FOURTH SEMESTER : M.Sc.(CS)
Paper I : Software Engineering

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT-I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD & Use case approach, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS, Requirement Management, IEEE Std. for SRS.

UNIT-II

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Putnam resource allocation model, Validating Software Estimates, Risk Management.

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design.

UNIT-III

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Data Structure Metrics, Information Flow Metrics.

Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models-Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001.

UNIT-IV

Software Testing: Testing process, Design of test cases, Introduction to functional testing & Structural testing, Unit Testing, Integration and System Testing, Debugging, Alpha & Beta Testing.

Software Maintenance: Management of Maintenance, Maintenance Process, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

RECOMMENDED BOOKS

1. K. K. Aggarwal and Yogesh Singh, “Software Engineering”, New Age International,
2. R. S. Pressman, “Software Engineering – A Practitioner’s Approach”, McGraw Hill Int. ,
3. Pankaj Jalote, “An Integrated Approach to Software Engineering”, Narosa,

REFERENCES:

1. Stephen R. Schach, “Classical & Object Oriented Software Engineering”, IRWIN,
2. James Peter, W. Pedrycz, “Software Engineering: An Engineering Approach
3. I. Sommerville, “Software Engineering”, Addison Wesley,8Ed., 2009.
4. Frank Tsui and Orlando Karan, “Essentials of Software Engineering”, Joes and Bartlett,

2 Ed., 2010.

5. Kassem A. Saleh, “Software Engineering”, Cengage Learning, 2009.
6. Rajib Mall, “Fundamrntal of Software Engineering”, PHI, 3Ed., 2009.
7. Carlo Ghizzi , Mehdi Jazayeri and Dino Mandrioli, “ Fundamental of Software Engineering”,

FOURTH SEMESTER : M.Sc.(CS)
Paper II : Artificial Intelligence and Expert System

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I

General Issues and overview of AI : The AI problems; what is an AI technique; Characteristics of AI applications

Problem solving, search and control strategies : General problem solving; production systems; control strategies: forward and backward and backward chaining Exhaustive searches: Depth first Breadth first search

UNIT - II

Heuristic Search techniques : Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/Or Graphs; problem reduction and AO* algorithm; constraint satisfaction problems.

Game playing : Minimax search procedure; Alpha-Beta cutoffs; Additional Refinements.

UNIT - III

Knowledge Representation : First order predicate calculus; Skolemization Resolution principle and unification; Inference Mechanisms; Horn's clauses; semantic Networks; frame systems and value inheritance. Scripts; conceptual dependency;

AI Programming Languages : Introduction to Lisp, Syntax and Numeric functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

UNIT - IV

Natural language processing : Parsing technique; context—context- free grammar; Recursive Transition Nets (RTN); Augmented Transition Nets ((ATN); case and logic grammars; semantic analysis.

Planning : Overview- An example Domain: The Blocks Word; Component of planning systems: Goal Stack Planning (linear planning); Non-linear planning using goal sets; probabilistic reasoning and Uncertainty; probability theory; Bayes Theorem and Bayesian networks; certainty factor.

UNIT - V

Expert Systems : Introduction to expert systems and Applications of expert systems; various expert system shells: vidwan; frame work; knowledge acquisition; case studies; MYCIN.

Learning : Role learning; learning by induction; Explanation based learning.

BOOKS RECOMMENDED :

1. Artificial Intelligence - Elaine Rich and Kevin knight, Tata McGraw hill.
2. Introduction to Artificial Intelligence and Expert Systems - Dan W. Patterson, Prentice hall of India.
3. Principles of Artificial Intelligence - Nills j. Nilson, Narosa publishing house.
4. Programming in PROLOG - Clocksin & C.S. Melish, Narosa publishing house.
5. Rule based expert system (A practical Introduction) - M.sasikumar, S.Ramani, narosa publishing house.

FOURTH SEMESTER : M.Sc.(CS)
Paper III : Elective 1. Data Mining & Data Warehouse

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction & Data Warehousing and OLAP Technology for Data Mining –
What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

UNIT - II : Data Preprocessing, Data Mining Primitive, Languages and System Architecture –
Why preprocess the data?, Data cleaning ,Data integration and transformation, Data reduction, Discrimination and concept hierarchy generation, Data Mining Primitive, Data Mining Query Language, Architecture of data mining system.

UNIT - III : Mining Association Rules in Large Databases-
Association rule mining, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databases, Mining multidimensional association rules from transactional databases and data warehouse, From association mining to correlation analysis, Constraint-based association mining.

UNIT - IV : Classification and Prediction & Cluster Analysis –
What is classification? What is prediction? Issues regarding classification and prediction, Classification by decision tree induction, Bayesian Classification, Classification by back propagation, Classification based on concepts from association rule mining, Other Classification Methods ,Prediction, Classification accuracy, What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT - V : Mining Complex Types of Data & Applications and Trends in Data Mining -
Multidimensional analysis and descriptive mining of complex data objects, Mining spatial databases, Mining multimedia databases, Mining time-series and sequence data, Mining text databases, Mining the World-Wide Web, Data mining applications, Data mining system products and research prototypes, Additional themes on data mining, Social impact of data mining, Trends in data mining.

BOOKS RECOMMENDED

1. Data Mining: Concepts and Techniques - Jiawei Han and Micheline Kamber
2. Data Mining Concepts - H. Marget

FOURTH SEMESTER : M.Sc.(CS)
Paper III : Elective 2. Advanced Computer Architecture

Max Marks : 100 **Min Marks : 40**

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT I

Introduction:- Feng's and Flynn's classification schemes, multiprocessor and multicomputer, UMA, NUMA, COMA, NORMA, memory models, parallel computers and its type. Application of ParallelComputers.

UNIT II

System Interconnect Architecture-Static & dynamic, Hypercube interconnection network, multistage interconnection networks-architecture & routing, design consideration, throughput, delay, blocking and non-blocking properties. Performance Metrics and Benchmarks.

UNIT III

Principle of Pipelining-overlapped parallelism, Linear and non-Linear pipelining, reservation table, calculation of MAL. Types of instruction pipeline. Arithmetic pipeline designs example-Floating point adder, pipelined multiplier.

UNIT IV

Advance processor Technology-RISC, CISC,VLIW architectures. Hazard detection and resolution, functional organization of instruction in IBM 360/91.

UNIT V

Exploring parallelism in program- multidimensional arrays, Parallel Algorithm- Matrix addition, subtraction, multiplication-block and SIMD. Bitonic sort, sorting on linear array processors. Bernstein's condition, Iso efficiency Concept.

TEXT BOOKS:.

1. Computer Architecture & Parallel Processing by Kai Hwang and F.A. Briggs-Mc Graw Hill.
2. Advanced Computer Architecture By Kai Hwang –Mc Graw Hill.
3. Parallel Computer Architecture & Programming by- V Raja Raman and C. Shiarammuty-PHI

REFERENCE BOOKS:

Parallel Computing Theory and practice by Michael J. Quinn –Tata Mc-Graw Hill

SCHEME OF TEACHING AND EXAMINATIONS

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

FIRST SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P	L+(T+P)/2	Th	Ses	Pr	Total	Th	Ses	Pr	Total
Msc(IT)101	Object Oriented Programming with C++	3	2	-	4	100	50	-	150	40	30	-	70
Msc(IT)102	Mathematical Foundations Of Computer Science	3	2	-	4	100	50	-	150	40	30	-	70
Msc(IT)103	Essentials of Information Technology	3	2	-	4	100	50	-	150	40	30	-	70
Msc(IT)104	Data Structure through algorithms with ‘C”	3	2	-	4	100	50	-	150	40	30	-	70
Msc(IT)105	Operating System (with Linux as case Study)	3	2	-	4	100	50	-	150	40	30	-	70
Msc(IT)106	Programming Lab C++	-	-	3x2	3	-	25	100	125	-	15	50	65
Msc(IT)107	Data Structure through algorithms ‘ ”Lab	-	-	3x2	3	-	25	100	125	-	15	50	65
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

FIRST SEMESTER : M. Sc-101

Object Oriented Programming with 'C++ '

Max Marks: 100
Min Marks : 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction to OOP

Advantages of OOP, The Object Oriented Approach, and Characteristics of object oriented languages- Object, Classes, Inheritance, Reusability, and Polymorphism. OMT.

UNIT – II : Language Fundamental

Overview of C++: History of C++, Data Types - int, float, char, double, void. Constant and Variables. Operators and Expression: Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operators, Bitwise Operators. Control constructor: if , if-else, nested if-else, while(), do-while() , for(;;), break, continue, switch, goto. Storage class.

UNIT – III : Structure and Function

Structures : A Simple structures ,specify the structures, Defining a structure variable, Accessing structures member. Enumeration data type.

Function: Function Declaration, Calling Function, Function Defines, Passing Argument to function, Passing Constant, Passing Value, Reference Argument, Passing struct variable, Overloaded Function, Inline Function, Default Argument, return statement, returning by reference.

Array: Defining array, array element , initiation array, multi dimensional array, passing array to function.

UNIT – IV : Object Classes and Inheritance

Object and Class, Using the class, class construct, class destructors, object as function argument, struct and classes, array as class member, operator overloading. Type of inheritance, Derive class, Base class. Access specifier: protected. Overriding, member function, String, Templates.

UNIT – V

Pointers and Virtual Function

pointers: & and * operator pointer variables, pointer to void ,pointer and array, pointer and function, pointer and string, memory management, new and delete, pointer to object, pointer to pointer, link list.Virtual Function: Virtual Function, Virtual member function, accesses with pointer, Late binding, pure virtual function, Friend function, Friend class, static function, this pointer.

File and Stream

C++ streams, Stream class, string I/O, char I/O, Object I/O, I/O with multiple object, File pointer, Disk I/O,

RECOMMENDED BOOKS :

1. Object Oriented Programming : McGregor and Sykes S A, 1992 Van Nostrand.
2. The C++ Programming Language : Strustrp B,Addision Wasley.
3. Object Oriented Programming in C++ : Lafore R, Galgotia Publications.
4. Introduction to Object Oriented Programming : Witt KV, Galgotia Publications.
5. Object Oriented Programming : Blaschek G, Springer Verlag
6. Object Data Management : Cattel R, Addison Wasley.
7. Modern Database Systems : Kim W, ACM Press, Addision Wesley.

FIRST SEMESTER : MSc(IT)-102
Mathematical Foundation Of Computer Science

Max Marks : 100
Min Marks : 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Mathematical Logic, Sets Relations and functions

Mathematical Logic : Notations, Algebra of Propositions & Propositional functions, logical connectives, Truth values & Truth table Tautologies & Contradictions, Normal Forms, Predicate Calculus, Quantifiers.

Set Theory: Sets, Subsets, Power sets, Complement, Union and Intersection, De-Morgan's law Cardinality, relations: Cartesian Products, relational Matrices, properties of relations equivalence relation functions: Injection, Surjection, Bijection, Composition, of Functions, Permutations, Cardinality, the characteristic functions recursive definitions, finite induction.

UNIT – II : Lattices & Boolean Algebra

Lattices : Lattices as Algebraic System, Sub lattices, some special Lattices(Complement, Distributive, Modular).

Boolean Algebra : Axiomatic definitions of Boolean algebra as algebraic structures with two operations, Switching Circuits.

UNIT – III : Groups Fields & Ring

Groups : Groups, axioms, permutation groups, subgroups, co-sets, normal subgroups, free subgroups, grammars, language).

Fields & Rings : Definition **,** Structure, Minimal Polynomials, Irreducible Polynomials, Polynomial roots & its Applications.

UNIT – IV : Graphs

Graphs : Simple Graph, Multigraph & Psuedograph, Degree of a Vertex, Types of Graphs, Sub Graphs and Isomorphic Graphs, Operations of Graphs, Path, Cycles and Connectivity, Euler and Hamilton Graph, Shortest Path Problems BFS(Breadth First Search , Dijkastra's Algorithm, Representation of Graphs, Planar Graphs, Applications of Graph Theory.

UNIT – V : Trees

Trees : Trees, Properties of trees, pendant vertices in a tree, center of tree, Spanning tree, Binary tree, Tree Traversal, Applications of trees in computer science.

BOOKS RECOMMENDED :

1. A text book of Discrete Mathematics – By Swapan Kumar Sarkar.(S.Chand & company Ltd.).
2. Discrete Mathematical structure with applications to computer science - By J.P Trembly & R.P. Manohar.
3. Discrete Mathematics -By K.A Ross and C.R.B writht.
4. Discrete Mathematics Structures for computer science -By Bernard Kohman & Robert C. Bushy.
5. Discrete Mathematics -By Seymour Lipschutz Mare Lipson. Tata McGraw-Hill Edition.

FIRST SEMESTER : M. Sc-103
Essentials Of Information Technology

Max Marks : 100
Min Marks : 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction –

Basics concept of IT, concept of data and information,. Data processing, History of computer, Data processing, organization of computers and input and output device, storage device, and file organization.

UNIT – II : Software concept -

System software, application software, utility package, compilers, and interpreters, operating system, elementary command of DOS, UNIX and WINDOWS (file handling directory, management and general purpose user interfacing command).

UNIT – III : Computer languages –

Machine languages, assembly languages, high level languages, 4^{th} generation languages, general purpose, concept of oops and SQL

UNIT – IV : Communication and network technology -

Communication and system elements, communication mode (Analog and Digital, Synchronous and Asynchronous, Simplex, Half duplex, Full duplex, circuit switching), communication media (Speed and capacity, twisted pair, coaxial cable, optics, wireless), common network, protocols (ISO/OS, reference model, TCP/IP).

UNIT – V : Internet

Technical foundation of Internet- Client server computing, Distributed Computing, Domain naming system, DNS Server, Internet Security – Fire walls, Encryptions etc.

Internet Applications - E-mail, WWW, E-commerce, Teleconferencing,

Application of Information Technology - State of Art Application of IT, Application of IT in business, Industry, home, education and training entertainment, science and engineering and medicine.

BOOKS RECOMMENDED :

1. Fundamental of Computer - V.Rajaraman
2. Computer today - Sanders D.H
3. Information technology today - S.Jaiswal

FIRST SEMESTER : M.Sc.-104

Data Structure Through Algorithms with C

Max Marks : 100
Min Marks : 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I : Introduction and Preliminaries -

Introduction, Basic terminology, Elementary data organization, Data structure, Data structure operation, Algorithms : complexity, time-space Tradeoff.. Mathematical Notation and functions, Algorithmic Notation, Control Structures, Complexity of Algorithms, Sub algorithms, Variables, Data Type.

UNIT – II : String Processing, Arrays, Records And Pointers –

Basic Terminology, Storing String, Character Data Type, String Operations, Word Processing, Pattern Matching Algorithms. Linear Array, Representation of linear Array in Memory, Traversing Linear Arrays, Inserting And Deleting, Sorting; Bubble Sort, Searching; Liner Search, Binary Search, Multidimensional Array, Pointers; Pointer Array, Records; Record Structures, Representation of Records in Memory; Parallel Arrays, Matrices, Sparse Matrices.

UNIT – III : Linked Lists, Stacks, Queues, Recursion -

Linked list, Representation of linked lists in memory, Traversing a linked list, Searching a linked list, Memory Allocation; Garbage Collection, Insertion into a linked List, Deletion from a Linked List, Header Linked List, Two- Way Linked Lists. Stacks, Array Representation of Stack, Arithmetic Expressions; Polish Notation, Quicksort, an application of Stacks, Recursion, Tower of Hanoi, Implementation of Recursive Procedures by Stacks, Queues, Deques, Priority Queues.

UNIT – IV : Trees & Graphs -

Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree, Heap; Heap sort, Path Lengths; Huffmans Algorithms, General Tree. Graph Theory Terminology, Sequential Representation of Graph; Adjacency Matrix, Path Matrix, Linked Representation of Graph.

UNIT – V : Sorting And Searching –

Sorting, Insertion Sort, Selection Sort, Merging, Merge Sort, Radix Sort, Searching and data modification, hashing.

BOOKS RECOMMENDED :

1. Data Structure **- Seymour Lipschutz (Schaum's Series).**
2. Data Structure & Program Design **- Robert L. Kruse, 3rd Ed., Prentice Hall.**

FIRST SEMESTER : M. Sc.-105

Operating System (with Linux as case Study)

Max Marks: 100
Min Marks: 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction:

What is operating system, basic concept, terminology, batch processing, spooling, multiprogramming, time sharing, real time systems, protection, multiprocessor system, operating system as resource manager, process view point, memory management, process management, device management and information management, other views of operating system, historical, functional job control language and supervisor service control.

UNIT – II

Memory Management:

Preliminaries of memory management, memory handling in M/C, relocation, swapping and swap time calculation, multiple partitions, partitioned allocation MFT, fragmentation, MVT, compaction, paging, job scheduling implementation of page tables, shared page, virtual memory-overlays, concepts of virtual memory demand page, memory management and performance, page replacement and page replacement algorithms. Allocation algorithms. Storage hierarchy disk and drum scheduling - physical characteristics fcfs scheduling SCAN, short of seek time first disk scheduling algorithms sector queuing.

UNIT – III

Information Management (File System) :

File concept, file type, typed based system, disk based system, general model of file system, file directory maintenance, symbolic file system, basic file system, physical file system, file support device directory, access methods free space management contiguous, linked allocation and indexed allocation performances.

Processor Management (CPU Scheduling) :

Reviewing of multiprogramming concept, scheduling concept, basic concept, CPU I/O burst cycle process state, PCB (Programme Control Block) scheduling queries, schedulers, scheduling algorithms - performance criteria, first-come - first served shortest job - first priority, preemptive algorithm, round robin, multilevel queues and multilevel feedback queues, algorithm evolution, multiprocessor scheduling , separate system, coordinated job scheduling, master / slave scheduling.

UNIT – IV

Dead Locks :

The dead lock problem - dead lock definition, dead lock detection, detection algorithm usage, dead lock characterization, resource allocation graph, dead lock prevention, mutual exclusion, hold and wait, no preemption and circular wait, dead lock avoidance-bankers algorithm. Recovery from deadlock process termination, resource preemption, combined approach to deadlock handling.

UNIT – V

Device Management :

Dedicated, shared and virtual devices, sequential access and direct access device, channel and control units, I/O schedulers. Introduction to assembly language programming, introduction to I/O programming, introduction to interrupts and their programming.

Unix (Operating System) :

History, design principle, programmer interface, user interface, file system, process management, I/O system, interprocess communication.

BOOKS RECOMMENDED :

1. Principles of Operating System - Peterson.
2. Operating System - Mandinick & Donovan.

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

SECOND SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+ (T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Th	Ses	Pr	Total	Th	Ses	Pr	Total
Msc(IT)201	Java & HTML	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)202	Computer System Architecture	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)203	RDBMS & ORACLE	3	2	-	4	100	25		125	40	15	-	55
Msc(IT)204	Program Based Numerical Analysis	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)205	Computer Networks & Data Communication	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)206	Programming Lab Java & HTML	-	-	3x2	3	-	50	100	150	-	30	50	80
Msc(IT)207	Programming Practice	-	-	2	1	-	50	50	100	-	30	25	55
Msc(IT)208	Common Software	-	-	2	1	-	50	50	100	-	30	25	55
Msc(IT)209	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

SECOND SEMESTER - M. Sc. (I.T.) 201
Programming in JAVA & HTML

Max Marks: 100
Min Marks : 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

1. **Introduction to java programming**

An overview of Java: Object Oriented Programming, Features of Java, Java Virtual Machine, Java Environment: Java Development Kit, Java Standard Library, Data Types, Variables: Declaring a variable, Dynamic Initialization, The scope and life time of variable, Type conversion and Casting: Narrowing and Widening Conversions, Numeric Promotions, Type Conversion Contexts; Operators: Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [ ] and instance of operator. Control Statements: Java's Selection statement, Iteration Statement, Jump Statement, Array: Declaring Array variables, Constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.

2. **Define the Class and interface**

Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining Methods, method overloading, Using objects as parameter, Constructors, Garbage collection, finalize () method. Inheritance: Inheritance basic, method overloading, object reference this and super, Chaining constructor using this () and super (), Member accessibility modifier: public, protected, default accessibility of member, private protected, private, Package: Define package, CLASSPATH, importing package, Interface: Define an interface, implementing interface, extending interface, variable in interface, Overview of nested class: Top level nested class and interface, Non static inner class, Local class, Anonymous class.

UNIT – II

3. **Exception handling and Multithreading**

Exception Handling: Exception types, Uncaught Exception, Using try and catch, multiple catch, nested try block, throw, and throws, finally.

Multithreading: creating thread, Thread priority, synchronization, thread Scheduler, Running & yielding, sleeping and waking up, waiting and notifying, suspend and resume, miscellaneous method in thread class.

4. **Input output, Networking and Fundamental class of java**

Object class, String class, StringBuffer class, Wrapper class, Math class, Collection: Collection interface, List interface, Set interface sorted interface, ArrayList class, LikedList class, TreeSet, Comparator, Vector, Stack.

Input output classes and interface: File, BufferStream, CharacterStream, and Random Access for files, Object Sterilization.

Networking: Socket overview, Client/Server, Proxy Server, Network class and interface, TCP/IP client socket, TCP/IP Server socket, URL Connection, Datagrams, DatagramPackets.

UNIT – III

5. **Applet programming and AWT**

Applet: Applet and Application program, Creating Applets, Applet Life Cycle, Applet and Thread, Supplying Applet parameter, Using Images and Sound in Applets, JAR files, Applet Security.

Introducing the AWT: Overview of the java.awt package, Component and Containers: Component, Container, Panel, Applet, Window, Frame, and Dialog classes. Working with Graphics, Working with Fonts, Working with Colors, GUI Control Components: Button, Canvas, Checkbox and CheckboxGroup, Choice, List, Label, Scrollbar, TextField and TextArea, Frame, Menu Bars and Menu

Layout Management: Layout Management Policies, FlowLayout, GridLayout, BorderLayout, CardLayout, GridBagLayout, Customized Layout.

Event Handling: Overview of Event Handling, Event Hierarchy, Event Delegation Model, Event Adapters, Low Level Event Processing.

6. **Advance features of java**

JDBC: JDBC/ODBC Bridge, The Driver manage class, the java.sql package, data manipulation: Insert, Update, Delete Record, Data navigation: ResultSet

BDK: What is java Beans, Advantages of java Beans, the Bean Developer Kit, Jar Files, Introspection, Developing a New Bean, Using Bound Properties, Using BeanInfo interface, The java Beans API.

UNIT – IV

7. **HTML Basics & Web Site Design Principles –**

Concept of a Web Site, Web Standards, What is HTML? HTML Versions, Naming Scheme for HTML Documents, HTML document/file, HTML Editor, Explanation of the Structure of the homepage, Elements in HTML Documents, HTML Tags, Basic HTML Tags, Comment tag in HTML, Viewing the Source of a web page, How to download the web page source? XHTML, CSS, Extensible Markup Language (XML), Extensible Style sheet language (XSL), Some tips for designing web pages, HTML Document Structure. HTML Document Structure-Head Section, Illustration of Document Structure,<BASE> Element,<ISINDEX> Element,<LINK> Element ,META ,<TITLE> Element,<SCRIPT> Element ,Practical Applications, *HTML Document Structure-Body Section:*-Body elements and its attributes: Background; Background Color; Text; Link; Active Link (ALINK); Visited Link (VLINK); Left margin; Top margin ,Organization of Elements in the BODY of the document: Text Block Elements; Text Emphasis Elements; Special Elements -- Hypertext Anchors; Character-Level Elements; Character References ,Text Block Elements: HR (Horizontal Line); Hn (Headings) ; P (Paragraph); Lists; ADDRESS ; BLOCKQUOTE; TABLE; DIV (HTML 3.2 and up) ; PRE (Preformatted); FORM ,Text Emphasis Elements, Special Elements -- Hypertext Anchors ,Character-Level Elements: line breaks (BR) and Images (IMG),Lists ,ADDRESS Element, BLOCKQUOTE Element, TABLE Element ,COMMENTS in HTML ,CHARACTER Emphasis Modes, Logical & Physical Styles ,Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER.

UNIT – V

Image, Internal and External Linking between WebPages

Netscape, Microsoft and Advanced Standard Elements List, FONT, BASEFONT and CENTER Insertion of images using the element IMG (Attributes: SRC (Source), WIDTH, HEIGHT, ALT (Alternative), ALIGN),IMG (In-line Images) Element and Attributes; Illustrations of IMG Alignment, Image as Hypertext Anchor, Internal and External Linking between Web Pages

Hypertext Anchors, HREF in Anchors, Links to a Particular Place in a Document, NAME attribute in an Anchor, Targeting NAME Anchors, TITLE attribute, Practical IT Application Designing web pages links with each other, Designing Frames in HTML. Practical examples.

8. **Creating Business Websites with Dynamic Web Pages** –

Concept of static web pages and dynamic web pages, Introduction to scripting, Types of Scripting languages, Scripting Files, Client Side Scripting with VB/Jscript/JavaScript, Practical examples of Client side scripting. Identifying Objects & Events, and Creating & Implementing Common Methods,**.** Hosting & promotion of the web site, Domain Name Registration, Web Space allocation, Uploading / Downloading the website- FTP, cute FTP. Web Site Promotion Search Engines, Banner Advertisements.

Reference Book:

1. The Complete Reference Java 2 - Herbert Schildt, Publisher- TMH
2. A Programmer Guide to Java - Khlid A. Mughal, R.W. Rasmussen Publisher- Addison Wesley
3. Introduction to HTML by - Kamlesh N. Agarwala, O.P.Vyas, P A. Agarwala. (Kitab Mahal Publications).
4. Web Enabled Commercial Application Java 2 - Ivan Bayross Publisher- B.P.B.

SECOND SEMESTER - M. Sc. (I.T.) 202
Computer System Architecture

Max Marks: 100
Min Marks: 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Representation of Information

Number system, Integer & Floating point representation Character code (ASCII, EBCDIC), Error Detect and Correct code, Basic Building Blocks, Boolean Algebra, MAP Simplification, Combination Blocks, Gates, Multiplexers, Decoders, etc Sequential building block, flip-flop, registers, counters, ALU, RAM etc.

UNIT – II

Register transfer language and micro operations

Concepts of bus, data movement along registers, a language to represent conditional data transfer, data movement from its memory, arithmetic and logical operations along with register transfer timing in register transfer

UNIT – III

Basic Computer Organization and Design

Instruction code, Computer Instructions, Timing and Control, Execution of Instruction, Input and Output Interrupt, Design of Computer.

Computer Software

Programming Language, Assembly Language, Assembler, Program Loops, Input/Output Programming, System Software. Central Processor Organization: - Processor Bus Organization, Arithmetic Logic Unit, Stack Organization, Instruction Formats, Addressing modes, Data transfer and Manipulation, Program Control, Microprocessor Organization, Parallel Processing,.

UNIT – IV

Input –Output Organization

Peripheral Devices, Input/Output Interface, Asynchronous Data Transfer, Direct Memory Access (DMA), Priority Interrupt, Input-Output Processor, Multiprocessor System Organization, and Data Communication Processor**.**

UNIT – V

Memory Organization

Auxiliary Memory, Micro Computer Memory, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.

BOOKS RECOMMENDED :

1. Computer System Architecture - M. Morris Mano (PHI).
2. Digital Computer Electronics - Malvino.
3. Digital Computers and Logic Design - M.Morris Mano (PHI).
4. Structured Computer Organization - Andrew M. Tanenbanm (PHI).

SECOND SEMESTER - M. Sc. (I.T.) 203
RDBMS & ORACLE

Max Marks : 100
Min Marks : 40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Overview of Database Management -

Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases, Client/Server databases, Object-oriented databases, Object-relational databases, Introduction to ODBC concept.

UNIT – II

Relational Model -

Entity - Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; Concept of keys: candidate key, primary key, alternate key, foreign key; Strong and weak entities, Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features, Introduction to UML, Representation in UML diagram (Class Diagram etc.).

UNIT – III

Structured Query Language

Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages, Introduction to SQL constructs (SELECT…FROM, WHERE… GROUP BY… HAVING… ORDERBY….), INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.

UNIT – IV

Relational Database Design-

Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization, Clustering of tables, Clustering indexes.

UNIT – V

Introduction to Query Processing and Protecting the Database

Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.

Data Organization -

File Organization: -Fixed length records, variable length records, Organization of records in files, Indexing: - indexed files -B-tree, B+-tree, and Hashing Techniques.

BOOKS RECOMMENDED :

1. Database system concept - **H. Korth and A. Silberschatz, TMH**
2. Data Base Management System - **Alexies & Mathews [Vikas publication]**
3. Data Base Management System - **C. J. Date [Narosha Pub.]**
4. Data Base Management System - **James Matin**
5. Principles of Database System - **Ullman**
6. An Introduction to database systems - **Bipin Desai, Galgotia Publication.**
7. Database Management System - **A. K. Majumdar & P.Bhattacharya, TMH**

SECOND SEMESTER - M. Sc. (I.T.) 204
Program Based Numerical Analysis

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. **Simple/Scientific calculators are allowed.**

UNIT – I

Solution of Polynomial and Transcendental Algebraic Equations

Bisection method, Regulafalsi method & Newton's method, Solution of Cubic & Biquadratic Equation, Complex roots of polynomial equations.

UNIT – II

Simultaneous Equations and Matrix

Gauss-Jordan method, Cholesky's method, Reduction to lower or upper Traingular forms, Inversion of matrix, method of partitioning, Characteristics equation of matrix, Power methods, Eigen values of matrix, Transformation to diagonal forms.

UNIT – III

Curve-Fitting from Observed Data

Divided difference table for evenly or unevenly spaced data, polynomial curve-fitting - Newton's, Gauss and Langranges form of interpolation and Divided Differences, method of least square for polynomials,.

UNIT – IV

Numerical Differentiation and Integration

Forward and Backword differential operators, Newton - cotes integration formula : Trapezoidal Rule, Simpson's Rule, Boole's Rule, Weddle Rule, Legendre's rule, method of weighted coefficients.

UNIT – V

Solution of Differential Equations

Numerical Solution of ordinary differential equations, one step method : Taylor's Series, Predictor-Corrector Method, Euler's Method, Runga-Kutta Method, Milne's method.

BOOKS RECOMMENDED

1. *Garewal* - Numerical methods
2. *Gupta & Mallic* : Numerical Methods
3. *Hamming R.W.* : Numerical methods for scientist & Engineers. (McGraw Hill)
4. *Conle S.D.* : Elementary numerical analysis
   Carl De Boor (International Book Company London)
5. *Jain M.K.* : Numerical methods for Science and Engineering
   Iyengar S.R.K calculations (John Willey & Sons)

SECOND SEMESTER - M. Sc. (I.T.) 205
Computer Networks And Data communication

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction to Computer Networking

The Concept of Networking, Data Communication, Required network elements, The role of Standards Organization. Line Configuration, Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks.

The OSI and TCP/IP Reference Model

The Concept of Layered Architecture, Design Issues for the Layers. Interfaces and services, Detailed Functions of the Layers. Comparison between OSI and TCP/IP Reference model.

UNIT – II

Transmission of Digital Data

Shannon's and Nyquist theorems for maximum data rate of a channel. Transmission media- Co-axial, UTP, Fiber optic and wireless. Analog and digital data Transmission- parallel and serial transmission. DTE-DCE interface using RS-232C. Study of modems- 56k and Cable Modem. Modem standards.

Multiplexing and Switching

The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching.

UNIT – III

Data Link Layer and Routing Algorithms

Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- ALOHA, Slotted ALOHA, CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, and its header. IP address classes and subnet mask. The concept of ICMP, ARP, RARP, RSVP, CIDR and Ipv6.

Routing algorithms- shorted path first, Distance Vector, Link State. Congestion Control-The leaky bucket and Token bucket Algorithms.

UNIT – IV

Transport Layer

The Concept of client and Server in terms of Socket addressing in Transport layer. Two way and three-way handshaking. TCP header.

Network Performance Issues. The Concept of Domain Name System, Various Resource Records. Architecture and services of E-mail (RFC-822 and MIME). The Concept of World Wide Web- server side and client side.

ATM

The concept of ATM, ATM Adoption layers- AAL1, AAL2, AAL3/4, AAL5, Comparison of AAL protocols. Cell formats for UNI and NNI. Service Categories, Quality of service, Congestion Control in ATM.

UNIT – V

Comparative study of Networking Technologies

X.25, Frame Relay, ATM, SONET, SMDS, ISDN.

Network Security

The Importance of Security in Networking. Traditional Cryptography, Data Encryption Standards, RSA algorithm.

BOOKS RECOMMENDED

1.	Computer Networks–	A S Tanenbaum
2.	Data Communication and Networking-	Forouzan

M.Sc.(IT) -207 DATA COMMUNICATION AND NETWORKING

1. Running the Diagnostic utility for NIC provided with the Driver Floppy/CD.
2. Demonstration of UTP Flat and Cross Cable Crimping.
3. Configuration of Windows 98 Peer-to-Peer Networking.
4. Installation of Windows 2000 server along with Common Software Installations.
5. Concept of Active Directory and DNS with their Configuration in Windows 2000.
6. User and Group Administration in Windows 2000 Server.
7. Implementation of NTFS File and Folder permission and Security.
8. Windows 2000 Server as a DHCP Server Installation and Configuration.
9. Windows 2000 Server as a WINS Server Installation and Configuration.
10. Implementation of Monitoring Tools.
11. Interconnectivity with Windows 98, Linux 8.0.
12. Implementation of Terminal Services on Windows 2000 Server.
13. Installation of Oracle 8i on 2000 Server and Network Client on WIN98 and Connectivity between them.

M.Sc.(IT) –208 Common Software - Programming In Visual Basic

1: Introduction to visual Basic

Editions of Visual Basic, Event Driven Programming, Terminology, Working environment, project and executable files, Understanding modules, Using the code editor window, Other code navigation features, Code documentation and formatting, environment options, code formatting option, Automatic code completion features.

2:Creating Programs

Introduction to objects, Controlling objects, Properties, methods and events, Working with forms, Interacting with the user: MsgBox function, InputBox function, Code statements, Managing forms, Creating a program in Visual Basic, Printing.

3:Variable and Procedures

Overview of variables, Declaring, Scope, arrays, User-defined data types, constants working with procedures, Working with dates and times, Using the Format function, Manipulating text strings.

4:Controlling Program Execution

Comparison and logical operators, If…Then statements, Select Case Statements looping structures, Using Do…Loop structures, For…Next statement, Exiting a loop.

5:Working with Controls

Types of controls, Overview of standard controls, Combo Box and List Box, Option Button and Frame controls Menu, Status bars, Toolbars, Advanced standard controls, ActiveX controls, Insertable objects, Validation.

6: Error Trapping & Debugging

Overview of run-time errors, error handling process, The Err object, Errors and calling chain, Errors in an error-handling routine, Inline error handling, Error-handling styles, General error-trapping options Type of errors, Break mode Debug toolbar, Watch window, Immediate window, Local window, Tracing program flow with the Call Stack.

7 Sequential and Random Files:

Saving data to file, basic filling, data analysis and file, the extended text editor, Random access file, the design and coding.

8 :Data Access Using the ADO Data Control

Overview of ActiveX data Objects, Visual Basic data access features, Relational database concepts Using the ADO Data control to access data, Overview of DAO, RDO, Data Control, structured query language (SQL), Manipulating data Using Data Form Wizard.

9:Report Generation:

Overview of Report, Data Report, and Add groups, Data Environment, Connection to database Introduction to Crystal Report Generator.

10:Advances Tools:

Overview of drag and drop, Mouse events, Drag and drop basics, Date Time Control, Calendar, Print Dialog, MDI (Multiple Document Interface).

BOOK RECOMMENDED:

Mastering Visual Basic 6 Fundamentals – By Microsoft
Mastering in Visual Basic – By BPB Publications.
Introduction to VB Programming – V.K.Jain

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

THIRD SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P	L+(T+P)/2	Th	Ses	Pr	Total	Th	Ses	Pr	Total
Msc(IT)301	AI & Expert System	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)302	Introduction to .Net Technology	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)303	Software Engineering	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)304	Electives : 1. Data Mining & Warehousing 2. Advanced Computer Architecture	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)305	Electives : 1. Mobile Communication 2. Artificial Neural Network & fuzzy logic	3	2	-	4	100	25	-	125	40	15	-	55
Msc(IT)306	Programming Lab	-	-	3x2	3	-	50	100	150	-	30	50	80
Msc(IT)307	Programming Practice / Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
Msc(IT)308	Common Software/Mini-Project	-	-	2	1	-	50	50	100	-	30	25	55
Msc(IT)309	Seminar	-	-	2	1	-	25	-	25	-	15	-	15
	TOTAL	15	10	12	26	500	300	200	**1000**	200	180	100	**480**

THIRD SEMESTER : M.Sc.(IT) – 301
Artificial Intelligence And Expert Systems

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

General Issues and overview of AI :

The AI problems; What is an AI technique; Characteristics of AI applications

Problem solving, search and control strategies :

General problem solving; production systems; control strategies: forward and backward and backward chaining Exhaustive searches: Depth first Breadth first search

UNIT – II

Heuristic Search techniques :

Hill climbing; Branch and Bound technique; Best first search and A* algorithm; AND/Or Graphs; problem reduction and AO* algorithm; constraint satisfaction problems

Game playing :

Minimax search procedure; Alpha-Beta cutoffs; Additional Refinements

UNIT – III

Knowledge Representation :

First order predicate calculus; Skolemization Resolution principle and unification; Inference Mechanisms; Horn's clauses; semantic Networks; frame systems and value inheritance. Scripts; conceptual dependency;

AI Programmiing Languages :

Introduction to Lisp, Syntax and Numeric functions; List manipulation functions; Iteration and Recursion; Property list and Arrays, Introduction to PROLOG.

UNIT – IV

Natural language processing :

Parsing technique; context—context- free grammar; Recursive Transition Nets (RTN); Augmented Transition Nets ((ATN); case and logic grammars; semantic analysis.

Planning :

Overview- An example Domain: The Blocks Word; Component of planning systems: Goal Stack Planning (linear planning); Non-linear planning using goal sets; probabilistic reasoning and Uncertainty; probability theory; Bayes Theorem and Bayesian networks; certainty factor.

UNIT – V

Expert Systems :

Introduction to expert systems and Applications of expert systems; various expert system shells: vidwan; frame work; knowledge acquisition; case studies; MYCIN.

Learning :

Role learning; learning by induction; Explanation based learning.

MAIN READING:

1. Elaine Rich and Kevin knight: Artificial Intelligence-Tata McGraw hill.
2. Dan W. Patterson: Introduction to Artificial Intelligence and Expert Systems. Prentice hall of India.
3. Nills j. Nilson: Principles of Artificial Intelligence; Narosa publishing house.
4. Clocksin & C.S. Melish ; Programming in PROLOG – Narosa publishing house.
5. M.sasikumar ,S.Ramani. etc: Rule based expert system (A practical Introduction) narosa publishing house.

THIRD SEMESTER : M.Sc.(IT) – 302
Introduction to .NET Technology

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT - I : Inside the .NET framework :

Overview of .net framework, Managed Execution process, CLR, common language specification, JIT Compilation , MSIL, Namespaces, Assemblies, metadata, Common Type System, cross language, interoperability, Garbage collection.

UNIT - II : Programming with .NET Framework

Windows form : working with Visual Studio IDE, creating a .NET solution, MDI application, components and controls, Data types, variables, Type conversions, Operators, Control Structures : conditional statements, loops, arrays, types of methods, method data, Introduction to exception handling-exception statements.

UNIT - III : XML, Windows process and File Handling

Types, structures, Enumerations, classes, Interfaces, Working with files-Files and directories, streams, Readers and writers, Reading and writing XML files, XML serialization, processing Transaction, Monitoring and Managing Windows Process, retrieving information about process.

UNIT - IV : Building .NET Framework Applications

Introduction and Architecture of ASP .NET, Differentiate classic ASP and ASP .NET, Web application, Web forms, Form validations – Client side, Server side, controls in web forms, Events in Web form.

UNIT - V : Advanced concepts and Database Programming

Delegates, ADO .NET Architecture, .NET data provider, dataset components, creating database applications using Window forms and web forms (Database connectivity through ADO .NET), Introduction to web services, web services for Mobile application, Remote overview.

BOOKS RECOMMENDED

MSDN online – by Microsoft

THIRD SEMESTER : M.Sc.(IT) – 303
Software Engineering

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Software Engineering Fundamentals :

Definition of software product; software development paradigms; software engineering; knowledge engineering and end user development approaches.

Software Analysis :

Abstraction; partitioning and projection; system specification; software requirements specification (SRS) standards; formal specification method; specification tools; flow based, data based and object orientated analysis.

UNIT – II

Systems Design ;

Idealised and constrained design; process oriented design (Gane and Sarson and Yourdon notations); data oriented design (Warnier – (Orr, E-r modeling); Object oriented design (Booch approach); Cohesion and coupling; Design metrics; design documentation standards.

UNIT – III

Role of Case Tools :

Relevance of case tools; High-end and low–end case tools; Automated support for data dictionaries, data flow diagrams, entity relationship diagrams.

Coding And Programming :

Choice of programming languages; mixed language programming and call semantics; Re-engineering legacy systems; coding standard.

UNIT – IV

Software Quality And Testing :

Software quality assurance; types of software testing (white box, black box, unit, integration, validation, system etc); debugging and reliability analysis; program complexity analysis; software quality and metrics; software maturity model and extensions. Software cost and Time estimation. Functions points; issues in software cost estimation; introduction to the Rayleigh curve3; alglorithmic cost model (COCOM0, Putnam-slim, Watson and feliix); Other approaches to software cost and size estimation (software complexity, Delphi, costing by analolgy)

UNIT – V

Software Project Management :

Planning software projects; work background structures; integrating software, software design and project planning; software project teams; project monitoring and controls.

RECOMENDED BOOKS:

1. Software Engineering: A Practitioner's Approach – by essman Roger, Tata McGraw Hill New delhi, 1991.

2 . An Integrated approach to Software Engineering - by Jalote Pankaj, Narosa: New delhi.1991.

THIRD SEMESTER : M.Sc.(IT) – 304
Elective -1 : Data Mining& DataWarehousing

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction & Data Warehousing and OLAP Technology for Data Mining –

What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

UNIT – II

Data Preprocessing, Data Mining Primitive , Languages and System Architecture -

Why preprocess the data? Data cleaning ,Data integration and transformation, Data reduction, Discrimination and concept hierarchy generation, Data Mining Primitive, Data Mining Query Language, Architecture of data mining system.

UNIT – III

Mining Association Rules in Large Databases –

Association rule mining, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databases, Mining multidimensional association rules from transactional databases and data warehouse, From association mining to correlation analysis, Constraint-based association mining.

UNIT – IV

Classification and Prediction & Cluster Analysis -

What is classification? What is prediction?, Issues regarding classification and prediction, Classification by decision tree induction, Bayesian Classification, Classification by back propagation, Classification based on concepts from association rule mining, Other Classification Methods ,Prediction, Classification accuracy, What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT – V

Mining Complex Types of Data & Applications and Trends in Data Mining -

Multidimensional analysis and descriptive mining of complex data objects, Mining spatial databases, Mining multimedia databases, Mining time-series and sequence data, Mining text databases, Mining the World-Wide Web, Data mining applications, Data mining system products and research prototypes, Additional themes on data mining, Social impact of data mining, Trends in data mining

RECOMENDED BOOKS:

1. Data Mining: Concepts and Techniques -
- Jiawei Han and Micheline Kamber
2. Data Mining Concepts - H. Marget

THIRD SEMESTER : M.Sc.(IT) – 304
Elective - 2 : Advanced Computer Architecture

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT I:
Introdution - Feng's and Flynn's classification scheme, Multiprocessor and Multicomputer, UMA, NUMA, COMA, NORMA, memory models, parallel computer and its type. Applications of Parallel Computers.

UNIT II:
System Interconnect Architecture – Static and Dynamic, Hypercube Interconnection network, multistage interconnection networks-architecture and routin, design consideration, throughput delay, blocking and non-blocking properties. Performance Metrics and Benchmarks.

UNIT III:
Principle of pipelining-overlapped parallelism, Linear and non-linear pipelining, reservation table, calculation of MAL. Types of Instruction Pipeline. Arithmetic pipeline designs example –Floating point adder, pipelined multiplier.

UNIT IV:
Advanced processor Technology – RISC, CISC, VLIW architectures, Hazard detection and resolution, functional organization of instruction in IBM 360/91.

UNIT V:
Exploring parallelism in program- multidimensional arrays. Parallel Algorithm-Matrix addition, subtraction, multiplication –block and SIMD. Bitonic sort, sorting on linear array processors. Bernstein's condition, iso efficiency concept.

TEXT BOOKS:.

1. Computer Architecture & Parallel Processing by Kai Hwang and F.A. Briggs-Mc Graw Hill.
2. Advanced Computer Architecture By Kai Hwang –Mc Graw Hill.
3. Parallel Computer Architecture & Programming by- V Raja Raman and C. Shiarammuty-PHI

REFERENCE BOOKS:

Parallel Computing Theory and practice by Michael J. Quinn –Tata Mc-Graw Hill

THIRD SEMESTER : M.Sc.(IT) – 305
Mobile Communication

Max. Marks: 100
Min Marks:40

NOTE :- The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT – I

Introduction.

Introduction to Mobile Communication, Short history of wireless communication, Applications, Vehicles, Emergency, Business, Replacement of wired network, Location dependent services, infotainment, Mobile and Wireless devices, A Simplified reference model, some open research topics in mobile communication

UNIT – II

Satellite Systems

History of satellite system, Applications of satellite systems, Type of satellite systems, characteristics of satellite systems, satellite system infrastructure, satellite system architecture, Global Positioning system (GPS), Limitations of GPS. Beneficiaries of GPS, Applications of GPS

UNIT – III

Mobile Communication Systems

Introduction, Cellular System Infrastructure,, Registration, Handoff Parameters and Underlying support, Roaming Support Using System Backbone, to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign Network, Home Agent , Foreign Agent, Care-of Address, IP Packet Delivery, Agent Discovery, Agent Solicitation, Registration, Tunneling, Dynamic host configuration protocol

UNIT – IV

Wireless LANs and PANs

Introduction to IEEE 802.11, Ricochet, Ricochet Wireless Modem, Services Provided by Ricochet , Home RF, Home RF Technology, Hiper LAN, Blue tooth , Advantages and disadvantages of Wireless LAN, Infra red vs radio transmission , introduction to MAC. Technologies influence WLANs / WPANs in future.

UNIT – V

Mobile Adhoc Network

Introduction to Mobile Adhoc Network(MANET), Characteristics of MANET, Applications of MANET, Routing, Need for Routing, Routing Classification, Table-Driven Routing Protocol – Destination Sequenced Distance Vector Routing Protocol, Cluster-Head Gateway Switch Routing, Wireless Routing Protocol. Source initiated On-demand Routing- Adhoc On Demand Distance Vector Routing, Dynamic Source Routing, Temporarily Ordered Routing Algorithms, Hybrib Protocol – Zone Routing Protocol.

RECOMENDED BOOKS:

1. Mobile Communication: Jochen H. Schiller, Pearson Education Publication
2. Introduction to Wireless and Mobile Systems: D.P. Agrawal , Qing-An Zing , Vikas Publishing House

SCHEME OF TEACHING AND EXAMINATIONS
MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

FOURTH SEMESTER

Subject Code	SUBJECTS	Teaching Load Per Week			Credit L+ (T+P)/2	Examination Marks							
						Max. Marks				Min. Marks			
		L	T	P		Sessional Marks of Project Work	Project Viva-Voce	Pr	Total	Sessional Marks of Project Work	Project Viva-Voce	Pr	Total
Msc(IT)401	System Development Project (System Design & Implementation)	5	-	30	20	200	200	-	400	120	100	-	220
	TOTAL	5	-	30	20	200	200	-	400	120	100	-	220

Note : Major Project will include Research Project as well during which candidate may publish Research Paper.

Pt. Ravishankar Shukla University, Raipur
S.o.S. in Computer Science & IT

Syllabus of Entrance Exam for M.Phil. - COMPUTER SCIENCE

Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point),

Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage, K-Map.

Programming languages: Programmking in C: elements of C-Tokens, identifiers , data types in C. Control structure in C. sequence, selection & iteration(s). structured data types in C-arrays, struct , union, string, and pointers.
O-O Programming Concepts: Class ,object , instantiation, Inheritance, polymorphism and overloading.
C++ Programming: Elements of C++-Tokens,identifiers. Variables and constants, data types, operators, control statements. Functions parameter passing. Class and objects. Constructors and destructors. Overloading, inheritance, templates, exception handling.

Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps, Graph theory. Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching.

Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Belady's anomaly ,Memory management and virtual memory, File systems, I/O systems, Protection and security.

Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Information Systems and Software Engineering: information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

Computer Networks: ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques (error correcting & detecting,CRC), Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Network security - basic concepts of public key and private key cryptography, digital signature, firewalls.

Mobile communication: Introduction, Cellular system infrastructure, Registration, Handoff Parameters and Underlying support, Roaming Support Using Backbone to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign network, Home agent, Foreign Agent, care of Address, IP Packet Delivery, Agent Delivery, Agent Solicitation, Registration, Tunneling, Dynamic Host configuration protocol.

Scheme of M. Phil. (Computer Science & IT)

Paper	Name of Papers
Paper - I	Research Methodology and Communication System
Paper - II	**Electives :**
	1. Parallel Computing
	2. Data Mining and Data Warehousing
Paper - III	Practical Based on Paper - I & II
Paper - IV	Dissertation: Periodic Assessment of Research Tools and Field Work etc

PAPER - I
Research Methodology and Communication System

Research Methodology : An Introduction; Meaning, Motivation, Type, Approaches, Significance, Research and Scientific method of Research; criteria of Good Research; **Research Problem**-selecting the research Problem, Techniques involved in defining problems, **Research Design**- need, features, concept and types; **Sampling Design** - Sample Survey, Implications, steps, criteria of selection, characteristics, types.

Measurements - Measurement in Research, Scales, Sources of Errors, Techniques of developing Measurement Tools; **Processing and Analysis** - Processing Operations, Some Problems, Types of Analysis; **Hypothesis** - Basic Concepts, Procedure for Hypothesis Testing, Flow Diagram, Tests of Hypothesis, Important Parametric Tests, Hypothesis Testing for Means, difference between means, comparing Two related samples, Proportions, Difference between proportions, Comparing a variance to some.

Internetworking and TCP/IP
Introduction to Internetworking, Network Layer Interconnection, Internet Architecture, Interconnection through IP Router, Comparison of TCP/IP model with OSI Model, TCP/IP Internet & Services, TCP/IP Suit: ARP, ICMP, IGMP, Internet Protocol, UDP, DHCP, DNS, FTP, HTTP, SMTP. Recent developments: Social Networking and Blogs.

Wireless Communication
Introduction, Cellular System Infrastructure, Registration, Handoff Parameters and Underlying support, Roaming Support Using System Backbone, to Mobile IP, Functions of Mobile IP, Mobile Node, Corresponding Node, Home Network, Foreign Network, Care-of Address. Introduction to IEEE 802.11. Security threats to Wireless Networks, Study of existing wired networks security solutions and why it is not applicable for Wireless Networks. Current approaches for Wireless Networks Security.

M**obile Adhoc Network :** Introduction to Mobile Adhoc Network(MANET), Characteristics of MANET, Applications of MANET, Routing, Need for Routing, Routing Classification, Table-Driven Routing Protocol – Destination Sequenced Distance Vector Routing Protocol, Cluster-Head Gateway Switch Routing, Wireless Routing Protocol. Source initiated On-demand Routing- Adhoc On Demand Distance Vector Routing, Dynamic Source Routing, Temporarily Ordered Routing Algorithms, Hybrid Protocol – Zone Routing Protocol. Current issues and perspectives.

Network Simulator (NS2)
Preliminaries of Network Simulator, Functions of Network Simulator, Network simulator structure, Components of Network Simulator, creating nodes movement, Traffic Source Generator, Event Schedulers, Agent Setup TCL/QTGL script for simulation of various wired and wireless topologies (student required to develop their own program), Trace file analysis, Parsing Trace file. Other Network simulators.

References/Books

1. Research Methodology C.R Kothari, New Age international Publishers
2. Computer Network by A.S. Tanenbaum, Pearson Education.
3. Data Communications and Networking by B.A. Forouzan, TMH.
4. Introduction to Wireless and Mobile Systems: D.P. Agrawal , Qing-An Zing , Vikas Publishing House.

PAPER - II

Elective - 1 : Parallel Computing

Unit-I
Introduction– Transistors and its applications. Types of parallelism, architectural classification schemes, tightly and loosely coupled architectures, memory models, parallel computers and its types. To achieve parallelism in uniprocessor machine. DOP, Bernstein' conditions. Solving mismatch problem between software parallelism and hardware parallelism.

Unit-II
Pipelining – Types of pipelines, Hazard detection and resolution, Job sequencing and collision prevention, calculation of MAL, bounds on MAL. Implementation with shift register. Arithmetic pipeline Design using CSA & CPA.

Unit-III

Interconnection Networks- Static and dynamic, Hypercube interconnection network, multistage interconnection networks- types, architecture & routing, design consideration, performance evaluation and fault tolerance of interconnection networks. Benchmarks, Grains.

Unit-IV
Advanced processor Technology and Case Studies - Brief overview of processors. RISC, CISC, VLIW, super scalar architecture, Vector computer-vector operation, vector chaining. Functional organization of instruction in IBM 360/91, architectures of different versions of Cray and PARAM, sequent symmetry computer.

Unit-V
Exploiting parallelism in programs- Multidimensional arrays, DAG, distance and direction vectors, data flow computers and data flow graphs.
Parallel Algorithm- Matrix addition, subtraction, multiplication-block and SIMD, sorting- Bitonic sort, sorting on linear array processors.
Overview of OMP, MPI and CUDA.

Text Books:

1. Computer Architecture & Parallel Processing by Kai Hwang and F.A. Briggs-Mc Graw Hill.
2. Advanced Computer Architecture By Kai Hwang –Mc Graw Hill.
3. Parallel Computer Architecture & Programming by- V Raja Raman and C. Shiarammuty-PHI

Reference Books:

Parallel Computing Theory and practice by Michael J. Quinn –Tata Mc-Graw Hill.

PAPER - II
Elective - 2 : Data Mining & Data Warehousing

Unit-I

Introduction & Data Warehousing and OLAP Technology for Data Mining – What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

Unit-II

Data Preprocessing, Data Mining Primitive, Languages and System Architecture –

Why preprocess the data?, Data cleaning ,Data integration and transformation, Data reduction, Discrimination and concept hierarchy generation, Data Mining Primitive, Data Mining Query Language, Architecture of data mining system.

Unit-III

Mining Association Rules in Large Databases-

Association rule mining, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databases, Mining multidimensional association rules from transactional databases and data warehouse, From association mining to correlation analysis, Constraint-based association mining.

Unit-IV

Classification and Prediction & Cluster Analysis –

What is classification? What is prediction? Issues regarding classification and prediction, Classification by decision tree induction, Bayesian Classification, Classification by back propagation, Classification based on concepts from association rule mining, Other Classification Methods ,Prediction, Classification accuracy, What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

Unit-V

Mining Complex Types of Data & Applications and Trends in Data Mining -Multidimensional analysis and descriptive mining of complex data objects, Mining spatial databases, Mining multimedia databases, Mining time-series and sequence data, Mining text databases, Mining the World-Wide Web, Data mining applications, Data mining system products and research prototypes, Additional themes on data mining, Social impact of data mining, Trends in data mining.

BOOKS RECOMMENDED

1. Data Mining: Concepts and Techniques - Jiawei Han and Micheline Kamber
2. Data Mining Concepts - H. Marget

Pt. Ravishankar Shukla University, Raipur

Course work for Ph.D. in Computer Science

Sr. No	Paper	Name of Papers
1.	Paper-I	Research Methodology, Communication System and Parallel Computing
2.	Paper-II	Review of Research Paper.

Research Methodology, Communication System and Parallel Computing

Unit- I

Research Methodology and Measurement– Introduction, meaning, motivation, approaches, research proposal, research ethics, research problem, research design, sampling design. Measurement in research, sources of errors, error calculation and handling with examples. Uncertainty analysis, Hypothesis, Performance Metrics and evaluation with examples.

Unit- II

Communication System- Wired and Unwired Networks, Modulation and Multiplexing, OSI and TCP/IP Models, Switches and Switching, ATM, Network Security. Protocols like Aloha, S-Aloha etc. Header Formats. Interconnection Networks.

Unit- III

Parallel Computing- Types of Parallelism, Classification Schemes, Multiprocessor and Multicomputer, Memory Models and Organizations, Cache Coherence, Pipelining, MAL calculation, Hazard and Collision, Dependence Analysis, Data Flow and Vector Computers, DAG, Multi threading, Case Studies.

Unit- IV

Study and Implementation of Algorithms- Complexity, Routing and Congestion Control algorithms, Parallel Algorithms for sorting, matrix handling etc. Table Driven, Source Initiated on Demand and Hybrid Protocols, Code Optimization.

Unit- V

Modelling and Simulation- Introduction to Modelling, Queuing Analysis, Mathematical Modelling of Communication System, Monte-Carlo Simulation Technique, Simulation of Communication System through C Language, Study of different Simulators. Environment setup and Trace File generation in Network Simulator.

Recommended books –

1. System Simulation with Digital Computer by N.Deo, IIT Kanpur, PHI.
2. Computer Architecture & Parallel Processing by Kai Hwang and F.A. Briggs-Mc Graw Hill.
3. Research Methodology C.R. Kothari, New Age international Publishers
4. Advanced Computer Architecture By Kai Hwang –Mc Graw Hill.
5. Parallel Computing Theory and practice by Michael J. Quinn –Tata Mc-Graw Hill.
6. Computer Network by A.S. Tanenbaum, Pearson Education.
7. Data Communications and Networking by B.A. Forouzan, TMH.

SYLLABUS FOR UNIVERSITY TEACHING DEPARTMENT AND AFFILIATED

COLLEGES IN P.G. CLASSES

M.A. in Economics: Semester Examination 2017-18

At post graduate level, candidates are required to study 15 papers in First, Second and Third semester (5 papers in each semester) and 04 papers in fourth semester examination. This is to be treated as the nineteen papers of the course structure. So there shall be 19 papers in the post graduate examination in Economics. Viva - voce examination be treated as a compulsory paper for M.A. fourth semester examination. Each paper shall carry 100 marks out of which 80 marks will be for theory paper and 20 marks for internal assessment. There shall be 2000 marks in M.A. Candidates shall have secure 36 percent marks in aggregate of all papers in order to pass the M.A. Examination. Examination and result shall be treated according to rules and regulations of ordinance no. 13.

M.A. SEMESTER-I and SEMESTER-II

PAPER	SEMESTER-I	Marks		SEMESTER-II	Marks	
		Theory	Internal Assessment.		Theory	Internal Assessment
PAPER-I	Micro Economics-I	80	20	Micro Economics-II	80	20
PAPER-II	Macro Economics-I	80	20	Macro Economics-II	80	20
PAPER-III	Quantitative Methods	80	20	Research Methods & Computer Application	80	20
PAPER-IV	Indian Economy	80	20	Indian Economic Policy	80	20
PAPER-V	Industrial Economics	80	20	Labour Economics	80	20

M.A. SEMESTER-III and SEMESTER-IV

PAPER	SEMESTER-III	Marks		SEMESTER-IV	Marks	
		Theory	Internal Assessment		Theory	Internal Assessment
PAPER-I	Economics of Growth	80	20	Economics of Development & Planning	80	20
PAPER-II	International Trade	80	20	International Economics	80	20
PAPER-III	Public Finance	80	20	Public Economics	80	20
PAPER-IV	Environmental Economics	80	20	Economics of Social Sector	80	20
PAPER-V	Demography	80	20	Viva-Voce	100	--

SEMESTER – I
Micro Economics -1
Paper - I

Unit-I Introduction: - Concept of Equilibrium, Economic Models, Neo Classical Demand Analysis. Elasticity of Demand (Price, Income & Cross), Elasticity of supply.

Unit- II Indifference curve, Marginal Rate of Substitution. Income & substitution effect, Hicks and Slutsky theorem, Revealed preference theory. Hicks's Revision of Demand, Hicksian Consumer surplus

Unit – III Theory of Production – Production function, the short period & long period production function, the law of variable proportion (isoquant approach) Marginal rate of Technical Substitutions, Returns to a factor and returns to scale. Expansion path, Cobb Douglas Production function, CES production function.

Unit- IV Theory of cost and Revenue analysis, Perfect Competition - equilibrium of firm in Perfect Competition. Monopoly - short run and long run equilibriums, price discrimination under monopoly competition, monopoly control and regulation. Comparison between monopoly and perfect competition.

Unit – V Monopolistic Competition – price and output determination under monopolistic competition, Group equilibrium, theory of excess capacity. Oligopoly – non- collusive oligopoly model: The kinked demand curve. The collusive oligopoly – Cartels: joint profit maximization or perfect cartels , price leadership : the low cost price leadership model.

Text Books

1. Jhingan M. L. (2014), Advanced Economic Theory, Vrinda Publication, New Delhi
2. Jhingan M. L. (2014), Micro Economics , Vrinda Publication, New Delhi
3. Agarwal , A (2014), Micro Economic analysis , Sahitya Bhawan Publication, New Delhi

Reference Books

1. Kraps, David M. (1990) a course in micro economics theory Princeton university press, Princeton.
2. Kout sayiannis; A (1979) modern Microeconomics (2nd Edition), macmillan press,London.
3. Layard, PRG and P.W. Watters (1978), Micro economic theory, McGraw Hill, New York.
4. San A (1999) Micro economics theory and Applications, Oxford University Press, New Delhi;
5. Stigler, G. (1996) theory of Price (4th edition), Princeton Hall of India, New Delhi.
6. Varian, H (2000) Micro economics Analysis, W.W. Norten, New York.
7. Baumol W.J., (1982) Economic theory and operations Analysis, Princeton Hall of lndia, New Delhi.
8. Handersan, J.M. and R.E. Quandy (1980) Micro economics theory - A Mathematical approach, Mc Graw Hill New Delhi.
9. Hirshleifer, J. And A Glazer (1997), Price theory and Application, Prentise Hall of India, New Delhi.

SEMESTER – I
MACRO ECONOMIC

Paper – II

Unit – I National Income and Accounts – Concept of National Income and National Product, Problems of Measurement, , Different forms of National Income Accounting – Social Accounting, Input Out-put Accounting, Flow of Funds, Balance of Payment – Accounting. Circular flow of Income – Two, Three and Four Sector Economy

Unit – II Classical Theory of Employment, Say's Law of Market , Principle of Effective Demand, Keynesian & Pigou Theory of Employment, Comparison of Classical and Keynesian Models. National Income Determination of Keynesian Model - Two, Three and Four Sector Economy.

Unit- III Consumption Function- Keynesian Psychological Law of Consumption, Short Run and Long

Run Consumption Function. Theory of Consumption Function – Absolute Income Hypothesis, Duesanbery's Relative Hypothesis, Life Cycle and Permanent Income Hypothesis.

Unit –IV Investment Function,, Marginal Efficiency of Capital and Investment. Saving and Investment Equality, Multiplier and its working, Accelerator and its working, Super-Multiplier. Supply of Money, Determinants of Money Supply, Measurement of Money supply, Control of Money Supply. High Powered Money, Money Multiplier.

Unit – V Demand for Money –Fisher and Cash Balance (Cambridge) Approach, Fundamental Equation of Keynes. Friedman's re-formulation of the quantity theory of money.
Post Keynesian Approach to Demand for Money- Patinkin, Bamuls, James Tobin, Friedman, and Gurley & Shaw's Approaches.

Text books

1 Sethi,T.T.(2008)Macro Economics ,Laxminarayan Agrawal ,Agra.
2 Jhingan,M.L.(2010)Monetary Economics,vrinda publications pvt.ltd.
3 Jhingan,M.L.(2000)Macro Economic theory,vrinda publications pvt ltd.
4 Shinghai G.C &Mishra J.P.(2013) Macroeconomic Analysis, Sahitya bhawan publication Agra.

SEMESTER- I
QUANTITATIVE METHODS
Paper – III

Unit – I Skewness – Symmetrical and asymmetrical distribution, Measurement of skewness – Karl Pearson's coefficient of Skewness, Bowley coefficient of skewness. Simple correlation- Measurement of correlation – Karl Pearson's coefficient of correlation and Spearman's rank correlation, Coefficient of correlation by the method of least square, Probable error and standard error in correlation, coefficient of determination of correlation.

Unit – II Regression analysis – regression and correlation, regression lines and regression coefficient, regression equations. Simple regression analysis, Multiple regression analysis (up to three variables only). Standard error of the estimates of simple regression analysis. Inter potation and extrapolation- Method of fitting a parabolic curve, Newton's advancing difference method, Direct binomial expansion method and Lagrange's method.

Unit – III Association of Attributes – Meaning and types of association, Consistency of data, Methods of determining association – Method of comparison of proportion, Coefficient of association using Yule's method. Probability – meaning and definition, Permutation and combination, Types of events, measurement of Probability – addition and multiplication theorem, conditional probability.

Unit – IV Index Number- Fisher's Ideal Index number, Reversibility Test – Time reversibility & factor reversibility tests. Time series Analysis – Components of time series, Measurement of long term trend- semi-average method, Moving average method and method of least squares.

Unit - V Functions: Meaning and types of functions, Differentiation: Meaning and rules of differentiation, Integration: Meaning and rules of integration, Problems related to differentiation and integration, Auto correlation.

Reference:

1. Shukla, S.M. and S.P. Sahay – Quantitative method's Sahitya Bhawan Publications, Agra.
2. Agrawal, D.R., 'Quantitative methods'. Vrinda Publications (P) Ltd.
3. Sancheti, D.C., 'Quantitative methods' Sultanchand and Sons, New Delhi.
4. Gupta, S.P. and others, "Quantitative Techniques." Sultanchand and Sons, New Delhi.
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SEMESTER- I
INDIAN ECONOMY
Paper –IV

Unit – I - Indian Economy: Meaning, basic characteristics and major issues of development of Indian Economy, GDP and National Income of India – Components and Structure of GDP, Role of Primary, Secondary and Tertiary Sectors in GDP, National Income and Per Capita Income, Growth Rates of GDP and Per Capita Income.

Unit – II - Demographic Features of India – Size, Growth Rate, Sex Ratio, Age-Composition, Literacy and Density of Population, Migration, Rural-Urban Migration, Urbanization and Civic Amenities, Occupational Structure, National Population Policy, Demographic Features of Chhattisgarh State.

Unit – III - Agricultural Development in Indian Economy – Agricultural Growth and Productivity, Causes of Low Productivity and Measures to Increase it, Agricultural Marketing and Warehousing, Institutional Structure- Land Reforms in India, The Green Revolution, National Agricultural Policy and Food Security in India, Rural credit in India, NABARD and its role in rural credit.

Unit – IV- Industrial Development in India, Industrial Policies of 1956 and 1991, Public Sector Enterprises and their Performance, Privatization and Disinvestment, Small Scale Sector and Minor Medium Enterprises, Unorganized Sector and Informalisation of the Indian Economy and Knowledge Economy.

Unit – V - Infrastructure- Infrastructure and Economic Development, Energy, Power, Transportation- Road, Railway, Water and Civil Aviation in India, Private Investment in Infrastructure: Outlook and Prospect, Concept of Social Sector and Social Infrastructure, Education, Health and Family Welfare.

Reference:-

5 Ahulwalia, I. J. and I. M. E. Litle (Eds.) 1999): India's Economic Reforms and Development (Essay honor of Manohar Singh), Oxford University Press, New Delhi

6 .Bardhan, P. K. (9th Edition) (1998): The Political Economy of Development India, Oxford University Press, New Delhi.

7 Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).

8 Brahmananda, P. R. and V. R. Panchmukhi (9th Eds.) (2001): Development Experience in the Indian Economy: Interstate Perspectives, Bookwell, Delhi.

9 Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.

10 Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.

SEMESTER- I
INDUSTRIAL ECONOMICS
Paper –V

Unit – I Concept and Organization of a Firm-Ownership, Control and Objectives of the Firm. Rationale of Industrialization: - Agriculture and Industrialization – patterns, process, speed, Implications of Industrialization. Theories of Industrial location, Alfred Weber and Sergeant Florence Theory. Factors Affecting Industrial Localization.

Unit – II Industrial Productivity, Efficiency and Capacity. Industrial Policy in India, Role Of Public and Private Sector industries in India. Recent Trends in Industrial Growth. Strategies for Industrial Growth, Regional Development of Industries.

Unit – III Owned, External and Other Components of Funds, Nature, Volume and Types of Institutional Finance – IDBI, IFCI, SFCs, SIDC, Commercial Bank.

Unit –IV Structure of Industrial Labour, Employment Dimensions of Indian Industry. Industrial Legislation, Industrial Relations, Exit policy and Social Security.

Unit – V Large scale industries:- Iron and Steel, Cement Jute, Sugar , paper industry . Development of Small-Scale and Cottage Industries in India.

Text books

1. Ahluwalia, I.J. (1985), Industrial Growth in India, Oxford University Press, New Delhi.
2. Barthwal, R.R. (1985) : Industrial Economics, Wiley Eastern Ltd., New Delhi.
3. Chernilam, F (1994) : Industrial Economics : Indian Perspective (3rd Edition), Himalaya Publishing House, Mumbai.
4. Desai, B. (1999), Industrial Economic in India (3rd Edition), Himalaya Publishing house Mumbai.
5. Kuchhal .S.C , the industrial economy of India , Chaitanya publishing house.

Reference

1. Divine, P.J. and R.M. Jones et. At. (1976) : An Introduction to industrial economics, George Allen and Unwin Ltd., London.
2. Government of India, Economic Survey (Annual)
3. Hay, D. and D.J. Morries (1979), Industrial Economics : Theory and Evidence, Oxford University Press, New Delhi.
4. Kuchhal, S.C. (1980) :Industrial Economy of India (th Edition), Chaitanya Publishing House, Allahabad.
5. Reserve Bank of India Report on Currency and Finance (Annual).
6. Singh, A. and A. Sadhu (1988) : Industrial Economics, Himalaya Publishing House

SEMESTER- II
MICRO ECONOMICS-II
Paper –I

Unit – I Sales maximization model: Baumol's model (price-output determination of a product without advertisement and optimal advertising outlay), Managerial theories of the firm: Williamson's model of managerial discretion, Marris theory of the firm. Theory of limit pricing: Bains model

Unit – II Theory of distribution: marginal productivity theory of distribution (Marshall – Hicks version), Product Exhaustion theorem. NEO-Classical Approach of Distribution: relative share of labor and capital, technological progress and factor shares in income, Determinants of rent, wages, interest and profit (Only modern Theory)

Unit – III Linear programming and Game Theory (Geographical and simplex methods)

Unit – IV Concept of Equilibrium: static and dynamic equilibrium, partial and general equilibrium. Walrasian Excess Demand.

Unit – V Welfare economics – introduction, value judgment, classicial welfare economics, Pigovian Welfare economics, Pareto optimal conditions. New welfare economics: compensation principle of Kaldor - Hicks. Social welfare function: Bergson – Samuelsons social welfare function, Arrow's impossibility theorem.

Text Books

1. Jhingan M. L. (2014), Advanced Economic Theory, Vrinda Publication, New Delhi
2. Jhingan M. L. (2014), Micro Economics , Vrinda Publication, New Delhi
3. Agarwal , A (2014), Micro Economic analysis , Sahitya Bhawan Publication, New Delhi

Reference Books

1. Mansfield, E. (1997), Microeconomics (9th Edition), W.W. Norton and Company, New York.
2. Ray, N.C. (1975), An Introduction to Microeconomics, Macmillan Company of India Ltd., delhi.
3. Ryan, W.J.L. (1962), Price Theory, Macmillan and Co. Limited, London.
4. Samuelson, P.A. and W.D. Nordhaus (1998), Economics, Tata McGraw Hill, New Delhi.
5. Stonier, A.W. and D.C. Hague (1972), A Textbook of Economic Theory, ELBS and Longman Group, London.

SEMESTER- II
MACRO ECONOMICS
Paper –II

Unit – I Theory of Inflation – Classical, Keynesian and Monetarist Approaches to Inflation, Semi And Full inflation, Theory of Structural Inflation, Stagflation, Control of Inflation. Philips Curve Analysis – Short Run and Long Run Philip's Curve. The Natural Rate of Unemployment Hypothesis, Tobin's Modified Philip Curve.

Unit – II Business Cycles, Main Features of Business Cycles, Types of Business Cycle, measures to control business cycle. Theories of Business Cycles :- Hawtrey's Monetary Theory of Trade Cycle, Schumpeter's, Keynes, Hicks, Samuelson's, Friedman, Kaldor Model of Trade Cycle.

Unit – III Monetary Policy-Meaning of Monetary Policy, Instrument of Monetary Policy, Objective Of Monetary policy, Limitations of Monetary Policy, Monetary Policy and EconomicDevelopment. Fiscal Policy – Meaning of Fiscal Policy, Instruments of Fiscal Policy, Objectives of Fiscal Policy, Fiscal Policy and Economic Growth, Effectiveness of Fiscal Policy, Monetarism Vs Fiscalism – The Debate, Similarities between Monetary Policies and Fiscal Policies.

Unit – IV IS-LM Model, The Product Market Equilibrium, The Money Market Equilibrium, Equilibrium of Product and Money Market, Merits and Demerits of IS-LM Curve, Extension of IS-LM Models With Flexible Prices and Labour Market.

Unit – V The Rational Expectation Hypothesis: - Adaptive Expectations, Rational Expectations. The New Classical Macro - Economics , Policy implications of New Classical Macro-Economics. Supply side economics: - main features, policy prescriptions.

Text books

1. Sethi,T.T.(2009-10) Macro economics ,Laxminarayan Agrawal ,Agra.
2. Jhingan,M.L.(2008) Monetary Economics,vrinda publications pvt.ltd.
3 Jhingan,M.L.(2010) Macroeconomic theory,vrinda publications pvt ltd.
4 Shinghai G.C. & Mishra J.P. (2013) Macro Economic Analysis, Sahitya Bhawan Publication Agra.

Reference

1. Blackhouse, R. and A. Salansi (Eds.) (20()), Macroeconomics and the Real World (2 vols) Exford University Press, London.
2. Branson, W.A. (1989), Macroeconomics Theory and Policy, (3rd Edition), Harper and Row, New York.
3. Aornbusch, R and F. Stanley (1997), Macroeconomics, McGraw Hill, inc., New York
4. Hall, R.E. and J.B. Taylor (1986), Macroeconomics, W.W>Norton, New York.
5. Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University Press, New Delhi.
6. Jha, R. (1991), Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd. New Delhi.
7. Romer, DL. (1996), Advanced macroeconomics, McGraw Hill Company Ltd., New York.
8. Scarte, B.L. (1997), Cycles, Growth and inflation, McGraw Hill, New York.
9. Markeley, G. (1978), Macroeconomics Theory and Policy, macmillan, New York.

SEMESTER - II
RESEARCH METHODOLOGY AND COMPUTER APPLICATION
Paper –III

Unit – I Research methodology and research methods, research : meaning, types of research, motivation of research, main stages of statistical research, primary and secondary data, methods of collecting primary data, secondary data -different sources, precautions while constructing questionnaire/schedule, editing of primary data.

Unit – II Sampling- Meaning and need for sampling, size of sampling, merits and limitations of sampling, sampling and non- sampling errors, sampling frame, how to judge the reliability of samples. Various methods of sampling. Sampling design- meaning and steps in sample design,

Unit – III Classification and tabulation of data- meaning and objectives of classification, types of classification, tabulation of data, parts of a table, types of tables. Processing and analysis of data- processing operations, some problems in processing, Elements/types of analysis.

Unit – IV Hypothesis : Meaning of hypothesis, basic concepts concerning testing of hypothesis, procedure for hypothesis testing, test of significance based on students 't' test, chi-square test F ratio test and paired T test, practical problems related to students 't' test, Chi-square test, F ratio test and paired T test .

Unit – IV Computer : What is ' Computer'? important characteristics of a computer, history of computer, different parts of a computer - hardware and software, various types of computer, main characteristics of a computer, elementary knowledge of INTERNET and MS office, role of computer in economic research.

Reference Books

1.Kothari, C.R. 'Research methodology'.2. Sharma, Dr. Ramnath, 'Methods and Techniques of Social Survey and Research, A Rajhans Publication.
3. Bajpai, Dr. S.R., 'Methods of Social Survey and Research' Kitab Ghar, Kanpur-3
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SEMESTER- II
INDIAN ECONOMIC POLICY
Paper – IV

Unit – I Planning in India– Objectives and Strategies of Planning, Twelfth Five Year Plan, Development Strategy, LPG Model of Development, PURA- a Neo Gandhian Approach to Development, Developing Gross–root Organization: Panchayats, NGO'S.

Unit – II Problem of Poverty and Inequality – The Concept of Poverty, Measurement and Estimation of Poverty in India, International Comparison of Poverty and Inequality of Incomes, Poverty Eradication Programmes, Causes of Failure to Remove Poverty.

Problem of Unemployment in India- Nature of Unemployment, Various Schemes to Reduce the Unemployment, Balanced Regional Development- Indicators, Causes, Changing Scenario and Policy Measures to remove Regional Disparity.

Unit – III Indian Finance System – An overview, Functions of the Reserve Bank of India, Commercial Banking system, Progress of Banking since 1969, RRBs, DFIs and NBFCs, Financial Sector Reforms in India, Stock Exchange in India, Composition of Indian Capital Market, SEBI and Capital market reform.

Unit – IV Foreign Trade of India- Importance of Foreign Trade for a developing Economy, Foreign Trade since 1991, Structure and Direction of Foreign Trade, Balance of Payments of India, Issues in Export Import Policies, External value of the Rupee and Foreign Exchange Reserves, FEMA, SEZs, Trade Reforms in India.

Unit – V WTO and its Impact on the Different Sector of Economy, Economic Reforms – Rational of Internal and External Reforms, Cooperative movement in India- Organization, Structure and Development of different types of Cooperatives in India.

Reference:-

1. Ahulwalia, I. J. and I. M. E. Litle (Eds.) 1999): India's Economic Reforms and Development (Essay honor of Manohar Singh), Oxford University Press, New Delhi,.
2. Bardhan, P. K. (9th Edition) (1998): The Political Economy of Development India, Oxford University Press, New Delhi.
3. Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).
4. Brahmananda, P. R. and V. R. Panchmukhi (9th Eds.) (2001): Development Experience in the Indian Economy : Interstate Perspectives, Bookwell, Delhi.
5. Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.
6. Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.

SEMESTER- II
LABOUR ECONOMICS
Paper – V

Unit – I Labour Economics - Definition, Nature, Scope & Importance. Labour Market – Nature and Characteristics of Labour Markets in India .Supply of Labour - Labour force,factors affecting Law of Labour Supply. Demand for Labour – Labour productivity, Demand for Labour by Industrialist..

Unit – II Theories of labour market: - Classical Theory of labour,Marginal productivity theory of Labour Concept of wages – Real Wages , Nominal Wages, Factors Affecting Real wages , Theories of Wage Determination - Classical Theory, New Theory, The theory of Collective Bargaining.

Unit – III Theories of Labour Movement - Labour Unions in India, Rise and Growth of Labour Union, Achievements of Labour Unions. Structure and Pattern of Trade Union - Objectives, Growth, Achievements and Failures.

Unit – IV Labour Legislation in Indian Labour, Laws and Practices in Relation to International Labour Standards. State and Labour , State and Social Security of Labour, Concept of Social Security and its Evolution.

Unit – V Labour Welfare in India, Rural and Agricultural Labour in India, Child Labour, Female Labour, Concept of Industrial Peace, Settlement of Industrial Dispute, Second National Labour Commission.

Text books

1. Goyal, Sunil & Goyal, M.L.(2008):Labour Economics, R.B.S.A. Publications, Jaipur.
2. Saxsena, R.C.(2010): Labour Problems & Social Welfare, K. Nath and Company Publication, Meret.
3. Singh, Dilip Kumar,(2008): Workers Participationin in Management and Industrial Relation, Rawat Publication, Jaipur & Delhi.
4. Singh, Usha & Singh, H.P.(2011):Child Labour in India :Problem and Solutions,Classical Publication ,New Delhi
5. Gupta .P.K , labour economics , vrinda publications .

SEMESTER – III
ECONOMICS OF GROWTH
PAPER – I

UNIT I - Economic Growth: Economic Growth and Development, Measurement of Economic Growth, Vicious Circle of poverty, Physical Quality of Life Index.Human development Index, Gender Development index, Gender empowerment measure, UNDP - Human Development Report 2015.

Unit – II- The Concept of Capital Output Ratio, Input-Output Analysis, Project Evaluation and its methods and Cost – Benefit analysis , Shadow Prices. The Concept of Capital Output Ratio, Input-Output Analysis, Project Evaluation and its methods and Cost – Benefit analysis , Shadow Prices.

Unit – III- Theories of Growth :- Harrod - Domar model ,Joan Robinson model, Meads Neo-Classical Model, Solow Long- Run , Kaldor model of Distribution.

Unit – IV Approaches to Growth: -. Kaldor model of Growth, The Pesinetti Model of Profit and Growth, The Models of Technical Change , The Golden rule of Accumulation model.

Unit - V Steady State Growth , Growth Accounting , The Fel'dman Model,The Mahalanobis Four Sector Model.

Text Books

1. Jhingan,M.L.(2008)31ST edition,The economics of development and planning,vrinda publication pvt.Ltd.
2. Shinghai G.C. & Mishra J.P.(2013) Macroeconomic Analysis,Sahitya bhawan publication Agra.
3. Mishra, J.P.(2012)Economics of Growth and development Sahitya bhawan publication Agra.

Reference Books

1. Hajela P.D. (1998), Labour Restructuring in India : A Critique of the New Economic Policies, Commonwealth Publishers, New Delhi.
2. Jhabvala, R. and R.K. Subrahmanya (Eds.) (2000). The Unorganised Sector : Work Security and Social Protection. Sage Publication, New Delhi.
3. Lester, R.A. (1964). Economics of Labour. (2nd Edition), Macmilan, New York.
4. Mc Connell, C.R. and S.L. Brue (1986). Contemporary Labour Economics, Mc Graw-Hill New York.
5. Papola, T.S.P.P. Ghosh and A.N. Sharma (Eds.) 1993, Labour, Employment and industrial Relations in India, B.R. Publishing Corporation New Delhi.
6. Rosenberh M.R. (1998), Labour Markets I Low Income Countries in Chenery, H.B. and T.N. Srinivasan, (Eds.) The Handbook of Development Economics, North-Holland, New York.
7. Venkata Ratnam, C.S. (2001), Globlization and Labour- Management Relations Dynamics of change, Sage publications/ Response Books, New Delhi.

SEMESTER- III
INTERNATIONAL TRADE
Paper – II

Unit – I Theory of International Trade – Meaning and Distinguishing Features of Inter- regional and International Trade, The Comparative Cost Theory, Refinements of the Comparative Cost Theory, Opportunity Cost Theory, Theory of Reciprocal Demand.

Unit – II Modern Theory of International Trade, Factor Price Equalization, Theorem of International Trade, Stopler Samuelson and Rybezynski Theorems.

The Terms of Trade – Concepts, Determination of Terms of Trade, Factors Affecting Terms of Trade, Terms of Trade & Economic Development, Its Empirical Relevance and Policy Implications for Less Developed Countries, Terms of Trade & Welfare Implications.

Unit – III The Theory of Intervention – Tariffs, Quotas, and Non-tariff Barriers, Economic Effects of Tariff and Quotas on National Income, Output, Consumption, Price, Employment, Terms of Trade & Income Distribution, The Stopler – Samuelson Theorem of Tariff on Income Distribution, The Learner's Paradox.

Unit – IV Balance of Payments – Meaning and components, Equilibrium and Disequilibrium in the BoP, Measures to Correct the Adverse BoP, Adjustment Mechanisms of BoP, Devaluation- The J-curve effect, Marshall-Lerner's Conditions under Devaluation, Expenditure Reducing and Expenditure Switching Policies and Direct Control.

Unit – V Income Adjustment- Foreign Trade Multiplier, Foreign Repercussion or Back-Wash Effect, Foreign Exchange Rate-Spot and Forward Exchanges Rates, Fixed and Flexible Exchange Rates, their Merits and Demerits, Hybrid Exchange Rate, Floating Rate of Exchange, Managed Floating System.

Reference:-

1. Bhagwati, J. (Ed). (1981): International Trade, Selected readings, Cambridge, University Press, Massachusetts.
2. Carbough, R.J. (1999), International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990), International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, D. S. (2000), International Economics: Study Guide and Work Book, (5^{th} Edition), Routledge Publishers, London.
5. Dunn, R. M., and J. H. Mutti (2000), International Economics, Routledge, London.
6. Kenen, P.B. (1994), The International Economy, Cambridge University Press, London.
7. Kindleberger, C. P. (1973), International Economics and International Economic Policy A Ready, McGraw Hill International, Singapore.
8. Krugman, P. R. and M. Obstfeld (1994), International Economics : Theory and Policy, Glenview, Foresman.

SEMESTER- III
PUBLIC FINANCE
Paper – III

Unit – I Definition, Nature and scope of Public Finance, Role of Public Finance in developing Countries, Principles of Maximum Social Advantages. Taxation – features of good tax system, Objectives of Taxation, Principles of Taxation, canons of Taxation, Shifting, Effects and Incidence of Taxation. Impact of Tax under Laws of Returns and Perfect Competition.

Unit – II Public Expenditure: - Meaning and Scope, Different Forms of Expenditure, Canons of Public expenditure, Structure and Growth of Public Expenditure in India. Trends in Central Government Expenditure. Economic Effects of Public Expenditure on Production and Distribution. Public Expenditure and Economic Growth.

Unit – III Public Revenue: - Meaning, classification, sources, principles and effects of public revenue. Classification of taxation: - Indirect & Direct Tax, Goods and service tax GST) New Direct tax, Central Excise, Custom Duties, Taxes on Land and Agriculture, Value Added Tax, Modvat , Service Tax. Taxable Capacity.

Unit – IV Public Debt – Meaning and Objectives of public debt, Different Sources of Public Debt, Redemption of Public Debt. Principle of Public Debt Management, Growth of Public Debt in India, Burden of Public Debt.

Unit – V Budget – Meaning, Objectives , Different forms of Budget, Budgetary Process in India, Kinds of Budget – traditional Budget, Performance Budget, Zero Based Budget, Out- come Budget, Gender Budget. Budget Theory – Classical Viewpoint (Balance Budget), Modern View Point (Imbalanced Budget.)

Text Book

1. Lekhi, R.K.,(2014), Public Finance, Kalyani Publication Ludhiana New Delhi
2. S.K., Sing, (2013) Principal of Public Finance Sahitya Bhavan Publication, Agra.
3. Pant, K.C., (2012) Public Finance
4. Sinha, V.C.,(2013) Public Finance and Economic, Sahitya Bhavan Publication.

Reference Books

1. Atkinson, A.B. and J.E. Siglitz (1980), Lectures on Public Economics, Tata McGraw Hill, New York.
2. Auerbach, A.J. and M. Feldstern (Eds.), Handbook of Public Economics, Vol. 1, North Holland, Amsterdam.
3. Government of India (1992), Reports of the Tax Reforms Committee – Interim and Final (Chairman : Raja J. Chelliah).
4. Chelliah, Raja J. et. Al (1981)., Trends and issues in India's Federal Finance, NIPFP. New Delhi.
5. Peacock, A and G.K. Shaw (1976), Th Economic Theory of Fiscal Policy, George Alen and Unwin, London.
6. Sahni, B.S. (Ed.) (1972), Public Expenditure Analysis: Selected Readings, Rotherdam University Press.
7. Musgrave, R.A. and P.B. Musgrave (1976), Public Finance in Theory and Practice, Mcgraw Hill, Kogakusha, Tokyo.
8. 14th Finance commission Report-2015
9. Central Govt. and Stat Govt. Budget- 2015

SEMESTER- III
ENVIRONMENTAL ECONOMICS
Paper – IV

Unit – I The Economics of Environment - Environmental Micro Economics and Macro Economics, The Circular Flow Model. Theory of Resources Environment and Economic Development - Economic Growth and The Environment, Future of Economic Growth and The Environment. Criterion of Social Welfare- Bentham Criteria, Pareto Optimality Criteria, Kaldor-Hicks Compensation Criterion.

Unit – II Economic Theory of Environmental Issues - The Theory of Environmental Externalities, Accounting for Environmental Cost, Internalizing Environmental Cost, Positive Externalities. Welfare Analysis of Externalities - Property Rights and The Environment. Common Property Resources and Public Goods - Common Property, Open Excess and Property Rights, Market Failure and Public Goods, Social choice of optimum pollution, Pigovian Taxes and subsidies, Maximization of Social Welfare Under Perfect Competition.

Unit – III Population, Agriculture and The Environment - Population and the Environment- Demographic Transition and Environment, Population Growth and Economic Growth, Population Policy for the 21st Century, Agriculture, Food and Environment, Sustainable Agriculture for the Future, Environment and Neo-Classical Modal of Natural Resources, Energy and Resources.

Unit – IV Ecological Economics, National Income and Environmental Accounting - Ecological Economics Basic Concept, Natural Capital and Accounting for Changes in Natural Capital, Macro Economic Scale, Model of Economic and Ecological System. National Income and Accounting - Natural Capital, System of Environment and Economic Accounts (SEEA).

Unit – V Environmental Value and Methods - Use Value, Option Value and Non Use Value, Cost Benefit Analysis, Methods of environmental valuation- Hedonic Pricing. Household Production Function, Travel Cost Method, Averting Behavior Approach, Contingent Valuation Method, International Carbon Tax. Environment and W.T.O.

Reference

1. Madhu Raj – Environmental Economics.
2. Steve Baker – Environmental Economics.
3. D.W. Pearce – Environmental Economics.
4. Baurnol, W.J. and W.E. Oates. (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
5. Thomas and Callan (2009): Environmental Economics.
6. Charles D. Kolasted (2005): Environmental Economics, Oxford University Press.
7. Brian Roach, Jonathan M. Harries and Anne Marie codur (2015): Microeconomics and the environment, Global Development and Environment Institute, Tufts University, Medford.
8. Jonathan M. Harries and Anne-Marie codur (2004): Macroeconomics and the environment, Global Development and Environment Institute, Tufts University, Medford.

SEMESTER- III
DEMOGRAPHY
Paper – V

Unit – I Demography – Meaning and Importance, Theories of Population – Theory of Optimum Population and Theory of Demographic Transition. Measures of Population Change and Distribution – Rate of Population Change and Distribution, Measures of Degree of Concentration of Population – Lorenz Curve and Gini Concentration Ratio.

Unit – II Migration – Kinds and Factor Affecting of Migration, Hurdles of Migration, Measurement of Internal Migration, Migration Rates and Ratio. Urbanization- Factors Influencing Urbanization and Effects of Urbanization, Population and Economic Development. Human Resource Development in India.

Unit – III Mortality – Meaning and Sources of Mortality Data, Causes of High Death Rate in India, Trends in Death Rate in India, Measurement of Mortality Based on Death Statistics, Crude Death, Specific Death Rate, Infant Mortality Rate and Standardized Death Rate, Child Mortality Rate, Maternal Mortality Rate, Life Table – Functions and Construction of Life Table. Problems Related to Death Rates and Life Table.

Unit – IV Fertility– Meaning, Causes of High Birth Rate in India, Trends in Birth Rate in India, Measurement of Fertility and Reproduction – Crude Birth Rate, General Fertility Rate, Age-Specific Fertility Rate, Total Fertility Rate. Gross Reproduction Rate and Net Reproduction Rate. Problems Related to Fertility and Reproduction Rates.

Unit – V Women Empowerment - Economic Status, Women in Decision Making, Women and Labour Market; Women Work Participation: Concept and Analysis of Women's Work Participation, Structure or Wages across Regions and Economic Sector's, Determinants of wage Differentials, Gender and Education.

Text Books

1. Agrawal, S. N. 'India's population Problems, Tata Mc-Graw Hill co. Bombay.
2. Bogue, D. J., 'Principles of Demography', Honwiley, New York.
3. Sinha, V. C. and Pushpa Sinha, 'Principles of Demography', Mayur Paper backs.
4. Mishra, Jai Prakash, Demography', Sahitya Bhawan Publications, Agra.
5. Pathak, K. B. and F. Ram, 'Techniques of Demographic Analysis', Himalaya Publishing House.
6. Jhingan, M. L. and others, 'Demography', Vrinda Publications (P) Ltd.
7. Srinivasan, K., 'Basic Demographic Techniques and Applications', Sage Publication.

Reference Books

1. Census India SRS Bulletins, Registrar General of India, Govt. of India, 2011
2. Rural-Urban distribution *Census of India: Census Data 2001: India at a glance >> Rural-Urban Distribution.* Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
3. Number of Villages *Census of India: Number of Villages* Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
4. Urban Agglomerations and Towns *Census of India: Urban Agglomerations and Towns.* Office of the Registrar General and Census Commissioner, India. Retrieved on 2008-11-26.
5. Preston, S.H. (1976). Family Sizes of Children and Family Sizes of Women. *Demography* 13(1): 105-114.
6. Pritchett, L.H. (1994). Desired Fertility and the Impact of Population Policies. *Population and Development Review* 20(1): 1-55.

SEMESTER - IV
ECONOMICS OF DEVELOPMENT AND PLANNING
Paper – I

Unit – I Economic Planning; Objectives. Achievements and Failures of Indian Plans, Resource Mobilization in Indian Plans, Strategy of Indian Plan. Saving, Capital Formation and Overall Growth Rate, Twelfth Five Year Plan (2012-17) Achievement of Eleventh Five Year Plan.

Unit – II Theories of Development: - The Marxian Model, The Schumpeterian Model, Keynesian Theory of Development , Rostow's Stages of Economic Growth.

Unit – III Approaches to Development :- Arther Lewis Model of Unlimited Supply of Labour, Ranis & Fie Model, Leibenstein's Critical Minimum Effort thesis , The Big push theory.

Unit – IV Development Models: - the doctrine of Balanced Growth, the concept of Unbalanced Growth , The Limits to Growth Model ,Myrdal's Theory of Circular Causation.

Unit - V Investment Criteria in Economic Development; The social Marginal Productivity Criteria, The capital Turnover Criteria, The Re-investment Criterion, Time Series Criterion, the Choice of Techniques.

Text books

1. Jhingan,M.L.(2003),The Economics of development and planning,vrinda publication pvt. Ltd.
2. Shinghai ,G.C. & Mishra ,J.P.(2013)Macro Economic Analysis,Sahitya bhawan publication Agra.

3 . Mishra, J.P.(2012)Economics of Growth and Development, Sahitya bhawan publication Agra.

Reference Books

1. Todaro, M.P. (1996) (6^{th} edition) Economic Development, Longman London.
2. Solow, R.M. (2000), Growth Theory An Exposition, Oxford University Press, Oxford.
3. United Nations, Human development Department report 2005.
4. Behrman, S. and T.N. Shrinivasan (1995), Hand book of Development Economics, Vol 1, 2 & 3, Elsevier; Amsterdam.
5. Ghatak,s (1986), An introduction to development Economics, Allen & elnein, London.
6. Sen, A.K. (Ed.) 1990 growth Economics, Penguin, Harmondsworth.
7. Dasgupta, P.A.K. Sen and S. Marglin (1972), Guidelines for project Evaluation, UNIDO, Vienna,
8. Mehrotra, S. and J. Richard (1998), Development with a Human Face, Oxford University Press New Delhi.

SEMESTER- IV
INTERNATIONAL ECONOMICS
Paper – II

Unit – 1 Foreign Trade and Economic Development, The Theory of Regional Blocks- Customs Union, Static and Dynamic Effects of a Customs Union and Free Trade Area, Rational of Economic Progress of SAARC, ASEAN, IBSA and BRICS.

Unit – II Regionalism of European Union, The Euro-Dollar Market, NIEO,WTO- Functions of WTO, Multilateralism and WTO, TRIPS, TRIMS, Agriculture, Market- Access, Textile Clothing, Patent Rights, Ministerial Conferences of WTO, UNCTAD.

Unit – III Theory of Short Term & Long Term Capital Movement and International Trade– Port Folio Investment and International trade, FDI and International Trade, Merits & Demerits of Long Term Capital Movement in International Trade, Factors Affecting International Capital Movement, The Transfer Problem, Optimum Currency Area, Global Financial Crises.

Unit – IV International Monetary System, International Liquidity, IMF, World Bank, The World Bank Group, ADB, Foreign Capital in India.

Unit – V International Organisation's- G-20, G-15, BIMSTEC, OPEC, NAFTA, OECD, Working and Regulations of MNCs in India.

Reference:-

1. Bhagwati, J. (Ed). (1981): International Trade, Selected Readings, Cambridge, University press, Massachusetts.
2. Carbough, R. J. (1999), International Economics, International Thompson Publishing, New York.
3. Chacholiades, M. (1990), International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, M.S. (2000), International Economics: Study Guide and Work Book, (5th Edition), Routledge Publishers, London.
5. Dunn, R. M. And J. H. Mutti (2000), International Economics, Routledge, London.
6. Kenen, P. B. (1994), The International Economy, Cambridge University Press, London.
7. Kindleberger, C. P. (1973), International Economics and International Economic Policy A Reader, McGraw Hill International, Singapore.
8. Krugman, P. R. and M. Obstfeld (1994), International Economics: Theory and Policy, Glenview, Foresman.

SEMESTER- IV
PUBLIC ECONOMICS
Paper – III

Unit – I Role of Public Finance in Economic Development, Major Fiscal Function, Concept of Social Goods. Fiscal Federalism in India, Principles of Fiscal Federalism, Vertical and Horizontal Imbalances.

Unit – II Federal Finance – Principle of Federal Finance in India, Centre – State Financial Relation,Resource Transfer From Centre to States, Godgil's Formula. Fourteen Finance Commission.

Unit – III Indian Tax System: - Salient Features, Merits, Demerits, Measures for improvement of Indian Tax system Government measures for improvement: - Taxation enquiry Commission (1953-54), Wanchoo committee, Jha Committee, Kelkar Committee Report , Chelliah Committee Recommendations for reforming the taxation system.

Unit – IV Analysis of Centre & Chhattisgarh Govt , Budget. Taxable and Non Taxable Income of Chhattisgarh. Performance of the Chhattisgarh government budget.

Unit – V Financial Responsibilities and Budget Management Act. Structure and Growth of Public Expenditure in Chhattisgarh , Revenue Expenditure and Capital Expenditure. Plan & Non Plan Expenditure in Chhattisgarh.

Text Books

1. Lekhi, R.K.,(2014), Public Finance, Kalyani Publication, Ludhiana New Delhi.
2. S.K., Sing, (2013) Principal of Public Finance Sahitya Bhavan Publication, Agra.
3. Pant, K.C., (2012) Public Finance
4. Sinha, V.C., (2013) Public Finance and Economic, Sahitya Bhavan Publication.

Reference Books

1. Government of India (1992), reports of the Tax Reforms Committee – Interim and Final (Chairman : Raja J. Chelliah).
2. Chelliah, Raja J. et. Al (1981)., trends and issues in India's Federal Finance, NIPFP. New Delhi.
3. Peacock, A and G.K. Shaw (1976), The Economic Theory of Fiscal Policy, George Allen and Unwin, London.
4. Sahni, B.S. (Ed.) (1972), Public Expenditure Analysis : Selected Readings, Rotherdam University Press.
5. Jha, R. (1998), Modern Public Economics, Routledge, London.
6. Musgrave, R.A. and P.B. Musgrave (1976), Public Finance in Theory and Practice, McGraw Hill, Kogakusha, Tokyao.
7. Cornes, R. and T. Sandler (1986). The Theory of Externalities, Public Goods and Club Goods, Cambridge University Press. Cambridge.
8. Economic Servey Centre and State (2014-15)
9. 14th Finance commission Report- 2015
10. Central Govt. and Stat Govt. Budget- 2015

SEMESTER- IV
ECONOMICS OF SOCIAL SECTOR
Paper – IV

Unit – I Pollution- classification of pollution, Air, Water and Land Pollution, Cause & Effects of pollutant. Problem of solid waste management, Pollution control strategies, Equi Marginal law of pollution, Global environmental issues- Climate change, Global warming, Green House Effect, Ozone depletion.

Unit – 2 Development and Environment: Relation between development & environmental stress, The Environmental Kuznets Curve, The concept of Sustainable Development, Indicators of sustainability, Measuring sustainable development, Green Economy.

Unit – 3 Economics of Resources- Classification of resources, Renewable & Non-renewable resources, Optimum use of resources. Land resources, Forest resources, Social forestry, Peoples participation in the management of Common & forest land. Energy- Sources of energy, energy efficiency & environment, Alternative sources of energy.

Unit – 4 Economics of Education- Expenditure on education, Productive expenditure on education, Productivity of education, the return of education, Human capital, Human capital Vs Physical capital, Educational reforms and Right to Education Act.

Unit – 5 Health Economics- Determinants of health care, Malnutrition. The concept of Human life, Inequalities in health- class & gender, Perspective HDI, GDI, GEM and HPI.

Reference

1. Baurnol, W.J. and W.E. Oates (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
2. Berman, P. (Ed.) (1995): Health Sector reform in Developing Countries: Making health development sustainable, Boston: Harvard Series on Population and International health.
3. Blaug, M. (1972) : Introduction to Economics of Education J Penguin, London.
4. Bromely, D.W. (Ed.) (1995) : Handbook of Environmental Economics, Blackwell, London.
5. Cohn, E. and T. Gaske (1989) : Economics of Education, Pergamon Press, London.
6. Fisher, A.C. (1981): resource and Environmental Economics, Cambridge University Press, Cambridge.
7. Hanley, N.J.F. Shogern and B. White (1997): Environmental Economics in Theory and Practice, Macmillan.
8. Hussen, A.M. (1999) : Principles of Environmental Economics, Routledge. London.
9. Jeroen, C.J.M. van den Bergh (1999): Handbook of Environmental and Resource Economics, Edward Elgar Publishing Ltd. U.K.
10. Thomas and Callan (2009): Environmental Economics.

ECONOMICS
M.A. PREVIOUS AND M.A. FINAL EXAMINATION – 2017-18

At post-graduate level candidates required to-study ten compulsory papers during two years period. There shall be five compulsory papers in M A previous and five compulsory papers in M A final examinations. So, there shall be ten compulsory papers in the post-graduate examination. Each paper shall carry 100 marks. Candidate shall have to secure 36 percent marks in aggregate of all papers in order to pass the M A previous and M A final examination.

M.A. Previous

Paper I Micro Economics
Paper II Macro Economics
Paper III Quantitative Methods
Paper IV Indian Economic Policy
Paper V Demography

M.A. Final

Paper I Economics of Growth and Development
Paper II International Trade and Finance
Paper III Public Economics
Paper IV Economics of Social Sector and Environment
Paper V Agricultural Economics

M.A. (Previous) Economics
PAPER - I
MICRO ECONOMICS

UNIT-1 Introduction, Basic Concepts and Demand Analysis:

Basic Economic Problem- Choice and Security, Deductive and Inductive Methods of Analysis, Positive and Normative Economics, Economic Models, Characteristics of Equilibrium and Disequilibrium Systems.

Elasticity (price, Cross, Income) of demand- theoretical aspects and empirical estimation, elasticity of supply ; theories of demand-utility, Indifference Curve, Income and substitution effects, Slutsky theorem, compensated demand curve and their application, revealed preference theory, revision of demand theory of Hicks ;

characteristics of goods approach consumer's surplus, elementary theory of price determination - demand and supply equilibrium.

UNIT-2 Theory of Production and Costs;

Production Function - Short period and long period, law-of variable proportions and returns to scale, isoquants - least cost combination of inputs, returns to factor,

Economics of scale, elasticity of substitution, Euler's theorem, technical progress and production function cob-Douglas, CES, production functions and their properties. Marginal analysis as an approach to price and output determination, supply curve; Monopoly-short run and long run equilibrium price determination, Welfare aspects monopoly control and regulation.

UNIT-3 Monopolistic competition, General and Chamberlin approaches to equilibrium, (equilibrium of the firm and the group with product differentiation and selling Costs, excess Capacity under monopolistic and imperfect Competition, Criticism of monopolistic competition.

Oligopoly-Non-Collusive (Cournot, Bertrand, Edseworth, Chamberlin; Kinked demand curve) and Collusive (Carter and merger, price leadership and basic point price system) models.

UNIT-4 Critical evaluation of marginal analysis, Baumol's sales revenues maximization model, willamsan's model of managerial discretion, morris model of managerial enterprises. Full cost pricing rule, Bains limit pricing theory and its recent developments, including styles, labinis model, and behavioral model of the firm.

NEO-CLASSICAL APPROACH OF DISTRIBUTION WELFARE ECONOMICS AND GENERAL EQUILIBRIUM Marginal Productivity theory, Product Exhaustion theorem, Elasticity of Technical Substitution, technical progress and factor shares, theory of distribution in imperfect product and factor markets, Determinants of rent, wages, interest and profit.

UNIT-5 Pigovian welfare economics, Pareto optimum conditions value-judgment, social welfare function; compensation principle, inability to obtain .optimum welfare-imperfections, market failures decreasing costs uncertainty and non-existent and incomplete markets.

Partial and General equilibrium, Walrasian Excess Demand and input- output approaches to general equilibrium, existence, stability and uniqueness of equilibrium and general equilibrium.

BASIC READING LIST

1. Kraps, David M. (1990) a course in micro economics theory princation university press, Princeton.
2. Kout sayiannis; A (1979) modern Microeconomics (2nd Edition), macmillan press,London.
3. Layard,PRG andWattersPW(1978), Micro economic theory, McGraw Hill, New York.
4. San A (1999) Micro economics theory and Applications, Oxford University Press, New Delhi;.
5. Stigler, G. (1996) theory of Price (4th adition), Prentise Hall of India, New Delhi.
6. Varian, H (2000) Micro economics Analysis, W.W. Norten, New York.
7. Baumol W.J., (1982) Economic theory and operations Analysis, perntice Hall of lndia, New Delhi.
8. Handersan, J.M. and R.E. Quandy (1980) Micro economics theory - A Mathematical approach, Mc Graw Hill New Delhi.
9. Hirshleifer, J. And A Glazer (1997), Price theory and Application, Prentise Hall of India, New Delhi.
10. Health fields and wibs (1'987) An introduction to cost and production function, Macmillan, London.

PAPER- II
MACRO ECONOMICS

UNIT-1 National Income and accounts - Concepts of National Income and National Product. Problems of Measurement,' Circular Flow of Income in two, three and four sector economy; different forms of national income accounting, Social accounting, input-output accounting and flow of funds and balance of payment accounting. Consumption Function - .Keynes psychological law of consumption - implications of the law; short run and long-run consumption function, Empirical evidence on consumptions function; Income-consumption relationship Absolute income, Relative income, Life cycle and Permanent income hypotheses.

UNIT-2 Investment Function - Marginal efficiency of capital and investment - long run and short run; The accelerator and investment behavior, Saving and Investment equality, Multiplier; concept of Multiplier; Super Multiplier.

Supply of Money - money supply determination, demand determined money supply process, RBI approach to money supply; High powered money and money multiplier; budget deficits and money supply, money supply and open economy; control of money supply.

UNIT-3 Demand for money - Classical approach to demand for money - quantity theory approach, Fisher's equation, Cambridge quantity theory, Keynes's liquidity preference approach, transaction, precautionary and speculative demand for money - aggregate demand for money; Post - Keynesian approaches to demand for money - Patinkin and the real Balance Effect, Approaches of Baumol and Tobin; Friedman and the modern quantity theory; Crisis in Keynisian economics and the revival of monetarism. New-classical and Keynesian, views on interest: The IS-LM model; Derivation of IS curve; Derivation of LM curve; General equilibrium of Product and money market.

UNIT-4 Theory of Inflation - Classical, Keynesian and Monetarist approaches to inflation;

Structuralism theory of inflation; Philips curve analysis - Short run and long run, Philips curve; The Natural rate of unemployment hypothesis; Tobin's modified Philips curve; Adaptive expectations and rational expectation; Policies to control inflation. Business Cycles - Theories of Schumpeter, Kaldor, Samuelson and Hicks, Control of, business cycles.

UNIT-5 Monetary and fiscal policies - Types of Monetary Policy; Instruments of monetary Policy; Relative effectiveness of monetary and fiscal policies. Macro Economic Policies Development - Role of Monetary and fiscal Policies in India, New classical Macro economics.

BASIC READING LIST

1.Markley, G. (1978), Macroeconomics; Theory and Policy; Macmillan, New York.
2.Blackhouse, R. and A. Salansi (Eds.) (20()), Macroeconomics and the Real World (2vols) Exford University Press, London.
3.Branson, W.A. (1989), Macroeconomics Theory and Policy, (3rd Edition), Harper and Raw, New York.
4. Aornbusch, R. and .F. Stanley (1997), Macroeconomics, McGraw Hill, Inc., New York.
5.Hall, R.E. and J.B. Taylor (1986), Macroeconomics, W.W. Norton, New York.
6.Heijdra, B.J. and V.P. Frederick (2001), Foundations of Modern Macroeconomics, Oxford University' Press, New Delhi.
7.Jha, R. (1991), Contemporary Macroeconomic Theory and Policy, Wiley Eastern Ltd. New Delhi.
8.Romer. DL. (1996), Advanced Macroeconomics, McGraw Hill Company Ltd., New York.
9. Scarte, B.L. (1977), Cycles, Growth and Inflation; McGraw Hill, New York.

10.Shapiro, E. (1996), Macroeconomic Analysis', Galgotia. Publications, New Delhi.
11.Surrey, MJC (Ed) (1976), Macroeconomics Themes, Oxford University Press, Oxford

PAPER - III
QUANTITATIVE METHODS

UNIT-1 Concept and types of production functions-Cobb-Douglas production function; linear programming- Basic concept; formulation of a linear programming problem its structure and variables; nature of feasible, basic and optimal solution; solution of linear programming through graphical method; concept of game; strategies - simple and mixed; value of game ; saddle point solution; simple applications, limitations of the game theory.

UNIT-2 Skewness : Symmetrical and asymmetrical distribution; measurement of skewness - Karl Pearson's of coefficient Skewness, Bowley's coefficient of skewness; meaning, assumptions and limitations of simple correlation; measurement of correlation coefficient.. Karl Pearson's coefficient of correlation and spearman's rank correlation; probable error and standard error in correlation; regression analysis, regression lines regression equations, regression coefficient, correlation and regression, partial correlation and multiple correlation; multiple regression analysis (up to three variables) standard error of the estimates.

UNIT-3 Interpolation and extrapolation, methods of fitting a parabolic curve dirnct binomial expansion method. Newton's advancing difference method and Lagrange's method; Association of attributes, meaning and types of association, consistency of data, in association. Theory of probability, various types of events, addition and multiplication theorems, conditional probability and concept of inter dependence.

UNIT-4 Index Number - Type of index number, Fisher's ideal index number, Reversibility test, Cost of living index, Time series data Analysis - Components of time series. Short period and long period trend line; moving average method.

UNIT-5 Census and sample methods of statistical inquiry: Deliberate and random sampling, simple, random, stratified random and P.P.S. sampling. Concept of an *estimator* and its sampling distribution. desirable properties of an estimator; formulation of statistical hypotheses - null and alternative; goodness of fit. Confidence intervals and levels of significance, hypothesis testing based on z, t, x2 (Chi-square) and F tests, Type-1 and Type-2 errors.

BASIC READING LIST

1. Allen, R.G.D. (1974): Mathematical Analysis for Economics, Mcmillan Press and ELBS, London.
2. Chiang, A.C. (1986): Fundamental methods of Mathematical Economics, Mc Graw Hill, New York.
3.Gupta S.C. (1993): Fundamental of Applied Statistics S. Chand & Sons, New Delhi.

PAPER - IV
INDIAN ECONOMIC POLICY

UNIT-1 Economic Development and its determinants approaches to economic development and its measurement-sustainable development, role of state, market and other institutions, indicators of development-PQLI-Human Development Index (HDI), Gender development indices.

Planning in India- Objectives and strategy of planning, failures and achievements of

plans - developing grass-root organizations for development, Panchayats, NGOs and pressure groups.

UNIT-2 Demographic Features, Poverty and inequality, broad demographic features of Indian population, rural-urban migration, urbanization and civic amenities, poverty and Inequality. Resource Base and' Infrastructure Energy - Social infrastructure, education and health.

UNIT-3 The Agriculture-Sector-Institutional Structure, land reforms in India, technological change in agriculture, pricing of agricultural inputs and outputs. Terms of trade between agriculture and industry, agricultural finance policy. The Industrial Sector, Industrial Policy, public sector enterprises and their performance, problem of sick units in India. Privatization. and disinvestment debate, growth and pattern of industrialization, small-scale sector, productivity in industrial sector.

UNIT-4 Public Finance - Fiscal Federalism, Centre-state financial relations, finances of central government, finances of state government, parallel economics, problems relating to fiscal sector reforms in India, Money, Banking and prices - Analysis of price behavior in India, Financial sector reforms, Interest rate policy, Review of monetary policy of RBI.

UNIT-5 External sector - structure and direction of foreign trade, Balance of payments, Issues in Export-import policy and FEMA, Exchange rate policy, Foreign capital and MNCs in India; The progress of trade reforms in Indian. Economic Reforms - Rational of internal and external reforms: Globalization of Indian economy, W.T.O. and its impact on the different sectors of the economy.

BASIC READING LIST

1. Ahulwalia, I.J. and I.M.D. Litle (Eds.) (1999): India's Economic Reforms and Development (Essays honor of Mariohar Singh), Oxford University Press, New Delhi.
2. Bardhan, P.K. (9th Edition) (.1999): The Political Economy of Development India, Oxford University Press, and New Delhi.
3. Bawa, A.S. and Raikhy (Ed.) (1997): Structural change in Indian Economy, Guru Nanak Dev University Press, Amritsar.
4. Brahmananda, P.A. and V.A. Panchmukhi (9th Eds.) (2001): Development Experience in Indian Economy: Inter-state Perspectives, Bookwell, Delhi.
5. Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.
6. Dantwala, M.L. (1996): Dilemmans of Growth: The Indian Experience, Sage Publication, New, Delhi.

PAPER - V
DEMOGRAPHY

UNIT-1 Meaning, Scope and importance of demography sources of demographic data, Tools of demographic analysis, measurement of population growth and population pyramid; Theories .of population - Malthus theory, Socio-cultural and economic theories of population, Biological theories of population, Theory of optimum population, Theory of demographic transition.

UNIT-2 Fertility - meaning and definition of fertility, Measurement of fertility - child woman ratio, crude birth rate, corrected birth rate, General fertility rate, Age specific fertility rate, Total fertility rate, Gross reproduction rate, and Net reproduction rate, calculation of fertility rates, determinants of fertility, Trends fertility in India.

UNIT-3 Mortality and morbidity - Importance of mortality data causes of death, meaning of morbidity, Differentials in mortality and morbidity, measurement of mortality crude death rate, Age-specific death rate, Infant mortality rate, Standardized death rate and maternal mortality rate, calculation of mortality rates, Trends in mortality in India, life table.

UNIT-4 Migration and urbanization, Population projection, growth of population in India, population and economic development, population explosion in India, Demographic characteristics of developing countries. Population Policy of India.

UNIT-5 Women empowerment - Economic status, Women in decision making, Women and labour market; Women work participation: Concept and analysis of women's work, structure or wages across regions and economic sector's, Determinants of wage Differentials, Gender and education.

BASIC READING LIST

1.Agrawal S.N. (1972), India's Population Problem, Tata McGraw-Hill Co. Bombay.

2.Bose, S. (1996), India's Basic Demographic Statistics, B.A. Publishing Corporation, New Delhi.

3. Bogue, D.J. (1971), Principles of Demography, Hon Wiley, New York

4.Handry, A.T. (1999): Operations Research, Prentice Hall of India, New Delhi.

5. Speigal, M.R. (1992): Theory and problems of statistics, Mc Graw Hill Book Co., London.

6. Taha, H.A. (1997): Operations Research: An Introduction (6th editian), Prentice Hall of India Pvt. Ltd.; New Delhi.

7. Yamans, Tare (1975): Mathematics for Economics, Prentics Hall af India, New Delhi.

8. Mathur, P.N. & R. Bhardwaj (Eds.) 1967: Economic Analysis in input-autput Research, Input Output, Research Association of India, Pune.

9.Kathari, C.R. (1992): An introductian to. Operations Research Vikas Publishing House, New Delhi.

10.Hadley, G.(1962): Linear Programming, Addisan Wesley Publishing Co. Massachusetts.

11. Chou a (1975): Statistical Analysis Halt, Rainhart and Winstan, New Yark.

M.A. (Final) Economics

PAPER - I

ECONOMICS OF GROWTH AND DEVELOPMENT

UNIT-1 Economic Growth: Economic growth and development, Factors affecting economic growth, Capital, labor and technology. Measuring economic development, development gap. Common characteristics of developing economics. Obstacles to economic development: Human development index and other indices of development, Quality of life index, Food security. Human Resource Development.

UNIT-2 Theories of development- Ricardo, Karl marx, Schumpeter and Harrod-Domar model, Neoclassical model- solow, Meade. Mrs John Robinson and kaldor model. Technology progress and economic growth - Hick, Hayek learning by doing, Production function approach to economic development.

UNIT-3 Approaches to development - Vicious circle of poverty, circular causation unlimited supply of labour, big push theory, theory of critical minimum effort, Balanced and unbalanced growth, Low income equilibrium trap, Ranis-fie model.

UNIT-4 Problems of Development- Measuring poverty and income inequalities in developing countries. Nature and causes of poverty and income inequality. Capital formation, Capital output ratio, Human Capital formation in developing countries. Role of State in economic development.

UNIT-5 Allocation of resources - Need for investment criterion in developing countries. Marginal rate of resource criteria, the rate of turn over criterion, the time series criterion,

and cost benefit Analysis, Project evaluating and UNIDO guide lines. Shadow prices, Input-output Analysis.

BASIC READING LIST

1. Adelman, I (1961), Theories of Economic Growth and Development Stanford University press, Stanford.
2. Jhingan,M.L.(2008)31ST edition,The economics of development and planning,vrinda publication pvt.Ltd.
3. Shinghai G.C. & Mishra J.P.(2013) Macroeconomic Analysis,Sahitya bhawan publication Agra.
4. Mishra, J.P.(2012)Economics of Growth and development Sahitya bhawan publication Agra.
5. Hajela P.D. (1998), Labour Restructuring in India : A Critique of the New Economic Policies, Commonwealth Publishers, New Delhi.
6. Jhabvala, R. and R.K. Subrahmanya (Eds.) (2000). The Unorganised Sector : Work Security and Social Protection. Sage Publication, New Delhi.
7 .Lester, R.A. (1964). Economics of Labour. (2nd Edition), Macmilan, New York.
8. Mc Connell, C.R. and S.L. Brue (1986). Contemporary Labour Economics, Mc Graw-Hill New York.
10. Papola, T.S.P.P. Ghosh and A.N. Sharma (Eds.) 1993, Labour, Employment and industrial Relations in India, B.R. Publishing Corporation New Delhi.

PAPER - II
INTERNATIONAL TRADE AND FINANCE

UNIT-1 Theory of International Trade: The pure theory of international trade- Theories of absolute advantage, Opportunity cost, Modern theory of international trade, Theorem of factor price equalization, Heckscher-Ohlin theory of trade, Kravis and Linder theory of trade, Factor intensity reversals; Stapler-Samuelson and Rybczynski theorems, Empirical testing of comparative costs and H.O. theories, Economic growth and international trade.

UNIT-2 Measurement of gains-Measurement of gains from trade and their distribution, concepts of terms of trade- their uses and limitations, Determination of terms of trade, its empirical relevance and policy implications for less-developed countries, Welfare implications. The theory of intervention (Tariffs, quotas and non-tariff barriers), Economic effects of tariffs and quotas on national income,. output, employment, terms of trade, income distribution, Balance of payments on trading partners both in partial and general equilibrium analysis, The political economy of non-tariff barriers and their implications, Nominal effective and optimum test of tariffs their measurement, impact and welfare implications.

UNIT-3 Balance of payments - Meaning and components of balance of payments, Equilibrium and disequilibrium in the balance of payments, The process of adjustment under systems of gold standard, Fixed exchange rates and flexible' exchange rates, Expenditure-reducing and expenditure-switching policies and direct controls of adjustment, Policies for achieving internal and external equilibrium simultaneously under alternative exchange rate regimes, foreign trade multiplier. Determination of national income and output, Relative merits and Demerits of fixed and flexible exchange rates.

UNIT-4 The theoy of regional blocks-Forms of economic co-operation, Reforms for the emergence of trading blocs at the global level, static and dynamic effects of a customs union and free trade area, Rationale an economic progress of SAARC / SAPTA and ASEAN regions, Problems and prospects of forming a customs union in the Asian region, Regionalism (EU, NAFTA), Multilateralism and WTO, Rise and fall of gold standard and Breton-woods system, Need, adequacy and determinants of international reserves,

Conditionality clause of IMF, Emerging international monetary system Reforms of the International Monetary System, India and developing countries.

UNIT-5 Theory of short-term capital movements and East-Asian crisis and lessons for developing countries; international trade and financial instructions- functions of GATT/WTO (TRIPS. TRIMS), UNCTAD, IMF, World Bank and Asian Development Bank- Their achievements and failure WTO and World Bank from the point of view of India. Trade policies in India- Trade Problems and trade policies in India during the last five decades, Recent change in the direction and composition of trade and their implications, Rational and impact of trade reforms since 1991 on balance of payments, problems of India's international debt, working and regulations of MNCs in India. Export policies.

BASIC READING LIST

1. Bhagwati, J. (Ed). (1981) : International Trade, Selected Readings, Cambridge, University Press, Massachusetts.
2. Carbough, R.J. (1999), International Economics, International Thompson Publishing; New York.
3.Chacholiades, M. (1990), International Trade: Theory and Policy, McGraw Hill, Kogakusha, Japan.
4. Dana, M.S. (2000), International Economics: Study, Guide and Work Book, (5th Edition), Routledge Publishers, London.
5.Dunn, R.M. and J.H. Mutti (2000), International. Economics, Routledge, London.
6.Kenen, P.B. (1994), the International Economy. Cambridge University Press, London.
7.Kindleberger. C.P. (1973), International Economics and International Economic Policy: A Reader, McGraw Hill International, and Singapore.
8.Krugman, P.R and M. Obstfeld (1994), International Economics: Theory and Policy, Glenview, Foresman.

PAPER - III
PUBLIC ECONOMICS

UNIT-1 Role of Government in organized society, Government in a mixed economy, Public and Private goods, principles of maximum social advantages, Taxation- different forms, principles of taxation, shifting, effects and incidence of taxation, Indian taxes- personal income tax, excise duty, central excise and custom duties, taxes on land and agriculture, taxable capacity.

UNIT-2 Public Expenditure - Different forms of expenditure, economic effect of public expenditure on production and distribution, public expenditure and economic growth in developing countries, Wagner's law of increasing state activities, Wiseman Peacock hypothesis, pure theory of public- expenditure, structure and growth of public expenditure in India.

UNIT-3 Public Debt- different sources of public debt, Redemption of public debt, economic effects of public debt, Burden of public debt. Classical view of public debt, principles of debt management and repayment of public debt, growth of public debt in India.

UNIT-4 Fiscal policy - Objectives of fiscal policy in under-developed countries, economic stability and fiscal policy,' fiscal policy and full employment, balanced budget multiplier, functional finance.

UNIT-5 Finance Commission - Twelfth Finance Commission Report - only, Analysis of Central and State Government Budgets, Financial Administration, Budget and budgetary procedure in India, Gadgil formula, federal finance, principles of federal finance in India.

BASIC READING LIST

1. Atkinsan, A.B: and J.E. Siglitz (1980), Lectures an Public Economics, Tata McGraw Hili, New Yark.
2. Auerbach, A.J. and M. Feldstern (Eds.), Handbook of Public Ecanamics, Vol. 1, North Holland, Amsterdam.
3. Lekhi, R.K.,(2014), Public Finance, Kalyani Publication Ludhiana New Delhi
4. S.K., Sing, (2013) Principal of Public Finance Sahitya Bhavan Publication, Agra.
5. Pant, K.C., (2012) Public Finance
6. Sinha, V.C.,(2013) Public Finance and Economic, Sahitya Bhavan Publication.

PAPER - IV
ECONOMICS OF SOCIAL, SECTOR AND ENVIRONMENT

UNIT-1 Welfare Economics - Definition of Welfare Economics, Criterion of Social welfare, Benthem's Criterion, Cordiality Criterion. The Pareto optimality Criterion, Kaldor Hicks Compensation Criterion, The Bergson Criterion. The problem of second best. Social welfare function, Maximization of Social Welfare. Welfare Maximization in Perfect Competition.

UNIT-2 Environmental Economics - Definition of Environmental economics, Public Goods, Private goods. Market Failure and Public goods. Theory of Externalities-Economics and Diseconomies. External Costs, Marginal social cost, Marginal private cost. Pigouian Taxes and Subsidies Environmental Values use value, Option value, and non use value. International Carbon Tax. Environment and W.T.O. Macro-economic policy and Environment

UNIT-3 Pollution - Classification of Pollution, Control of Pollution, Air Pollution Control, Water, Pollution Control, Pollution Control Strategies, Cost-benefit analysis of pollution; Environmental Laws. Protection of Environment. Environment and Development, Sustainable Development. Population Growth and Environment.

UNIT-4 Resources - Classification of resources, Renewable resources, Non renewable resources, Optimal use of resources, Land resources, Forest resources, Social forestry, people's participation in the management of common and forest lands Energy Efficiency and environment. Energy Taxation-subsidies for Biomass, Automobile Fuels.

UNIT-5 Education - Economics of Education, The Return of education, Expenditure on education, The productivity of education. Human capital, Human capital vs Physical capital, Demand production Benifit of education, Educational Planning. Education, and Labour Market. Poverty Unemployment and Education. Health Economics Determinants of health, dimension of health care, Malnutrition. The concept of human life. Inequalities in health-Care and Gender Perspectives.

BASIC READING LIST

1.Baumol, W.J. and W.E. Oates (1988): The Theory of Environmental Policy, (2nd Edition), Cambridge University Press, Cambridge.
2.Berman, P. (Ed.)(1995) : Health Sector Reform in Developing Countries : Making health development sustainable, Boston: Harvard Series on Population and International Health.
3.Blaug, M. (1972): Introduction to Economics of Education J Penguin, London. (15)
4.Bromely, D.W. (Ed.) (1995): Handbook of Environmental Economics, Blackwell, and London.
5.Cohn, E. and T. Gaske (1989) : Economics of Education, Pergamum Press, London.
6.Fisher, A.C. (1981): Resource and Environmental Economics, Cambridge University Press, Cambridge.

7.Hanley, N.J.F. Shoge'rn and B. White (1997): Environmental Economics in theory and-Practice, Macmillan.
8.Hussen, A.M. (1999): Principles of Environmental Economics, Routledge, London.
9.Jeroen, C.J.M. van den Bergh (1999)': Handbook' of -Environmental and resource Economics, Edward Elgar Publishing .Ltd: U.K:
10. Madhu Raj - Environmental Economics.

PAPER - V
AGRICULTURE ECONOMICS

UNIT-I Nature and scope of Agricultural economics- Traditional and Modern agriculture, role of agriculture in economic development. Problems in rural industrialization, development of Agro-based industries, interdependence between agriculture and industry. Green revolution. Agricultural production, Production function analysis, cost concept in agricultural product, farm budgeting, Resource use and efficiency in Agricultural sector.

UNIT-II Land use, Principles of land utilization, land distribution, Land values and rent, Land reform measures and performance, Land tenures and farming systems, problems of marginal and small farmers. Rural Labour supply, Mobility of labour and labour market in agriculture sector. Nature of employment in rural sector Agriculture wages in India. Male-Female wage difference in agriculture.

UNIT-III Rural Finance - Role of rur.al capital and rural credit, Rural capital and capital formation, Characteristics and source of rural credit, Institutional and non institutional rural credit, Rural Banks, Commercial Banks,. Regional Rural Banks and Rural credit Co-operatives Societies. Agricultural prices-Agricultural markets, Behavior of agricultural prices, agricultural. Markets and agricultural marketable surplus. Taxation, crop insurance, state policy and Agricultural price policy.

UNIT-IV Agricultural Growth in India - Recent trends, inter-regional variation in growth of agricultural product, cropping pattern, factors affecting productivity, pricing of inputs, role of subsidies, role of technology and input of irrigation in Agricultural sector. Problems and prospects of Globalization and W.T.O. in India Agricultural commodities.

UNIT-V Infrastructure - Infrastructure and economic development, the structure of Transportation costs, Demand for transportation, Cost function in the transport Sector, Telephone utilities, role of postal services, Demand for Energy, Energy conservation, Renewable and Non-conventional Sources of Energy.

BASIC READING LIST

1. Bhahacharjee, J.P. - Studies. in Indian Agricultural Economics.
2. Rao, V.K.R.V.- New Challenge before Indian Agriculture.
3. Mellor, J.W. - The Economics of Agricultural Development.
4.Bhadure, A. (1984), The Economic Structure of Backward Agriculture, Macmillan, Delhi.
5.Bilgrami, S.A.R. (1996), Agricultural Economics, Himalaya Publishing House, Delhi.
6.Dantewada, M.L. Et.al,(1991),Indian Agricultural Development Since independence, Oxford & BH, New Delhi.
7.Government of India (1976), Report of the National Commission of Agriculture, New Delhi.
8.Government of India, Economic Survey (Annual), New Delhi.
10.Joshi, P.C. (1975), Land Reforms in India: Trends and. Prospects. Alled Publishers, Bombay.
12.Rao, C.H.I.Hanumanth (1975), Agricultural Growth, Rural Poverty. and Environmental Degradation in India, Oxford University Press, New Delhi.
14.Rudra,A. (1982), Indian Agricultural Economics, Myths and Relaity, Alled Publishers,New, Delhi.

M. Phil. In Economics: Allotment of Marks

Session: 2017-18

Sr. No.	Paper	Title	Marks
i	Paper- I	Advanced Economic Theory	100
ii	Paper- II	Research Methodology	100
iii	Paper- III	Indian Economy	100
--	---	**Total Marks(A)**	**300**
iv	Seminar	Based on Theory	50
v	Dissertation	Seminar: Based on Dissertation	50
vi	Dissertation	Script Writing	75
vii	Dissertation	Viva- voce	25
	---	**Total Marks (B)**	**200**
	---	**Grand Total (A+B)**	**500**

ADVANCED ECONOMIC THEORY

PAPER- I

Unit- I

Adam Smith- Founder of Classical Institution, Father of Economics, Wealth of Nations, Leading theme- Economic development, Division of labour, Productive and unproductive, Theory of labour, Theories of distribution, Capital accumulation, GNP, NNP and banking, An optimum investment pattern, Taxation policy, Laissez faire doctrine and role of Government, Taxation Policy, Adam Smith's growth model,

Unit- II

David Ricardo-The Principles of Political Economy and Taxation, Income distribution- Rent, Wages and Profits, Theory of value, Foreign trade- Comparative Cost Theory, Capital accumulation, Main sources of economic development, Taxation policy, Growth model of Ricardo: Critical evaluation. Karl Marx- Father of Socialism, Materialistic interpretation of history, Theory of surplus value, Capital accumulation, Development in Capitalistic Economy, Reserve army, Crisis in Capitalism, Growth model of Karl Marx and critical evaluation.

Unit- III

Marshallian Analysis- The neo-classical demand analysis, The indifference curve theory, The modern utility analysis of choices involving risk and uncertainty, Revealed Preference Theory, Demand Theory of Logical Ordering , Production function, Returns to a factor, Return to scale, Cobb-Douglas Production Function, CES production function, CES v/s CD.

Unit- IV

Representative firm, Quasi rent, Critical evaluation of neo-classical economy, Behavioral and managerial theories of the firms, Equilibrium of the firm, Behavioral theory of Cyert and Marsh , Mark Williamson's managerial discretion theory, Baumol's sales maximization model, Game theory and price determination, Linear Programming.

Unit- V

Welfare Economics: Pigou's Welfare Economics, New Welfare Economics, Paretian optimum theory, Maximization of Social Welfare- Bergson- Arrow's Impossibility theorem, Prof. Amartya Sen and his contribution to World Economy.

Reference Books

1. Jhingan M. L. (2014), Advanced Economic Theory, Vrinda Publication, New Delhi

Kraps, David M. (1990) a course in micro economics theory Princeton university press, Princeton.
2. Kout sayiannis; A (1979) modern Microeconomics (2nd Edition), Macmillan press, London.
3. Layard, PRG and P.W. Watters (1978), Micro economic theory, McGraw Hill, New York.
4. San A (1999) Micro economics theory and Applications, Oxford University Press, New Delhi;
4. Stigler, G. (1996) theory of Price (4th edition), Princeton Hall of India, New Delhi.
5. Varian, H (2000) Micro economics Analysis, W.W. Norten, New York.
6. Baumol W.J., (1982) Economic theory and operations Analysis, Princeton Hall of lndia, New Delhi.
7. Handersan, J.M. and R.E. Quandy (1980) Micro economics theory - A Mathematical approach, Mc-Graw Hill New Delhi.
8. Hirshleifer, J. And A Glazer (1997), Price theory and Application, Prentise Hall of India, New Delhi.

RESEARCH METHODOLOGY

PAPER – II

Unit- I

Research methodology vs research methods, meaning, objectives and significance of research; motivation in research; types of research - descriptive vs analytical, applied vs fundamental, quantitative vs qualitative, census vs sample, confidential vs open, research and scientific methods, research process; criteria of a good research; defining the research problems- what is a research problem?, selecting the problem, technique involved in defining a problem, an illustration,

Unit – II

Research design: meaning and need for research design, features of a good research design, important concepts relating to research design, different research designs, sampling design: census and sample survey, steps in sampling design, characteristics of a good sample design, different types of sampling design- probability and non- probability sampling, stratified sampling, cluster sampling, area sampling and sampling with probability proportional to size; sample size and its determination, sampling frame.

Unit – III

Processing and analysis of data: processing operations-editing, coding, classification and tabulation of data, some problems in processing, elements/ types of analysis.
statistics in research- use of correlation coefficient, coefficient of association, regression analysis, interpolation and extrapolation in analysis of data. Theoretical frequency distribution-normal distribution, binomial distribution and poisson distribution (elementary knowledge only), random variable-meaning and types.

Unit – IV

Testing of hypothesis: What is a hypothesis? Basic concept concerning testing of hypo-thesis, Procedure for hypothesis testing, Important parametric tests: Student's 't' test, Chi-square ($\chi 2$)

test and F- ratio test, Practical problems related to Student's 't' test Chi-square ($\chi 2$) test and F-ratio test, paired t test/ difference test.

Unit – V

Computer: what is a computer ? history of computer, characteristics of a computer, different types of computer, parts of a computer, INTERNET-elementary knowledge, MS office- MS Word, MS PowerPoint and MS Excel. Role of computer in economic research.

References Books

1. C.R. Kothari : Research Methodology
2. S.R. Bajpai : Methods of Social Survey and Research.
3. Ravindra Nath Mukherjee : Samajik Shodh avam Sankhyakiya.
4. Shukla and Sahay : Quanitative Methods

INDIAN ECONOMY

PAPER- III

Unit- I

Indian Plans- Strategies of Plans, Planning in India, Models of Development- Nehru v/s Gandhiji, Rao-Manmohan model of development, Industries- Industrial pattern and Plans, Large and small scale Indian iron and steel industries, Cotton and synthetic textile Industries, Jute, Sugar and Cement industries. Role of small scale industries in India, Sickness in Indian industries, Labour problems in Indian industries, National wage policy, National income in India.

Unit – II

Agriculture- Agricultural productivity: Trends and cropping pattern in India, Food security in India, Irrigation and agricultural inputs, Land reforms, Rural credit and marketing, Agricultural taxation in India, Agricultural policy, Farm management, Infrastructural, structure and economic development in India. Transport system in India's economic development, Rail-road condition, Urban infrastructure, Private investment in infrastructure- outlook and prospects.

Unit- III

Human resources- Human resources and economic development in India, Demographic transition in India, Growth rate of Population in India, Urbanization and economic development , Population policy, Poverty in India, Unemployment in India, Occupational structure and economic development, Human development in India, Education and health in India.

Unit- IV

Monetary management in India- Role and functions of Reserve Bank in India, Working of Indian monetary system, Inflation-monetary policy in India, Price policy in India, Indian Public Finance-Central Government Budget, Financial relation between Centre and States, Taxation in India, Finance Commission, Foreign trade in India, India's balance of payment, W.T.O. and India's foreign trade, Export and import bank.

Unit- V

Environment- Natural resources in the process of economic development, Land resources, Forest resources and Water resources, Power section Renewable resources, Energy efficiency, Energy taxation, Energy policy and Planning in India, Environment and development, Pollution control- Strategies, plans and policies.

Reference Books

1 Ahulwalia, I. J. and I. M. E. Litle (Eds.) 1999): India's Economic Reforms and Development (Essay honor of Manohar Singh), Oxford University Press, New Delhi

2 .Bardhan, P. K. (9^{th} Edition) (1998): The Political Economy of Development India, Oxford University Press, New Delhi.

3 Bawa, R.S. and Raikhy (Ed.) (1997): Structural Change in Indian Economy, Guru Nanak Dev University Press. Amritsar (PB).

4 Brahmananda, P. R. and V. R. Panchmukhi (9^{th} Eds.) (2001): Development Experience in the Indian Economy: Interstate Perspectives, Bookwell, Delhi.

5 Chakravarty, S. (1987): Development Planning: The Indian Experience, Oxford University Press, New Delhi.

6 Dantwala, M. L. (1996): Dilemmas of Growth: the Indian Experience, Sage Publication, New Delhi.

SCHOOL OF STUDIES IN ECONOMICS
Pt. Ravishankar Shukla University, Raipur (C.G.)

Session: 2017-18

COURSES WORK FOR THE Ph. D. STUDENTS IN ECONOMICS

Paper	Name of Papers	Marks
First	Methodological aspect of Economic Research	100
Second	Project Work	100
	a. Project Work: Report (Marks-50)	
	b. Project Work Presentation (Marks-30)	
	c. Project work Viva-Voce (Marks-20)	
Total Marks		**200**

PAPER - I: Methodological aspect of Economic Research (Marks 100)

UNIT – I

I. Research – Concept and types.

II. Motivation of research

III. Criteria of a good research

UNIT – II Research Methodology

I. Scientific Method

II. Research Design

III. Sampling

UNIT – III

I. Formulation of research Problem

II. Data Collection – Method, Tool, Technique

III. Data Processing

UNIT – IV Computer application in Social Research

I. Statistical Tool

II. Statistical Software

III. Data entry and Commands for Analysis

UNIT – V Research Writing Method.

Paper – II: Project Work (Marks 100)

Part – I: Project Work Report (Marks – 50)

The candidate shall review minimum 20 research articles of a broad research area from referred journals of the discipline. After reviewing the research articles the candidate shall submit a summary chronologically developing the arguments to the Department within two months from the beginning of the Course. On the basis of the review of literature the candidate shall prepare a Synopsis Including.

I. Research Topic.

II. Review of Literature.

III. Gaps in earlier Studies.

IV. Statement of Problem.

V. Objectives

VI. Hypotheses

VII. Methodology

VIII. Plan of the Study

Part – II: Project Work Presentation (Marks – 30)

The candidate shall present a seminar on the basis of the suggestions made in the seminar. Final examination will be conducted with the help of an external examiner in the presence of the internal examiner.

Part – III: Project Work Viva-voce (Marks – 20)

SCHEME OF EXAMINATION

&

SYLLABUS

FOR M.Sc. (ELECTRONICS)

(SEMESTER SYSTEM)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Electronics

EFFECTIVE FROM JULY 2017

School of Studies in Electronics and Photonics

Pt. Ravishankar Shukla University

Raipur (C.G.) 492010

PH: - 0771-2262639

WEBSITE: -www.prsu.ac.in

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

Scheme of Examination

M.Sc. (Electronics)

(Semester System)

EFFECTIVE FROM JULY 2017

M.Sc. Electronics is a four semester course spread over the period of two years. Every semester course consists of four theory courses and two laboratory courses ,each theory course carrying weight-age of 100 marks (4 credits) and lab course of 100 marks (2 Credits). However, in the final semester, there will be one project in lieu of one practical.

The School of Electronics, Pt Ravishankar Shukla University, Raipur offers this course on its campus. It is designed to offer in depth knowledge of the subject starting from its basic concepts to the state of art technologies in use today. Students are also provided extensive laboratory training on the course content and the current requirements of industries and R and D. In the final semester every student has to undertake a project. Advanced papers are offered to the students in the areas of Communications, Photonics, Digital Signal Processing, Embedded Systems, and Power Electronics and Neural network. In addition the course caters to the requirements of providing complete exposure to NET/SET syllabus for Electronics formed by the U.G.C.

The following shall be the scheme of examination for the course:

Semester – I

Theory	Marks			Credits
	Theory	Internal	Total	
Paper I (Code EL 101) Analog Integrated Electronics and Physics of Electronic Materials	**80**	**20**	**100**	**4**
Paper II (Code EL 102) Digital Design and Applications	**80**	**20**	**100**	**4**
Paper III (Code EL 105) Signals, Mathematical and Computational Methods in Electronics	**80**	**20**	**100**	**4**
Paper IV(Code EL 104).Optical , Quantum and Organic Electronics	**80**	**20**	**100**	**4**

Practical	Experiment	Viva	Internal	Max	Credits
1. Lab course "A" Analog Electronics Lab	60	20	20	100	2
2. Lab course "B" Digital electronics Lab	100	60	20	100	2
Total				600	20

Total Marks for Semester I=600 & Credit = 20

Semester – II

Theory	Marks			Credits
	Theory	Internal	Total	
Paper I (Code EL 201) Network Analysis and Synthesis	80	20	100	4
Paper II (Code EL 202) Microprocessor and C++ Programming	80	20	100	4
Paper III (Code EL 203) Analog and Digital Communication Systems	80	20	100	4
Paper IV (Code EL 204). Electromagnetic Plane wave, Transmission lines and Microwave Devices	80	20	100	4

Practical	Experiment	Viva	Internal	Max	Credits
1. Lab course "C" Analog and Digital Communication Lab	60	20	20	100	2
2. Lab course "D" –8085 Microprocessor Programming, Study Cards and Interfacing Lab	60	20	20	100	2
Total				600	20

Total Marks for Semester II=600 & Credits=20

Semester – III

Theory	Marks			Credits
	Theory	Internal	Total	
Paper I (Code EL 301) Advanced Microprocessor and Interfacing	80	20	100	4
Paper II (Code EL 302) Data Communication, Mobile and Wireless Communication	80	20	100	4
Paper III (Code EL 303) Instrumentation and Measurement Or Optional Paper III(Code EL 303)Photonics	80	20	100	4
Paper IV (Code EL 304). Power Electronics, Information Theory and Coding	80	20	100	4

Practical	Experiment	Viva	Internal	Max	Credits
1. Lab course "E" - Optical Electronics, Transducer and Instrumentation Lab	60	20	20	100	2
2. Lab course "F" – 8086 Microprocessor Programming, Interfacing and "C++" Programming Lab	60	20	20	100	2
Total				600	20

Total Marks for Semester III = 600 & Credits=20

Semester IV

Theory	Marks			Credits
	Theory	Internal	Total	
Paper I (Code EL 401) Digital Signal Processing	80	20	100	4
Paper II (Code EL 402) Optical and Satellite Communication	80	20	100	4
Paper III (Code EL 403) Automatic Control System and Artificial Neural Network	80	20	100	4
Paper IV (Code EL 404). Embedded System and Microcontroller	80	20	100	4

Practical	Experiment	Viva	Internal	Max	Credits
1. Lab course "G" - Optical Communication and 8051 Programming Lab	60	20	20	100	2
2. Project & Seminar	80	20	-	100	2
Total				600	20

Total Marks for Semester IV = 600 & Credits=20

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

SYLLABUS PRESCRIBED FOR THE EXAMINATION OF

M. Sc. Electronics

July - Dec 2017

Semester – I

Paper 1 - Analog Integrated Electronics and Physics of Electronic Materials

Max. Marks: 80, Min. Marks: 16
Student should be allowed to use Programmable Scientific Calculator in Examination hall

Unit I – Physics of Electronic Materials

Crystal structures, classification of crystals, lattices, reciprocal lattice, Miller indices, amorphous materials. Lattice Vibration and Phonons, Bloch theorem, Phonons, Nearly Free electron theory. Dielectric properties, electronic polarisability, Clausius Mossotti relation, dielectric Constant static and frequency dependent

Semiconductors: Direct and indirect band gap methods to determine the Forbidden gap, mobility and conductivity, intrinsic and extrinsic semiconductor, Impurities, carrier concentration, electrical properties of Ge and Si, experimental methods to study the electrical parameters, Drift and Diffusion, Hall effect, electrons and phonons in semiconductors.

Unit II –Transistor analysis at low frequencies

Review - Transistor Characteristic viz CE, CB and CC configuration of BJT, Principle of operation and characteristic of JFET and MOSFET,

Transistor at low frequency - Graphical analysis of CE configuration, Transistor hybrid Model, h- Parameters and their variations, analysis of a transistor amplifier circuit using h-parameter, Emitter follower, comparison of transistor amplifier configurations, Miller's Theorem and its dual, cascading transistor amplifiers, Simplified hybrid model – CE and CC configuration, common emitter amplifier with an emitter resistance.

Transistor biasing and stabilization

Unit III – Multistage and Feedback Amplifiers Analysis

Transistor at high frequencies, Hybrid – pi model, gain bandwidth product.

Multistage Amplifiers Analysis - Introduction, frequency response of an amplifier, band pass of cascaded stages, Coupling scheme - RC coupled, transformer coupled and direct coupled amplifiers, low frequency response of RC coupled stage, effect of emitter bypass capacitor on low frequency response, high frequency response of two cascaded CE transistor stages.

Feedback Amplifiers – Basic concept, types of feedback method of analysis of a feedback amplifier.

Unit IV – Operational Amplifier, Characteristics and Applications

Basic operational amplifier and its characteristics, characteristics of ideal and practical operation amplifier, parameters of operational amplifier, measurement of operational amplifier parameters, frequency response of operational amplifier,
Linear and Nonlinear Circuits analysis using operational amplifier - Inverting and Non inverting Amplifiers, Differentiator, Integrator, Voltage to current converter, Instrumentation amplifier, Sine wave Oscillator, Low pass and band – pass filters, Comparator, Multivibrator and Schmitt trigger, Triangular wave generator, Log and Antilog amplifiers

Unit V - Integrated Circuit Fabrication and Characteristics

Integrated circuit technology - SSI, MSI, LSI, VLSI, basic monolithic integrated circuits, planner process, epitaxial growth, masking and etching, diffusion of impurities, bipolar transistor fabrication, fabrication of FET,CMOS technology, monolithic diodes, integrated registers, integrated capacitors and inductors, monolithic circuit layout, metal semiconductor contact, packaging and characteristic of integrated circuit components.

TEXT BOOKS

1. Integrated electronics – Analog and digital circuits and systems Jacob Millman, Cristos, C. Halkias, Tata Macgraw- Hill
2. Electronic Devices and Circuit Theory, 9th ed. Boylestad & Nashelsky PHI
3. Microelectronics - Jacob Millman, Arvin Grabel, Tata Macgraw- Hill
4. Physics of Semiconductor Devices: Shur PHI
5. A Textbook of Applied Electronics (M.E.) Sedha R S, S. Chand Pub.
6. Physics of Semiconductor Devices: Sze
7. Ramakant A.Gayakwad, 'OP-AMP and Linear IC's', Prentice Hall
8. Principal of Electronic Material & Dev: S O Kasap

Paper 2 - Digital Design and Applications

Max. Marks: 80, Min. Marks: 16
Student should be allowed to use Programmable Scientific Calculator in Examination hall

Unit I - Basic Logic Circuit

Introduction of basic gates, universal gates, number systems and codes, Boolean algebra, switching characteristics of semiconductor devices, logic gate characteristics - speed of operation, power dissipation , figure of merit, fan in, fan out, noise margin. Logic families - RTL, DTL, TTL, ECL interfacing, ECL and TTL, MOS logic - MOSFET NAND and NOR gates, CMOS inverters, CMOS - NAND and NOR gates, interfacing CMOS and TTL, inter facing CMOS and ECL, comparison of logic families.

Unit II - Combinational Logic Design

Simplification of Boolean algebra using K- map, minterm and maxterm, design of binary adder, subtractor , digital comparator, parity generator/checkers, priority encoder, BCD to 7 - segments decoder, multiplexer , multiplexer tree, demultiplexer and demultiplexer tree.

Unit III - Sequential Circuit Design

Excitation table of flip flops – S - R, J-K, Master-Slave – JK, D and T flip-flops, clocked flip flop design – conversion of one form of flip flop to another type.

Analysis of clocked sequential circuits - State equation, state table, state diagram, state input equations, analysis with - flip flops, JK flip flops and T flip flops.

State reduction and assignment, design procedure – synthesis using D flip flops, JK Flip flops and T flip flops.

Unit IV - Registers, Counters and A/D, D/A converters

Registers - Shift registers, application of shift registers, serial to parallel converter, parallel to serial converter.

Counters - Ring counter, modulo- n- counter, synchronous counter –ripple counter (binary, BCD) and up-down counter, asynchronous counters - ripple counter (binary , BCD) and up-down counter. Other counters – counter with unused states, ring counter, Johnson counter.

A/D, D/A Converters – D/A weighted register type, R/2R ladder type, D/A converter specifications, A/D converters - successive approximation type, parallel comparator, dual slop ADC using voltage to frequency conversion and frequency to time conversion.

Unit V - Semiconductor Memories

Memory organization and operation , write operation, read operation , expanding memory size and word capacity , classification and characterization of memory, sequential memory ROM, dynamic ROM, RAM cell, content addressable memory (CAM), PLA, CCD, PAL.

TEXT BOOKS

1. Digital Design - M. Moris Mano, PHI Publication.
2. Modern Digital Electronics - R.P. Jain, Tata Mcgraw.
3. Digital Principal and Application - Malvino Leach, Tata Macgraw Hill
4. Digital Systems: Principles and Applications, 10th ed. Tocci**,** Widmer & Moss PHI

PAPER 3 – Signals, Mathematical and Computational Methods in Electronics

Max. Marks: 80, Min. Marks: 16
Student should be allowed to use Programmable Scientific Calculator in Examination hall.

UNIT I - Signal Analysis

Introduction – Classification of signals and systems, some ideal signals, energy signal,

Power signals, energy and power spectral densities.
Fourier Series, Complex Fourier Spectrum, The Fourier Transform, Continuous Spectrum, Fourier Transform involving Impulse Function, Properties of Fourier Transform, Fourier Transform of Periodic Functions, Convolution, Sampling Theorem.

UNIT II – Linear Systems and State Variables Techniques

Introduction, System Function (Transfer Function), Distortion less Transmission, Paley-Wiener criterion, Correlation, Autocorrelation

State Variables Techniques - State variable concepts, form of the state equations, time domain and frequency domain solution of state equations, state transition matrix, state equations for networks, state equations from transfer functions.

UNIT- III- Probability and Random Signal Theory

Introduction, set theory, Introduction to Probability, Conditional Probability Statistical Impedance, Baye's Theorem, Random variables, Discrete and Continuous Random Variables, Joint Distributions, Characteristics of Random Variables, Binomial, Poisson and normal Distributions, Uniform and other Distributions, Random and Markov Processes.

UNIT IV - Mathematical Methods

Laplace Transform – Definition, transform of elementary function, properties of Laplace transform, convolution theorem, application to differential equation, simultaneous Linear equations with constant coefficients, unit step and unit impulse function

Special Function - Bessel equations, recurrence formula, expansion for Jo and J1, values of J1/2, generating function for Jn(x), equation reducible to Bessel equation

UNIT V – Computational Methods

Numerical Differentiation and Integration

Finite Differences, Derivatives using Forward, Backward and Central Difference Formulae, Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's rules, Weddle's rule.

Numerical methods for Solution of Ordinary Differential Equation-Picards Method ,Taylor Series Method , Eulers and Modified Eulers methods, Runge and Runge Kutta Methods , Predictor and Corrector Method.

TEXT BOOKS

1. Communication System- Analog and Digital - R.P.Singh & S.D. Sapre TMH.
2. Signal and System - Nagrath, Sharan and Ranjan. Mcgraw hill Publishing
3. Signal and SystemsRodger E. Ziemer. Continuous and Discrete 2nd ed.Maxwell Macmillan Int. Edition,
4. Higher Engineering Mathematics - B.S. Grewal, Khanna Publications
5. Numerical Methods - Kandaswami,Thilagavathi and Gunavathi, S.Chand & Co.
6. An introduction to Numerical methods: A MATLAB approach by Abde/Wahab Kharab, Ronald B Guenther

Paper 4-Optical, Quantum and Organic Electronics

Max. Marks: 80, Min. Marks: 16
Student should be allowed to use Programmable Scientific Calculator in Examination hall

Unit I - Quantum Electronics

Coherent light sources, basic principle of lasers, laser pumping, stimulated emission, light amplification, threshold condition, Einstein's coefficient, laser rate equations for two, three and four level laser systems, variation of power around threshold, rectangular cavity, open plane resonator, mode locking and Q-switching of lasers.

Unit II - Applications of Quantum Electronics

Types of Lasers - Ruby Laser, He-Ne laser, Ar-ion laser, Co_2 laser, dye laser and semiconductor laser

Laser Applications - Laser in manufacturing, laser cutting of material, laser marking, laser transmitter, measurement of distance through Laser

Unit III - Optical Display Devices

Optical Display Devices - LED- Basic principle of operation, radiative recombination process, the spectrum of recombination process, the internal quantum efficiency, double hetrostructure, response time of LED, carrier configuration and modulation bandwidth, edge emitting LED, LED design. Liquid Crystal Displayconstruction, basic principle of emission, Plasma Display- construction, basic principle of emission

Unit IV - Photo Detectors and Organic Electronics

Photodiodes- General Principles, quantum efficiency, silicon photodiodes, hetrojuncton photodiodes, schottkey barrier diode, PIN photodiodes, avalanche photodiodes, and phototransistors.

Introduction to Organic Electronics, Organic versus Inorganic solids, Molecular materials, Organic Semiconductors, Electronic states in conjugated molecules, Conjugated polymers

Unit V - Electro-Optical Devices

Electro-Optic Effect - Kerr effect, Pockels effect, Farady effect, Electro-Optic Modulator-Electro-optic phase modulator, electro-optic amplitude modulator, kerr modulator

Acousto-Optic Effect - Raman-Nath and Bragg Diffraction, Raman-Nath acoustooptic Modulator, bragg modulator, acousto-optic modulator.

Magneto-Optic Effect - Faradays effect, magneto-optic modulator

TEXT BOOKS

1. Optical Electronics - Ghatak Thyagarajan, University Press
2. Optical Communication System - John Gower, PHI Publication.
3. **Optoelectronics Devices & Systems - S.C. Gupta, PHI Publication**
4. Optoelectronics - An Introduction - J.Wilson and J.F.B. Hawkes, PHI Publication.

5. Semiconductor Optoelectronic Devices, 2nd ed. **Bhattacharya PHI**
6. Pope and Swenburg, Electronic Processes in organic crystals and polymers, 2 nd Ed., Oxford
7. Organic molecular crystals, E.A. Sininsh EA and V. Capek.

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
SYLLABUS PRESCRIBED FOR THE EXAMINATION OF
M. Sc. Electronics
Jan-June 2018
Semester-II

Paper 1-Network Analysis and Synthesis

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Programmable Scientific Calculator in Examination hall.

2. Special graph paper viz. Polar graph & Semi log graph papers should be provided to the students in the examination hall.

Unit I - Mesh and Node Analysis and Network Theorems

Mesh and Node Analysis - Kirchhoff's laws , Star and Delta conversion, source transformation, mesh and node analysis of electric circuits, response of the network by differential equation and Laplace transform method ,initial conditions in the network.

Network Theorems - Thevenin's theorem, Norton's Theorem, Superposition, Millman theorem, Maximum power transfer theorem, and Reciprocity theorem, Tellegen theorem and Substitutions theorem .

Unit II – Coupled Circuit, Waveform Synthesis and Graph Theory

Coupled Circuit – Dot convention and magnetic coupling

Waveform Synthesis – Standard signals, unit step function, ramp function, impulse function, initial and final value of f(t) from F(s), the convolution integral.

Graph Theory - Concept of a network graph, twigs and links, trees, co trees ,formation of incidence matrix ,cut-set matrix, tie-set matrix and loop currents, analysis of networks ,network equilibrium equation ,duality, network transformation

Unit III - Network Function and Frequency Response Plots

Network Function - Network function for one port and two port, the calculation of network functions- ladder networks and general networks, pole and zero of network functions, restrictions on pole and zero locations for driving point functions ,restrictions on pole zero locations ,time domain behavior from the pole and zero plot, stability of active networks.

Frequency Response Plots- Magnitude and Phase plots, Root Loci, Bode Diagrams, Nyquist- Stability Criterion

Unit IV -Two Port Network Analysis

Relationship of two port variable , Z-parameters, Y- parameters, Hybrid parameters, ABCD parameters, conditions of reciprocity and symmetry, inter-relationship between parameter of two port network, different types of interconnections of two port networks.

Unit V- Network Synthesis

Concept, Procedure of Synthesis, Reactive Networks, Properties of Expressions of Driving point Admittances of L-C Networks, Pole-Zero Interpretations in L-C Networks. L-C Networks Synthesis-Foster's Canonic Form (First and Second Foster form), Significance of Elements in the Foster form, Cauer Canonic form of Reactive Networks-First and Second form of Cauer Networks, Applicability of Foster and Cauer forms, R-L & R-C Network Synthesis by Foster form, Identification of foster form , Identification of Admittance, L & R-C Network Synthesis by Cauer form, Identification of Immittance Function in Cauer form, Determination of end elements in Foster and Cauer R-L & R-C Networks.

TEXT BOOKS

1. Networks and System - D. Roy Choudhary, New Age International
2. Network Analysis: M.E. Van Valkenburg.PHI
3. Circuit theory (analysis and synthesis) - A. Chakrabarti, Dhanpat Rai and co.
2. Network Synthesis: M.E. Van Valkenburg.PHI

Paper 2 - Microprocessor and C++ Programming

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I - Micro-Computer System & 8085 Microprocessor Architecture

Microcomputer System & its operation- Overview of a basic Microcomputer structure and operation, Ideal microprocessor, Microprocessor evolution and types, Microprocessor initiated operation & Bus organization, internal data operation & registers, peripheral initiated operation.

Memory- Memory organization, memory map, memory & instruction fetch, types of memory. Interfacing Devices - Tri-state devices, buffer, decoder, encoder, latch.

Microprocessor Architecture - Introduction to 8085 Microprocessor, pin diagram & its function, bus timing, demultiplexing of address & data Bus, generation of control signals, microprocessor architecture of 8085, decoding & execution of an instruction, memory interfacing, timing diagram of memory, read & write cycle.

Unit II - Instruction Set & Programming of 8085, Stack & Subroutines

Instruction classification, instruction format, addressing modes, basic instructions and simple programming ,Additional Instructions DAA, DAD, LHLD.SHLD, PCHL, STC, XCHG, XTHL and programming, Code Conversion- BCD to Binary, Binary to BCD, Binary to ASCII, ASCII to Binary.

Stack & Subroutines - Concept of stack, PUSH/POP instruction, illustrative example, Concept of subroutines, call & return instruction, conditional call & return instruction, advanced subroutines concept.

Unit III - Counters, Time Delay, Interrupts & Interrupt Controller

Counters and Time Delay -Time delay using one register, Time delay using a register pair, flow chart & program for a hexadecimal counter and modulo 10 counter, delay calculations.

Interrupts - Interrupts of Intel 8085, hardware and software interrupts, vectored/non vectored interrupts, maskable/non- maskable interrupts, Interrupts priority concept, DI,EI, RIM, SIM instructions, pending interrupts.

Programmable Interrupt Controller - Architecture of 8259, initialization command words (ICW's), operational command words (OCW's), 8259 interrupts mode, simple initialization program for 8259.

Unit IV - Data Transfer & Peripheral Interfacing Devices

Format of data transfer, modes of data transfer, microprocessor controlled data transfer, peripheral control data transfer, peripheral I/O instruction, serial I/O lines, SOD and SID.

Programmable Peripheral Interfacing Devices - Programmable keyboard / display interface – 8279, Programmable peripheral interface – 8255, Programmable interval timer – 8253, Programmable Interrupt controller – 8259, Synchronous data communication device – 8251, DMA Controller 8257, RS 232 interface.

Unit V- "Object Oriented Programming

Principles and Basic concepts, OOPs languages, Application of OOPs, Simple programming in C++, Tokens, expressions and control structures Tokens, keyword, identifiers and constants, declaration of variables, operators in C++, manipulators, control structure.

Functions in C++ - main function, function references, return references, default arguments and constant arguments. Classes and Objects- C structures revisited, specifying class, C++ program with classes, arrays within Classes, memory allocation of objects, arrays of objects, returning objects, pointer to members, local classes.

TEXT BOOKS

1. Microprocessor Architecture Programming & Application with 8085/8080 Ramesh S. Gaonkar Penram Int. Pub2

2. 0000 to 8085: Introduction to Microprocessors for Engineers and Scientists, 2nd ed. Ghosh & Sridhar PHI

3. Fundamentals of Microcomputer & Microprocessor r - B.Ram, Dhanpat Roy Pub.

4. Object Oriented Programming E - Balaguruswamy with C++ Second Edition

5. PROGRAMMING IN C++ P.B.MAHAPATRA, S Chand & Co

Paper 3- Analog and Digital Communication Systems

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I Radiation and Propagation of Waves - Electromagnetic Radiation –Effect of environment, Propagation of waves –Ground Wave and Sky wave Propagation – The ionosphere – Space waves – Tropospheric scatter propagation – Extraterrestrial communications

Introduction to Communication Systems -Block diagram of communication system – Transmitter, Receiver, Modulation, Bandwidth requirements

Noise - Source of Noise, External Noise –Atmospheric Noise, Extra Terrestrial Noise, Industrial Noise, Internal Noise-Shot Noise, Resister or Johnson Noise ,Calculation of noise in Linear Systems, Noise Bandwidth, Power, Noise Temperature, Noise in Two Port Networks, Noise Figure, Cascaded stages, Measurement of Noise Figure, Signal in presence of Noise, Narrowband Noise.

Unit II – Amplitude Modulation System

Amplitude Modulation - Frequency spectrum of AM wave, Representation of AM wave, Power relation in AM wave, Single side band techniques – Suppression of carrier, suppression of side bands, vestigial side band,

Transmitters - Classification of radio transmitter, AM radio transmitter, Generation of AM -Transistor as AM Generator, balanced modulator, filter method, phase shift method, third method.

Receivers – Classification of radio receiver, basic function of AM receiver, tuned radio frequency receiver, super heterodyne receiver, AM demodulation – RC demodulator, square law demodulator. Noise in Amplitude Modulated Systems, Comparison of various AM systems,

Unit III – Angle Modulation System

Angle Modulation – Frequency modulation, analysis of FM waveform, frequency spectrum, Bessel function, Narrowband FM and Wide Band FM, Phase modulation

FM Modulators and Transmitters - Method of frequency modulation – Direct method – reactance modulator (FET and varactor diode method), Indirect Method, pre-emphasis and de-emphasis

FM Demodulators and Receivers – Super heterodyne FM receiver – block diagram, amplitude limiter, FM demodulator –phase discriminator, ratio detector, PLL demodulator. Comparison of AM, FM and PM, , frequency division multiplexing(FDM).

Unit IV - Pulse Modulation System

Pulse Amplitude Modulation - Natural Sampling, flat top sampling, equalization signal recovery to holding, PAM modulator and demodulator. Pulse time modulation (PTM)-Generation of PTM signals, PTM modulator and Demodulator, time division multiplexing (TDM).

Pulse Code Modulation- Quantization of signals, quantization error, pulse code modulation (PCM), companding, Bandwidth of PCM System, Noise in PCM System, Differential pulse code modulation, Delta modulation, Adaptive Delta modulation.

Digital Modulation Techniques - Introduction, Binary Phase Shift Keying (BPSK), Differential Phase Shift Keying (DPSK), Quadrature Phase Shift Keying (QPSK), Quadrature Amplitude Shift Keying (QASK) and Binary Frequency Shift Keying (BFSK).

Unit V – Monochrome and Colour Television

Elements of a TV System - Concept of Picture and sound transmission and reception, Flicker, Composite Video Signal, signal transmission and Channel bandwidth, Monochrome picture tube, Television Camera tube- Vidicon and CCD. Monochrome TV transmitter and receiver (Block Diagram), Essentials of Colour TV Three Colour theory, Lumina nce, Hue and saturation, Triniton Colour Picture tube, Block diagram of Colour TV transmitter and receiver, PAL Colour TV System. CCTV, HDTV, CATV and DTH, Concepts of Home Theatre

TEXT BOOKS

1. Principles of Communication Systems - Taub & Schilling, TMH
2. Principles of Communication Systems - George Kennedy, TMH
3, Communication System- Analog and Digital - R.P.Singh & S.D. Sapre TMH
4. Radio Engineering - G. K. Mithal G.K. Pub.
5. Monochrome and Colour Television - R.L. Gulati, New Age International, Wiley Eastern Ltd. New Delhi.
8. Advanced Electronic Communication Systems: Tomasi PHI
9. Television Engineering – A.M. Dhake, TMH
10. Electronic communication, Roddy and Coolen, PHI, New Delhi,

Paper 4 - Electromagnetic Plane Wave, Transmission Lines and Microwave Devices

Max. Marks: 80, Min. Marks: 16
1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

UNIT I - Electromagnetic Plane Wave

Electromagnetic Plane Wave - Electron motion in electric field , electron motion in magnetic field , electron motion in electromagnetic field, electric and magnetic wave equations, Maxwell equation, Poynting theorem, uniform plane wave and reflection, uniform plane wave propagation in free space and lossless dielectric, plane wave propagation in lossy media, Ionospheric propagation.

UNIT II - Transmission Lines and Antennas

Transmission Line - Basic equation , reflection and transmission coefficient , standing wave and standing wave ratio , line impedance and admittance, Determination of characteristics impedance, Fundamental of Smith Chart, Impedance Matching: Single and Double Stub Matching, microwave Coaxial Connectors.

Antennas – The Radiation mechanism, Current and Voltage distribution, Antennas gain, Antenna resistance, Bandwidth, Beam width and Polarization, effects of Antenna height, Dipole arrays, Folded dipole. Microwave Antennas - Parabolic reflector, Horn and Lens antenna, Special purpose antennas - Yagi, Log periodic and Loop antennas

UNIT III – Microwave Waveguides and Components

Waveguides - Rectangular Wave guide **–** TE and TM modes , power transmission, excitation in rectangular wave guide , circular wave guides – TE,TM and TEM mode,
Microwave Components - Waveguide Tee - E-plane tee, H-plane tee, Hybrid tee, scattering parameters (s-matrix), circulators, isolators , directional couplers.

UNIT IV – Microwave Sources and Measurements

Microwave Sources - Reflex Klystron - principle of operation of velocity modulation, power output and efficiency, electronic admittance, Cylindrical Magnetron – principle of operation, equation of electron motions, cyclotron angular frequency , power output and efficiency.

Microwave measurement techniques, - Microwave bench, precautions, power measurement, bolometric method, attenuation, VSWR, impedance, frequency and Q of the cavity, standing wave measurements, impedance measurement, cavity resonator, dielectric measurements.

UNIT V - Microwave Semiconducting and Avalanche Transit -Time Devices

Microwave Semiconducting Devices

Microwave Transistor **–** Microwave Bipolar Transistor – principle and amplification phenomenon, power frequency limitation, Microwave Tunnel Diode **–** principle and characteristics of microwave tunnel diodes, JFET operation and characteristics. Microwave

integrated circuit design, introduction, hybrid microwave integrated circuits (HMIC), monolithic microwave integrated circuit (MMIC), MIC materials, substrate material, conductor material, dielectric materials, resistive films, types of MIC'S, microwave monolithic integrated circuits (MMIC'S).

Transferred Electron Devices **–** Gunn Effect Diodes, GaAs diode Ridley Watkins Hilsum (RWH) theory – Differential negative resistance

Avalanche Transit -Time Devices - Read Diode- Avalanche multiplication, carrier current and external current, output power and quality factor. IMPATT Diodes and TRAPATT Diodes- Principles of operation, power output and efficiency

TEXT BOOKS

1. Microwave Devices and Circuits – Samuel Y. Liao, PHI Pub

2. Microwave Engineering – Annapurna Das, Sisir K. Das, Tata Mc Graw Hill.
3. Microwave and Radar Engineering - M. Kulkarni, Umesh Publication
4. Electronic Communication Systems - George Kennedy, 3rd Edition TMH
5. Introduction to electrodynamics by David J. Griffithe , PHI
6. Elements of engineering electromagnetics by Narayaaa Rao, PHI

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

SYLLABUS PRESCRIBED FOR THE EXAMINATION OF

M. Sc. Electronics

July-Dec 2018

Semester III

Paper - 1 Advanced Microprocessor and Interfacing

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit – I Architecture & Instruction set for 8086: Architecture and pin configuration of 8086, Instruction Format; Addressing modes, Data Transfer Instruction; Arithmetic Instructions; Branching and Looping Instructions, NOP and Halt, Flag Manipulation Instructions; Logical, Shift and Rotate Instruction. Byte and String Manipulation: String Instructions; REP Prefix, Table Translation, Number Format conversions. Assembler, Directives and Operators; Assembly Process; Translation of assembler Instructions, Programming of microprocessor 8086

Unit – II System Bus Structure

Basic 8086/8088 system bus architecture, Minimum mode Configuration, Maximum mode configuration; memory interfacing with 8086/8088 in minimum and maximum mode; System Bus Timings, Bus Standards, Interrupts of microprocessor 8086

Unit – III Architecture of Interfacing Devices

Programmable interrupt controller (PIC) 8259, Programmable DMA Controller (8257). (Architecture and Functioning only) 8-bit ADC and DAC, Programming for Interfacing of 8253/8254, 8251, 8279, ADC and DAC with 8086.

Unit – IV Architecture of 32 bit Microprocessors

Intel 80386 Architecture –Special 80386 Registers –Memory management – interrupts and exceptions – management of tasks –Real, protected and virtual 8086 mode-Introduction to 80486 microprocessor – Architecture ; Comparison with 80386 processor

The IBM PC Motherboard and Drives - Motherboard Components, System Resources, ROM BIOS Services

Drives - Principles of Magnetic Storage, Floppy Disk Drive, Hard Disk Drive, IDE Interface, SCSI Interface, CD-ROM Drive, BIOS Disk Drive Services.

Unit-V High End High Performance Processors

Instructions level Parallelism and Superscalar processors, Advanced Design features, Pentium IV, Power PC, Concept of Pentium Dual Core and Core 2 Duo processors. Mobile Phone Processors IA 64 Architecture General organization, Predication, Speculation and Software pipelining, Itanium organization, TRIPS (Tera-op, Reliable, Intelligently adaptive Processing System),Future trends in high performance processors.

TEXT BOOKS

1. Microcomputer System-The 8086/8088 Family,Architecture,Programming & Design - Y. U. Cheng Liu & A.Gibson, PHI.
2. Microprocessor & Interfacing - Doughlas V.Hall,Tata McgrawHill.
3. The Intel Microprocessor - Barry&Barry,PHL
4. Advance microprocessors and peripheral - Roy and Bhurchandi, PHI
5. Computer Organisation & Architecture - William Stallings,Pearson
6. The Intel Microprocessors 8086/8088, 80186/80187, 80286, 80386. 80486.
7. Pentium Processors - Architecture, Programming and interfacing, PHI, B.B. Brey

Paper 2-Data Communication, Mobile and Wireless Communication

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I- Data Communication

Data Signal, Signaling & Data Transmission Media, Communication Mode-Half Duplex/Full Duplex, Data Communication -Synchronous/Asynchronous Transmission, Serial/Parallel Data, Switching & Multiplexing-Circuit Switching, Message Switching, Packet Switching, Network Topology-Bus/Star/Ring/Mesh Topology, LAN, OSI Reference Model, Network Protocol(TCP/IP).

Unit II- Introduction to Mobile and Wireless Devices

Mobile and wireless devices, history, applications wireless transmission, frequencies for radio transmission, regulations, signals, antennas, signal propagation, multiplexing, modulation, wireless LANs and wireless WANs, spread spectrum, FHSS and DSSS spread spectrum technology, cellular systems, medium access control, specialized MAC.

Unit III- Telecommunications and Broadcast Systems

GSM, mobile services, system architecture, GSM subsystems, GSM communication frame, localization and calling, handover, security, new data services, satellite systems applications, GEO, LEO. MEO, routing, localization, broadcast systems, cyclic repletion of data.

Unit IV- Wireless Networks and others 3G Technologies

Wireless LAN, infrared v/s radio transmission, infrastructure and adhoc networks, IEEE 802.11, architecture (details of protocol not required), DFWMAC schemes, MAC frames, MAC management, roaming, HIPERLAN (just basics, frame and protocol details not required), Bluetooth, applications, physical layer, modes MAC layer, packet format, networking security, link management, brief discussions (frame details and protocols not required) on GPRS, DECT, TETRA, UMTS, IMT-2000, CDPD.

Unit V- Mobile Network and Transport Layers

Mobile network layer, requirements, entities, IP packet delivery, agent advertisement and discovery, registration, encapsulation and tunneling, optimization, messages, reverse tunneling, IPv6, DHCP, Mobile IP, DHCP, ad-hoc networks, mobile transport layer, traditional TCP, indirect TCP, snooping TCP, mobile TCP, fast transmit/fast recovery, transmission/time out freezing, selective retransmission, transaction oriented TCP.

TEXT BOOKS

1. Data Communication & Networking - Behrouz A Foruzon.
2. Wireless communications and networking" William Stallings, PHI
3. Data and Computer Communications – By William Stalling., 7th Ed., PHI
4. Mobile communications"-by Johan schiller, PEA, 2nd ED
5. Mobile and personal communications systems and services" Rajpandya, PHI
6. Computer Networks - Tanenbaum, PHI.
7 Data Communications and Distributed Networks, 3rd ed. Black PHI
8 Computer Networks: Protocols, Standards and Interfaces, 2nd ed. Black PHI

Paper –3 Instrumentation and Measurement

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I-Concept of Measurement

Basic concept of Measurement, Performance & Static Characteristics, Error in Measurement, Types of Errors-Gross, Systematic & Random, Dynamic Characteristics, Zero

Order, First Order,& Second Order System, Real Time Element, Specification & Testing of Dynamic Response.

Unit II- Transducers

Fundamental Concept & Transducers Classification Resistance, Capacitance, inductance, Piezoelectric, Thermoelectric, Hall effect, Techogenerator, Optical & Digital Transducers, Measurement of Displacement, Velocity, Acceleration, Force, Torque, Strain, Speed & Sound, Temperature, Pressure, Flow, Humidity, Thickness.

Unit III- Instrumentation Electronics

Instrumentation Amplifiers, Basic Characteristics, D.C. Amplifiers, Isolation Amplifiers, Feedback Transducers system, feedback Fundamentals, Inverse Transducers, Temperature Balance System.

Signal Processing Circuits-Phase Sensitive Detection, Absolute Value Circuit, Peak Detector, Sample & Hold Circuit, RMS Converter, Logarithmic Amplifier, Frequency to Voltage & Voltage to Frequency Converter, waveform Generators, Lock in Amplifiers, SMPS, UPS.

Unit IV-Measuring Instruments

Measuring Instruments- Measurement of R, L, C Bridge, Voltage, Current, Energy, Frequency/Time, Block diagram, working principle and procedure of operation of Digital Voltmeter, Digital Multimeters, Digital Frequency Meter, Q Meter, Digital Storage Oscilloscope

Electrometer, Spectrum analyzers, Impedance analyzer, Network analyzers, Logic analyzer, Semiconductor parameter analyzer

Unit V-Biomedical Electronic Instrumentation and Measurements

Introduction to biomedical instrumentation, sources of bioelectric potentials, electrodes-electrode theory, biopotential electrodes, biochemical transducers, cardiovascular measurements- electrocardiography, measurement of blood pressure, blood flow and heart sound, plethysmography, the elements of intensive care monitoring; calibration and reparability of patient monitoring equipment, pace makers.

TEXT BOOKS

1. Instrumentation Devices & Circuit System -Rangan,Sharma& Mani,
2. Transducers& Instrumentation -D.V.S.Murthi.PHI
3. Biomedical instrumentation and measurements – Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer
4. Electronic Instrumentation - H. S. Kalsi, 2nd Edition, tata Mcgraw Hill
5. Electronic Instrumentation and Measurements Bell PHI

Or
Optional Paper 3 - Photonics

Max. Marks: 80, Min. Marks: 16
Student should be allowed to use Programmable Scientific Calculator in Examination hall

Unit I- Optical Radiation
Theory of Light, Light as Electromagnetic wave, Polarization of Light, Principle of superposition, Interference, Diffraction, Scattering, Photon nature of light, Light wave in homogeneous medium, Plane Electromagnetic Wave, Maxwell's Wave equation and Diverging Waves.

Unit II - Radiometry & Photometry
Photometry and radiometry-'quantities and units, colourimetry- chromaticity coordinates UCS diagrams, colour temperature, visual basis of colourimetry, Human eye and color deficiency, color vision model,Radiant Power & Radiant Energy, Units of Light,Units related to transmitter and receiver, Lambert Law, Fresnal's Equations, Amplitude, Reflection and Transmission Coefficient,

Unit III - Photovoltaic Devices
Introduction, Solar Energy Spectrum,Photovoltaic Device Principles,p-n junction Photovoltaic I-V Characteristics, Solar Cell parameters, Series resistance & equivalent circuit, Homojunction Solar Cells, Heterojunction Solar Cells, Thin Film Solar Cells, Material requirements

Unit IV- Non Linear Optical processes
Introduction, Second Harmonic Generation, propagation of EMW through second order nonlinear media, experimental technique in study second order non linearitySelf Focussing and Defocussing, Optical Parametric Interactions, parametric oscillations, Four Wave Mixing, Multiphoton Absorption.

Unit V -Advances in Photonics
Raman Scattering, Photrefractive effect, Optogalvanic effect, Photothermal Deflection effect, Photorefraction in diffusing medium, Squeezed state, Optical Solitons, Optical Bistability, Optical interconnect, Photonic switches, Optical Computers, Ultrafast phenomena

TEXT BOOKS
1. Optical Electronics - Ghatak Thyagarajan, University Press
2. Optoelectronics An Introduction: Wilson & Hawkes PHI

3. Optoelectronics & Photonics S.O.Kasap, Pearso
4. Optoelectronics Devices & Systems - S.C. Gupta, PHI Publication

Paper 4- Power Electronics, Information Theory and Coding

Max. Marks: 80, Min. Marks: 16
1. Student should be allowed to use Non Programmable Scientific Calculator in Examination Hall

Unit I- Thyristors,Controlled Rectifiers and Commutation Techniques

Thyristors – Thyristor Characteristics, Two- transistor model of Thyristor, Turn ON and Turn OFF of Thyristor, di/dt protection, dv/dt protection, Type of Thyristors, Series operation and Parallel operation of Thyristors, Thyristor Firing Circuits, Unijunction Transistor. Controlled Rectifiers – Single Phase semiconverter with RL load, Single Phase full converter with RL load

Thyristor Commutation Techniques – Natural Commutation, Forced Commutation, Self Commutation, Complementary Commutation, External Pulse Commutation,

Unit II- AC Voltage Controllers, DC Choppers and Inverters

AC Voltage Controllers –Introduction, Principle of ON-OFF control, Principle of Phase control, Single Phase bi-directional controllers with inductive loads, Cycloconverters.

C Choppers – Principle of operation, Classification of Choppers – Class A, Class B, Class C, Class D and Class E Choppers.

Inverters-Introduction, classification of Invertors, Single phase, full bridge Voltage source inverter with RL load,

Unit III- Power Drives- DC Motor and AC Motor

DC Motor – Basic Characteristics, Speed control of DC motors – Armature voltage, Armature Resistance and Field flux controls, Solid state speed control of DC motor – Single Phase half wave converter, Single phase full wave converter.

AC Motor (Induction Motor) – Construction & Principle, Speed control of Induction motor – Stator voltage, Stator frequency, Pole changing, Rotor resistance and Slip power recovery control, Basic Construction and principle of Stepper motor

Unit IV – Power conditioners:

EMI/ RFI filter, CVT, Voltage regulators, Solid state regulators, UPS online & OFF line, reliability of UPS system. Batteries used for UPS, Important terms related to the UPS System & comparison of UPS system.

Applications of Power Electronics: Electronic ballast, Power factor correction, Induction heating, Dielectric heating.

Unit V – Information Theory : Introduction, Unit of Information, Entropy, Rate of Information, Joint Entropy and Conditional Entropy, Mutual Information, Channel Capacity-noise-free channel, symmetric channel, Binary Symmetric channel & cascaded channel,

Shannon's Theorem, Continuous Channel, Capacity of a Gaussian Channel: Shannon Hartley Theorem, Bandwidth S/N Trade-off.

Coding – Introduction, Coding Efficiency, Shannon Fano Coding, Huffman Coding, Error-Control Coding, Block Codes, Convolution Codes.

TEXT BOOKS

1. Power Electronics - Muhammad H. Rashid, Prentice Hall of India, Second Edition, New Delhi
2. Power Electronics - A.K. Gupta & L.N. Singh, Dhanpat Rai Publishing Company, 1st Edition
3. Power Electronics - J. Asger, PHI Publication.
4. Communication System - R.P.Singh & S.D. Sapre TMH Analog and Digital
5. Power Electronics - R.M. Jalnekar & N.B. Pasalkar
6. Pspice Simulation of Power Electronic Circuits: Raymond Ramshaw
8. Communication Systems-Simon Haykin, John Wiley & sons, NY, 4th Edition
9. Information theory- F.M Reza, McGraw Hill
10. A Text book of Electrical Technology (Volume –II) - B. L. Thereja & A K Theraja, S Chand & Co. Ltd (2006)
11. Principles of Electrical Machines- V K Mehta & Mehta,S Chand & Co. Ltd (2006)
12. Elecrtrical Machines – A Hussain, Dhanpat Rai & Co

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
SYLLABUS PRESCRIBED FOR THE EXAMINATION OF
M. Sc. Electronics
Semester-4
(Jan-June 2019)

Paper 1 -Digital Signal Processing

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I- Discrete Time Signals, Systems and Z-Transform

Discrete Time Signals, Systems-An introduction to analog signal processing, Discrete time signals & systems discrete time signals (sequences), Linear shift, Invariant systems, Stability & Casuality, linear constant coefficient Differential equations, Frequency domain representation of discrete time systems & signals, Sampling of continuous time signals.

Z-Transform- Introduction, Z-transforms (of finite length sequences, Right sided, left sided & two sided sequences) Inverse-Z transform, Z-transform theorems & properties – Region of convergence of rational Z-transform, Linearity, Shift of a sequence, multiplication

by an exponential sequence, Initial value theorem, Convolution of sequences, system functions.

Unit II-Discrete Fourier Transform

Discrete time fourier transform (DTFT), Representation of periodic sequence Discrete Fourier series(DFS), Properties of the Discrete Fourier series Linearity, Shift of a sequence, symmetry properties, periodic convolution; Fourier representation of finite duration sequences- The Discrete Fourier transform(DFT), Properties of discrete Fourier transform- Linearity, Circular shift of a sequence, Symmetry Properties, Circular convolution, Linear Convolution using the Discrete Fourier Transform.

Unit III- Fast Fourier Transform and Network Structures

Fast Fourier Transform (FFT), Inverse DFT, Radix FFT.

Signal Flow Graph Representation of Digital Network, Matrix Representation of digital Networks, Basic network structures for IIR systems (Direct form, cascaded form, and parallel form) Transposed forms, Basic network structures for FIR systems (direct form, cascaded form).

Unit IV- Digital IIR filter

Digital filter design techniquesdesign of IIR digital filters from analog filters, impulse invariance, Bilinear Transformation, Design examples: Analog Digital Transformation – Digital Butterworth Filters (impulse invariance, bilinear transformation), Digital Chebyshev filters (impulse invariance, bilinear transformation), Comparison of IIR and FIR Digital Filters.

Unit V- Digital FIR filter

Finite impulse response (FIR) Filter Design,Rectangular, Triangular, Hanning, Hamming, Blackman and Kaiser Window, Linear phase and Optimal Filter .

Application Digital Signal Processing-speech processing, speech analysis- short term Fourier analysis, cepstral analysis & linear predictive analysis, speech coding, channel vocoder

TEXT BOOKS

1. Digital Signal Processing - A.V. Oppenheim & Schafer. PHI
2. Discrete Time Signal Processing - A.V. Oppenheim & Schafer. PHI
3. Digital Signal Processing - Johny Jonson, Pearson PHI
4. Digital Signal Processing - Proakis
5. Digital Signal Processing -Vallavaraj, Salivahanan, Ghanapriya, THM

Paper 2-Optical and Satellite Communication

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I-Optical Fibers Optical fiber theory and applications, ages and disadvantages, parameters and types of optical fibers, Propagation of light through optical fiber ,single

mode step index fiber, multimode step index fibers, multimode graded index fibers, Comparison of Three types of Optical fibers, Acceptance angle and acceptance cone, Numerical Aperture, , construction of optical fiber cables,

Transmission Characteristics of Optical Fiber: Attenuation in Optical Fibers, loss mechanisms - absorption and Rayleigh scattering, Radiation losses, Wavelength dispersion, intermodal and intramodal, Bending losses, Coupling losses: misalignment and mismatch losses

Unit II- Principle of Optical Communication

Optical Fiber Communication System Block Diagram

Optical sources: Heterojunction LED, Edge emitting LEDs, Injection Laser LEDs

Light Detectors: PIN Diode and Avalanche Photodiode, Structure of In, GaAs APDs Characteristics of Light Detectors, Connector types and splices, Optical Fiber System Link Budget, Optical fiber manufacturing processes. Optical fiber testing and parameter (cut off Wavelength, loss per unit length, numerical aperture, bending loss, connector/spliceloss) measurement

Unit III- Optical Fiber Communication Systems and Applications

Typical Fiber Optic Communication System, Optical Transmitter, Optical Receiver, Optical Repeaters, Optical Amplifiers, semiconductor optical amplifiers, EDFA, Raman Amplifier. Basic idea of WDM and DWDM systems, System Architecture: Point to point link, Distributed Network, AN Fiber Optic Sensors in Health care, Optical Computing, Optical Logic Gates

Unit IV-Satellite Communication - I

Satellite Communication – Introduction, Kepler's laws, orbit, Power systems, Satellite Frequency Allocations and Band Spectrum, Elements of a Satellite Communication System, Active and Passive Satellites, Modem and Codec, Communication Satellite Link Design – General Link Design Equations, Effective Isolated Radiated Power (EIRP), System Noise Temperature, C/N and G/T ratio, Atmospheric and Ionosphere Effects on Link Design, Uplink Design, Complete Link Design, Interference Effects on complete link design, Earth Station parameters.

Unit V- Satellite Communication - II

Satellite orbits – synchronous orbit, orbital parameters, Satellite location with respect to the earth, Look Angles, Earth coverage and Slant range. Satellite Transponder model, Satellite RF Front End, Satellite Carrier Processing, Antenna – Antenna parameters, Gain, Resistance, Bandwidth, Beam-width and polarization, Parabolic antenna, Application of Satellite Communication in Television Direct Home Broadcast, Telephone services and Data Communication.

TEXT BOOKS

1. Optical Fiber Communication -G. Keiser, Mc. Graw Hill
2. Fiber Optics Communication -D. C. Agrawal
3. Satellite Communication -D.C. Agrawal, Khanna Pub.

4. Satellite Communication -R.M. Gagliardi
5. Fundamentals of Optical Fibre Communication: Satish Kumar PHI
6. Optical fibre and Laser Anuradha De New Age International Publishers
7. Optical Fiber Communication: V.S.Bagad Technical Publications
8. Optical Fiber Communications', John Senior: PHI.
9 Electronic communications, Roddy and Coolen, PHI, New Delhi,

Paper 3- Automatic Control System and Artificial Neural Network

Max. Marks: 80, Min. Marks: 16

1. Student should be allowed to use Non Programmable Scientific Calculator in Examination Hall

2. Special graph paper viz. Polar graph & Semi log graph papers should be provided to the students in the examination hall.

Unit I - Fundamental of Control System

Basic Definition, Classification of Control System, Open Loop & Closed loops System, Effect of feedback on System response, Impulse Response & Transfer Function, Block diagram, Block Diagram Reduction Techniques. Signal Flow Graph-Basic Definition in SFG, Rule for SFG, Properties of SFG, Masons Gain Formula.

Unit II -Time Domain analysis and Stability of Linear Control System

Time Response of Continuous Data system, test Signal ,Steady State Errors and error constants, Unit Step response, Time Domain specifications, time Response of first order System, Transient Response of Prototype second order System, effect of adding a zero to the system, Stability of Linear Control System-Absolute Stability, Relative Stability, Routh-Hurwitz Criterion-Ruth Tabulation, Special Cases.

Unit III- Frequency Domain Analysis and Frequency Response Plots

Frequency Domain Analysis - Frequency Response of closed loop control System, Frequency Domain Specifications of prototype Second Order System, Nyquist Stability Criterion and plot, Root Locus-basic properties, Relative Stability-Gain Margin & Phase Margin, Correlation Between Time & Frequency response, Polar Plot, Bode Plot.

Unit IV-State Variable Analysis and Controllors

State Variable Analysis and Design – Concept of state variables, state model, state model for linear continuous time system, diagonalization, solution of state equations, concept of controllability and observability, PID Controller.

Unit V- Artificial Neural Network

Introduction to ANS Technology-Models of a neuron, neural networks, viewed as directed graph, feedback from neurons to ANS, **Learning and training**- Hebbian, memory based, competitive, error-correction and learning. **Assignment problem** supervised and unsupervised learning. **Network architectures-Single layered**- feed forward networks,

multi-layered feed forward networks, Activation and Synaptic Dynamic. **Stability and convergence-** single layered perception least mean square algorithm, multilayered perceptions - backpropogation algorithm

TEXT BOOKS

1. Control systems Theory & Application - Samarajit Ghosh (Pearson Edu)
2. Control System Engineering - B.C.Kuo(PHI)
3. Control Systems Engineering - I.J. Nagrath, M. Gopal
4. Artificial Neural networks - B. Yagna Narayan
5. Neural Computing -Philips D. Wasserman
Theory and practice -Vannostrand Reinhold

Paper 4 – Embedded System and Microcontroller

Max. Marks: 80, Min. Marks: 16
1. Student should be allowed to use Non Programmable Scientific Calculator in Examination hall

Unit I- Introduction to Embedded systems:
Introduction, Application Areas, Categories of embedded systems, Overview of embedded systems architecture, Specialties of embedded systems, challenges and issues in embedded software development Recent Trends, hardware architecture, Software architecture, Application software, Communication Software, core platform development, boot sequence, development/testing tools.

UNIT – II
Introduction to Microcontrollers – Microprocessors and Microcontrollers - Introduction to Intel 8051/8751/8031 Microcontrollers – Architecture, Internal diagram, Data memory, Interrupt Structure, I/O ports, Timer / counters, Serial ports and Registers, Addressing modes.
Interfacing of Peripherals with 8051 Microcontroller - Interfacing of EPROM's, RAM's, PPI 8255, Programmable Interval Timer 8253/54, Display/Key Board Controller - 8279, interfacing of 8 bit A/D and D/A converters.

Unit III
Instruction set, 8051 assembly language programming , internal structure of 8051, power resetting, built up RAM and ROM, I/O Programming and Addressing modes.
Applications of 80C51 Microcontrollers - Interfacing of LCD Modules, Stepper Motors. System Design with 89C51 to monitor frequency, voltage, displacement, Temperature, speed, traffic light control system with s/W development.

UNIT – IV

Counter and time details, counter and timer programming using 8051, interrupt programming, types of interrupt. Asynchronous serial communication, data programming, RS232 standard, RS422 standard, 1488 and 1489 standard, GPIB, max 232 driver, serial communication programming

Unit - V

PIC Microcontrollers – Introduction to PIC 16C6x/7x family microcontrollers, Architecture, Registers, Register File Structure, Addressing Modes, Instruction set. Interrupt Structure, Timers, Counters, I/O Port Concepts, Peripheral Interfacing and Applications, Features of RISC architectures, CISC and RISC architecture comparison, advantages of RISC, Power saving methods

TEXT BOOKS

1.8051 Programming, Interfacing and Applications -K.J. Ayala, Penram Pub

2.8051 Microcontroller and Embedded systems -Muhammad Ali Mazidi & Janice Gillispie mazidi

3. Embedded systems - Raj Kamal, TMH

4. Embedded/Real Time Systems – Dr.K.V.K.K.Prasad, dreamtech Press.

5. Design with PIC Microcontrollers – John B.Peatman, Pearson Education Asia

6. PIC Microcontrollers: An Introduction to Microelectronics, Martin P. Bates, Elsevier.

BOOK FOR REFERENCE:

1. Intel Embedded Microcontrollers and Processors Vol. I

LAB COURSE "A"- ANALOG ELECTRONICS LAB

M.Sc. Electronics

July-Dec 2017

Semester I

Max. Marks: 100, Min. Marks: 20

1. To study the Astable and Monostable Multivibrator using IC741.

2. To study the RC Phase Shift Oscillator by determining its frequency of oscillation and Compare calculated and observed frequency.

3. To study the Schmitt Trigger using transistor and IC7413 by observing the output Waveform.

4. To study the Colpit Oscillator, determine its frequency of oscillation and compare the Calculated and observed frequency.

5. To study the Negative Feedback Amplifier by measuring closed loop gain and gain bandwidth product.

6. Verification of following network theorems (1) Superposition (2) Thevenin`s (3)

Nortan`s theorem.

7. To study and plot the MOSFET characteristics.
8. To study the Active Band pass filter and calculate its (1) Bandwidth: - Lower cutoff & upper cutoff frequency. (2) Quality factor.
9. Construct a Wein Bridge Oscillator and determine its frequency of oscillation and compare calculated and observed frequency.
10. To study the Active Low pass filter and to evaluate: -
    (1) Cutoff frequency, (2) Band pass gain, and (3) Plot the frequency response.
11. To study the Clipping circuits as positive and negative logic.
12. To study the Clamping circuits as positive and negative logic.
13. To Study the phototransistor characteristics.
14. To study the comparison of Schmitt trigger and phototransistor.
15. Verification of the Maximum Power Transfer theorem.
16. To study the characteristics of JFET (Junction field effect transistor) in common source configuration & evaluate— 1. AC drain resistance, 2. Amplification factor and 3. Drain Resistance.
17. To study the operation of Class B Amplifier.
18. To study the Z parameter of a passive Two Port Network.
19. To study the Op – Amp as voltage to current converter.
20. To study of characteristics of NPN transistor in common emitter configuration and evaluate— 1. Input resistance, 2. Output resistance and 3.Current gain.
21. To study the Active High pass filter and to evaluate:--
    (1) Low cutoff frequency, (2) Bandpass gain, and (3) Plot the frequency response.

Any other experiment of equal standard relevant to syllabus can also be set.

Note: -Students have to perform at least 15 experiments from the above list.

Reference Books

1 .Laboratory Experiments and PSPICE Simulations in Analog Electronics Maheshwari & Anand PHI

2 Laboratory Manual for Operational Amplifiers and Linear ICs, 2nd ed. Bell PHI

3. Student Reference Manual for Electronics Instrumentation Lab Wolf & Smith PHI

4. ELECTRONIC LAB PRIMER By B. Sasikala, S. Poorna Chandra S.Chand Pub

LAB COURSE "B"- DIGITAL ELECTRONICS LAB
M.Sc. Electronics
July -Dec 2017
Semester I

Max. Marks: 100, Min. Marks: 20

List of Experiments: -

1. Verify the following Boolean expressions--

   i) A + A'B = A +B ii) AB + AB' = A

   iii) AB + A'C + BC = AB + A'C iv) AB + A'C = (A + C)(A' + B).

2. To study the operation of 4 bit binary full adder and subtractor (IC 7483) having input and output carry bits. Add and subtract any two binary numbers of four bits.

3. To study the characteristics of C-MOS integrated circuits, verify the operation of C-MOS Inverter/NAND gate ICs and study the voltage level of C-MOS for proper ON/OFF (logic 1 or logic 0) condition.
4. To study the interfacing of C-MOS to TTL IC's and vice-versa. Different TTL logic gates and C-MOS logic gates with pull up resistance are provided for interfacing.
5. To study the master slave J-K flip-flop and verify truth table.
6. To study R-S/D/T flip-flops using NAND ICs and verify truth table.
7. To study the operation of shift register as serial in parallel and parallel in serial mode.
8. To study the operation of shift register as parallel in parallel and serial in serial mode.
9. To study write/read operation of digital data into semiconductor memory using IC 7489. Store and retrieve some set of data. (RAM)
10. To study the operation and application of a modern LSI D/A converter. Parallel binary Inputs from switches are applied to DAC, which in turn converts the binary number into a proportional output voltage.
11. To study the operation of modulo-n-counter as MOD 3 & MOD 4 and verify the Truth Table.
12. To study the operation of modulo-n-counter as MOD 8 & MOD 9 and verify the Truth

Table.

13. To study the operation of a Presetable Divide by N Counter and verify its truth table.
14. To study the operation of Multiplexer IC having 16: 1 channels.
15. To study the operation of Demultiplexer IC having 1:16 channels and 4 select inputs.
16. To study the operation of BCD Up-Down Counter.
17. To study the operation of Memory programming with seven segment display.
18. To study the operation of comparison of JK flip-flops and verify the difference with Timing diagram.

Any other experiment of equal standard relevant to syllabus can also be set.

Note: -Students have to perform at least 15 experiments from the above list.

Books:

1.Laboratory Manual for Operational Amplifiers and Linear ICs, 2nd ed. **Bell PHI**

2.Student Reference Manual for Electronics Instrumentation Lab Wolf & Smith **PHI**

LAB COURSE "C"- ANALOG AND DIGITAL COMMUNICATION LAB

M.Sc. Electronics

Jan-June 2018

Semester II

Max. Marks: 100, Min. Marks: 20

List of Experiments: -

Analog Communication

1. To study the operation of balanced modulator DSBSC using IC 1496.
2. To study the phase modulation using IC 2206 and calculate the modulation index.
3. To study amplitude modulation and demodulation and construct and AM generator and a diode detector and observe its operations under various conditions.
4. To demonstrate (i) use of 4046 PLL as an FM modulator. (ii) Use of 4046 PLL IC as an FM demodulator.
5. To study the characteristics and testing methods if TT attenuators.

6. To study the Carrier Wave (CW) operation of Klystron tube and determine its operating frequency.
7. To study the Square Wave operation of Klystron tube and determine its operating frequency.
8. To study the modes of Klystron tube.
9. To determine the frequency and wavelength of rectangular waveguide, working on TE_{10} mode.
10. To determine the standing wave ratio (SWR) of Klystron tube.
11. To determine the Reflection Coefficient of Klystron tube.

Digital communication-

1. Study of signal sampling and reconstruction techniques and to verify Nyquist criteria and tracing.
2. Study of PAM, PWM and PPM modulation and demodulation techniques.
3. Study of TDM pulse amplitude modulation and demodulation.
4. Study of pulse code modulation and demodulation techniques.
5. Study of delta and adaptive-delta modulation methods.
6. Study of Phase Shift Keying Modulation and Demodulation Technique.
7. Study of Amplitude Shift Keying Modulation and Demodulation Technique.
8. Study of Frequency Division Multiplexing and Demultiplexing

Any other experiment of equal standard relevant to syllabus can also be set.

Note: -Students have to perform at least 10 experiments from the above list.

Books: Laboratory Experiments and PSPICE Simulations in Analog Electronics Maheshwari & Anand PHI

LAB COURSE "D"- 8085 MICROPROCESSOR PROGRAMMING, STUDY CARDS AND INTERFACING LAB

M.Sc. Electronics
Jan-June 2018
Semester II

Max. Marks: 100, Min. Marks: 20

List of Experiments:-

1. Program of 8085 to add 8-bit numbers from memory & display result to C060H memory

location & carry in C061 H.

2. Program of 8085 of 8085 to transfer the data of 16 consecutive locations into other 16 Consecutive locations in forward order and vice versa
3. Program of 8085 to search the memory location that contained 05 H data in a string of length of 16 byte and display it to memory location to C060 H.
4. Program of 8085 to search number of 05 H data in a string of length of 16 byte and display it to memory location to C060 H.
5. Program of 8085 to multiply two 8-bit numbers.
6. Program of 8085 to divide two 8-bit numbers.
7. Program of 8085 to solve a Boolean Equation which rep. Combinational logic as follows:- X= A' (B+C). D' + A.B. (D+C), A.B.C. & D are four independent variables.
8. Program of 8085 to convert BCD into its equivalent binary number.
9. Program of 8085 to convert Binary number into its equivalent unpacked BCD number.
10. Program of 8085 to count the number of Zeros, positive and negative number in a series of 16 bytes.
11. Program of 8085 to convert Binary number into its equivalent ASCII number.
12. Program of 8085 to convert ASCII into its equivalent binary number.
13. Program of 8085 to find the largest and smallest number in a data array.
14. Program of 8085 to arrange the data array in ascending and descending order.
15. Program of 8085 to add a series of data of 16 consecutive memory location and display the result in C060 H and carry in C061 H memory location using subroutine.
16. Program of 8085 to subtract two 8-bit data from memory location using 2's complement method and display the result in C060 H and borrow in C061 H.

Note: -Students have to perform at least 15 Programs of 8085 from the above list.

*** STUDY OF 8255 CARD ***

1. Program 8255 in mode-O; i.e. simples I/O mode Program Port-A, Port-B, Port-C in O/P mode, transmit data from keyboard to all the ports.
2. Repeat program no.(1), with all ports in I/P mode. Store data to M.P.U.'s registers
3. Program 8255 in B.S.R. mode. Set port-C in O/P mode Using appropriate delay set/reset

PC.

4. Program 8255 in mode-1; i.e. strobe I/O mode Program Port-A, Port-B is in mode-1 and Port-A is in O/P mode and Port-B is in I/P mode and Port-C is used in control signal.
5. Program 8255 in mode 0 i.e. simple I/O mode. Program Port A in I/P mode and Prot B in output mode.
6. Program 8255 in mode 0 i.e. simple I/O mode/ Program Port B in I/P mode and Port A in output mode.
7. Program 8255 in mode 0 i.e. simple I/O mode. Program Port A in I/P mode, Port B in input mode. Read data from Port A&B, add it & display

* STUDY OF 8253 CARD *

8. Program 8253 in mode-0 i.e. interrupts on terminal count. Select counter c; Read/load lower 8-bits & then higher bits. Draw and explain the function of Gate, Out & Clock Signals.
9. Program 8253 in mode 1. Draw and explain the function of GATE, OUT and CLOCK Signals.
10. Program 8253 in mode 2. Draw and explain the function of GATE OUT and CLOCK Signals.
11. Program 8253 in mode 3 to generate square wave. Draw and explain the function of GATE, OUT and CLOCK Signals.

* STUDY OF LBDR CARD *

12. Study of Buffer IC-74L8245 on L.B.D.R. Card using 8085 M.P.U. kit.
13. Study of Latch IC-74L8245 on L.B.D.R. Card using 8085 M.P.U. kit.
14. Study of LBDR as 2 & 4 decoder.
15. To access memory locations (RAM) specified by generation control signals on L.B.D.R. card using 8085 M.P.U.

* STUDY OF 8259 CARD *

16. Study of master 8259 in stand-alone mode. Generate and interrupt request-using 8259 and display the respective interrupt in address field.

17. Study of 8259 in cascaded mode i.e. in 8259 as master and the other as slave. Generate an interrupt request using 8259 and display the respective interrupt in address field.

*** STUDY OF 8251 CARD ***

18. Interface 8251 with 8085 M.P.U. and program it in asynchronous transmitter mode, use 8251 Group A.
19. Interface 8251 with 8085 M.P.U. and program it in asynchronous receiver mode, use 8251 Group A.
20. Interface 8251 with 8085 M.P.U. and program it in synchronous transmitter mode, use 8251 Group A.
21. Interface 8251 with 8085 M.P.U. and program 8251 Group A is in synchronous transmitter mode and 8251 B is in synchronous receiver mode.

***STUDY OF 8237/57 CARD ***

22. Interface 8237 IC with 8085 M.P.U. memory to I/O transfer (Read Mode)
23. Interface 8237 IC with 8085 M.P.U. and Study memory to I/O transfer in block transfer mode (write mode).
24. Interface 8237 IC with 8085 M.P.U. and study I/O to memory transfer in single transfer mode (write mode)
25. Interface 8237 IC with 8085 M.P.U. and study I/O to memory transfer. In this mode data stored at 4150H to 415AH

Note: -Students have to perform at least 5 Study Cards from the above list.
PIO Card

***STUDY OF DAC CARDS ***

26. Program to demonstrate DAC as positive going staircase (or ramp) generator.
27. Program to demonstrate DAC as triangular wave generator.
28. Program to demonstrate DAC as exponential binary staircase generator.
29. Program to demonstrate DAC as R-C charging and discharging waveform.

***STUDY OF DYNA THUMBWHEEL CARDS ***

30. To study interfacing of Thumbwheel with microprocessor based system as Dyna-85.

*STUDY OF SERIAL DISPLAY INTERFACE CARDS *

31. To study interfacing of Serial Display Interface Card with microprocessor based system as Dyna-85.

Note: -Students have to perform at least 2 PIO Cards from the above list

Any other experiment of equal standard relevant to syllabus can also be set.

LAB COURSE "E"-OPTICAL ELECTRONICS, TRANSDUCER AND INSTRUMENTATION LAB

M.Sc Electronics
July-Dec 2018
Semester III

Max. Marks: 100, Min. Marks: 20
List of Experiments:-

Optical Electronics

1. To study the operation of an Opto-coupler IC-4 N 26.
2. To study the Phototransistor characteristics.
3. To study the comparison of a Schmitt trigger and Phototransistor.
4. To study the similarities and differences between conventional LEDs and fiber optic LEDS.

Transducer control system Trainer kit

1. To study the characteristics of a 3 wire RTD and to observe the change in resistance as Temperature increases (Wheatstone bridge).
2. To study the application of 2 wire RTD in a potentiometer circuit.
3. To study the application of 3 wires RTD in a Wheatstone bridge circuit.
4. To study the characteristics of thermocouple and observe the change in output voltage with the change in temperature.
5. To study semiconductor diode as a temperature sensor.
6. To study transistor as a temperature sensor.
7. To study the application of thermistor in a DC wheatstones bridge circuit.

8. To study the application of thermistor in a non- inverting Op – Amp circuit.

Thyristor Application trainer

1. To study & plot the SCR characteristics.
2. To study & plot the UJT characteristics.
3. To study & plot the DIAC characteristics.
4. To study & plot the TRIAC characteristics.

Virtual Instrumentation Using National Instrument LabView Software

1. Design a Virtual Instrument of Half adder digital circuit using LabView.
2. Design a Virtual Instrument of Full adder digital circuit using LabView.
3. Design a Virtual Instrument of Half subtractor digital circuit using LabView.
4. Design a Virtual Instrument of Full subtractor digital circuit using LabView.
5. Design a Virtual Instrument. to find maximum & minimum amplitude of given waveform using LabView.
6. Design a Virtual Instrument to convert Analog waveform to Digital waveform using LabView.
7. Design a Virtual Instrument to generate multitone waveform (sine & square) using LabView.
8. Design a Virtual Instrument to convert Celcius into equivalent Fahrenheit using LabView.

LAB Course "F"- 8086 MICROPROCESSOR PROGRAMMING INTERFACING AND "C" PROGRAMMING LAB

M.Sc Electronics
July-Dec 2018
Semester III

Max. Marks: 100, Min. Marks: 20

List of Experiments:-

8086 ASSEMBLY LANGUAGE PROGRAMMING

1. Write a program to transfer an 8-bit data from register to C060H memory location.
2. Write a program to transfer an 16-bit data from register to C060H memory location.
3. Write a program to add two 8-bit data and result is stored in C060H.
4. Write a program to add two 16-bit data and result is stored in C060H.
5. Write a program to subtract two 8-bit data and result is stored in C060H.
6. Write a program to subtract two 16-bit data and result is stored in C060H.
7. Write a program to multiply two 8-bit data and result is stored in C060H.
8. Write a program to multiply two 16-bit data and result is stored in C060H.
9. Write a program to divide 16-bit data by 8-bit and result is stored in C060H.
10. Write a program to divide 32-bit data by 16-bit and result is stored in C060H.

* STUDY OF 8255 CARD *

Study the Interfacing of 8255 Study card with 8086 Microprocessor.

* STUDY OF 8259 CARD *

Study the Interfacing of 8259 Study card with 8086 Microprocessor.

List of C Programming

1. Write a program to calculate the roots of quadratic equation $Ax^2+Bx+C=0$.
2. Write a program to calculate the average of a set of n numbers including zero and negative numbers.

3. Write a program to sort an array element in ascending order using bubble sort technique.
4. Write a program to sort and array element in descending order using bubble sort technique.
5. Write a program to plot a sin (X).
6. Write a program to read and print a single dimension array A and B each having 10 elements write a program that prints out an array C having elements, which are sum of the elements of array A and B.
7. Write a program to find a row sum and column sum of a given matrix and built a new matrix with the help of row sum and column sum and previous matrix.
8. Write a program to read and print two-dimensional matrix of order nxm. Find the sum of diagonals.
9. Write a program that calculate and prints out the maximum and minimum of array.
10. Write a program for sorting names in alphabetical order.
11. Write a program to plot and exponential series.
12. Write a program to print the terms in the exponential series, till the term is equal to 0.00001 also compute the exponential series of x,

    $e_x=1+x+x_2/2!+x_3/3!+\ldots\ldots\ldots+0.00001$.
13. Write a program for matrix multiplication.
14. Write a program for matrix addition.
15. Write a program for the operation of (a) addition (b) subtraction (c) multiplication (d) Division, using switch command
16. Write a program to find the factorial of a given number and Fibonacci series using switch command
17. Write a program to find the sum of natural numbers using function

Any other experiment of equal standard relevant to syllabus can also be set

LAB COURSE "G"- OPTICAL COMMUNICATION AND 8051 PROGRAMMING LAB

M.Sc. Electronics
Jan-June 2019
Semester IV

Max. Marks: 100, Min. Marks: 20
List of Experiments: -

Fiber Optics Communication kit

1. Study of setting up a fiber Optic Analog Link.
2. Study of setting up a fiber Optic Digital Link.
3. Study of Losses in Optical Fiber.
4. Measurement of Numerical aperture of a optical fiber.
5. Study of Manchester Coding & Decoding of optical signal.
6. Study of Time Division Demultiplexing through fiber optic link –B .
7. Measurement of Bit Error Rate of an optical signal through fiber optic link -B.
8. Study of Eye Pattern of fiber through fiber optic ling –B.
9. Forming PC to PC Communication Link using Optical Fiber & RS-232Interface.

8051 Programming: -

Any 10 Basic programming in 8051 Microcontroller

General Programming Practical of 8051

1. Write a program to find the addition of two 8- Bit Numbers.
2. Write a Program to subtract Two 8 – Bit Numbers.
3. Write a Program to find Multiplication of Two 8- Bit Numbers.
4. Write a Program to find Division of Two 8- Bit Numbers.
5. Write a Program to find the Factorial of a given numbers.
6. Write a Program to transfer the Data block in Forward order.
7. Write a Program to transfer Data Block in Reverse order.
8. Write a Program to find Addition of Series of numbers.
9. Write a program for searching no. of (05H) in a given Memory Location.

10. Write a Program to find out no. of Even & Odd no. in a given Data Series.

11. Write a Program to count Zero, Positive, Negative no. in a given Data Series.

12. Write a program to count the numbers which are divisible by 3 in a given Data Series

13. Write a Program to find the largest number in a given Data Series.

14. Write a Program to find the smallest number in a given Data Series.

15. Write a Program to arrange the Data in ascending order.

16. Write a Program to arrange the Data in descending order.

17. Write a program to convert Binary Number to BCD Number.

18. Write a program to convert Binary Number to ASCII Number

Interfacing Practical of 8051

1. To Study & Analyze the Interfacing of 16×2 LCD.

2. To Study & Analyze the Interfacing of 5×7 LED Matrix.

3. To Study & Analyze the Interfacing of Seven Segment Display.

4. To Study & Analyze the Interfacing of ADC & DAC Module.

5. To Study & Analyze the Interfacing of DC Motor.

6. To Study & Analyze the Interfacing of Stepper Motor.

7. To Study & Analyze the Interfacing of LEDs.

Any other experiment of equal standard relevant to syllabus can also be set.

Project & Seminar

Max. Marks: 100, Min. Marks: 20

Project

This course provides quality education to students on professional grounds. Apart from classroom lectures and Practical's, the students are also required to undertake a project in the fourth semester. This provides them with an opportunity to interact with the industry. Seminars are organized where eminent professionals from various organizations are invited.

Execution and documentation of a project on a specific topic with one of the following aspects

- Part of ongoing research projects in the department

- Developmental work related to industry requirements
- State of the art new technological studies
- Theoretical and experimental studies
- Development of prototypes in the finished product form
- Technical Writing and Project Documentation
- Presentation and Appreciation.

Seminar

Each student shall present a seminar in the Fourth semester on a topic relevant to Electronics for about 30 minutes. The topic should not be a replica of what is contained in the syllabus. The topic shall be approved by the Seminar Evaluation Committee of the Department. The committee shall evaluate the presentation of students. A seminar report in the prescribed form shall be submitted to the department after the approval from the committee.

The topics of current relevance covering following aspects should be chosen

- Collection of reference material
- Assimilation of concepts and preparing document
- Communication skills
- Presentation styles and use of projection aids
- Appraisal and evaluation of delivered seminars

SCHEME OF EXAMINATION
&
SYLLABUS

M.Tech. In Optoelectronics & Laser Technology

(Semester systems)

UNDER

FACULTY OF SCIENCE

Approved by Joint Board of Studies in Electronics & Physics

EFFECTIVE FROM JULY – 2017

School of Studies in Electronics and Photonics
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
WEBSITE: www. prsu.ac.in

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

SYLLABUS

M. Tech in Optoelectronics and Laser Technology

SESSION – 2017-2019

Photonics has been deemed the 21st century revolutionary technology that would create as enormous impact as electronics did in the 20th Century. Graduates with training in photonics and related technologies are in high demand. There is and will continue to be a big global demand for skilled people with photonics training. Optoelectronics and Laser technology has emerged as multidisciplinary subject of great breadth and richness attracting the interest of scientists, technologists and industrialists due to its manifold scientific and technological applications, it is worth-mentioning that in our country the number of postgraduate programmes on modern optics are a few, and in chhattisgarh state, none of institutes and universities has M.Tech programme in Optoelectronics and Laser Technology. This program is approved and supported by University Grants commission, New Delhi under its innovative Programme for Teaching and Research in Interdisciplinary and Emerging Areas.

This 4-semester interdisciplinary M.Tech. Programme between the S.O.S. in Electronics and S.O.S. in Physics aims at providing advanced training in the interdisciplinary areas of Optoelectronics Optical communication and laser Technology and to generate trained professionals in these areas with a strong background in both engineering and science. The programme covers fields like fiber optics, laser, semiconductor Optoelectronics, optical electronics, optoelectronics instrumentation, optical communication techniques and systems, photonic switching and guided wave optical components and devices for dense WDM applications, integrates optics etc.

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

SYLLABUS

M. Tech in Optoelectronics and Laser Technology

SEMESTER – I

JULY – DECEMBER , 2017

Course Code	Subject	Marks
OE – 11	Modern Optics	100
OE - 12	Laser Technology	100
OE – 13	Optoelectronics	100
OE – 14	Optical Communication	100
OE – 15	Seminar	50
OE – 16	Comprehensive Viva voce	Grade
OE - 17	Fiber Optics, Laser and Optoelectronics and Communication Lab Course – I	150

SEMESTER – II

JANUARY - JUNE , 2018

Course Code	Subject	Marks
OE – 21	Physics of Advanced Materials	100
OE – 22	Fiber Optics & Laser Instrumentation and Solar Photovoltaic Technologies	100
OE – 23	Optical Networks	100
OE – 24	Advance Optical Communication	100
OE -25	Seminar	50
OE – 26	Comprehensive Viva voce	Grade
OE – 27	Fiber Optics, Laser and Optoelectronics and Communication Lab Course – II	150

SEMESTER – III

JULY – DECEMBER , 2018

Course Code	Subject	Marks
OE – 31	Minor Project and Industrial training	150
OE – 32	Dissertation (Phase – I)	200

SEMESTER – IV

JANUARY – JUNE - 2019

Course Code	Subject	Marks
OE – 41	Dissertation (Phase – II)	450
	Comprehensive Viva- voce	

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

SYLLABUS
SEMESTER – I
July-Dec. 2017

OE-11-MODERN OPTICS

Unit I

Classification of optical processes, optical coefficients, complex refractive index and dielectric constant,

Optical materials : Crystalline insulators and semiconductor, glasses, metal, molecular materials, doped glass and insulator characteristics, Optical Physics in the Solid state, crystal symmetry, electronics bands, vibronic band, the density of state, delocalized states and collective excitation **Light propagation:** Propagation of light in dense optical medium, Atomic oscillator, vibration oscillator, free electron **oscillation**, the Kramers – Kronig relationship, Dispersion, Optical anisotropy, birefringence. Matrix representation of polarization, Jones vector, Jones matrices, Jones calculus, orthogonal polarization. Reflection and refraction at a plane boundary, fresnel's equations.

Unit II

Excitons : Basic concept, free excitons in external electric and magnetic fields,

Free Excitions at light densities, frenkel excitons.

Luminescence : Light emission in solids, Interband luminescence, Direct and indirect gap materials, photoluminescence : Excitation and relaxation, degeneracy, Photoluminescence spectroscopy.

Electroluminescence: General Principles of electroluminescence, light emitting diodes, diode laser.

Unit III

Electromagnetism in dielectrics, Electromagnetism fields and Maxwell equation. Electromagnetism waves, Quantum theory of radiative absorption and emission. Einstein coefficients, Quantum transition rates, selection rules. Basic concept of phonons, Polaritons and polarons.

Unit IV

Nonlinear optics : Non linear optics : Physical origin of optical nonlinearities, Non resonant and resonant nonlinearities, second order nonlinearities, Non liner frequency mixing, Crystal symmetry, Phase matching, Third order non linear media. Harmonic generation, mixing and parametric effects. multiphonon processes Two-photon absorption, saturated absorption, Spectroscopy Rayleigh, and Raman scattering. Stimulated Raman effect, Hyper Raman effect, Coherent Antistoke Raman scattering Self-focusing and self-phase modulation. Self-induced transparency. Solitons.

Unit V

Optical Design, Fourier Optics & Holography : Revision of geometrical optics. Fourier transforms. impulse response transfer function. Scalar diffraction, spatial and temporal coherence. Image forming systems, coherent and incoherent imaging. Spatial filtering. Holography (Fresnel, Fraunhofer, Fourier). Holographic techniques and applications. Fourier transforming property of thin lens.

REFERENCE BOOKS

1.Optical Electronics, A. Yariv Saunders

2.Optical Electronics, Ghatak & Thyagarajan, Cambridge U.K.

3.Essentials of Optoelectronics, A. Rogers (Chapman Hall)

4.Optical Properties of Solids Mark Fox

5.Jasprit Singh, Semi conductor Optoelectronics, McGraw Hill, 1995

OE-12 -LASER TECHNOLOGY

Unit I

Einstein Coefficients and Light Amplification

Introduction. The Einstein's coefficients, Quantum Theory for the Evaluation of the Transition Rates and Einstein Coefficients, Interaction with radiation having a broad spectrum, Introduction of a near monochromatic wave with an atom having a broad frequency response, More accurate solution for the two level system, Line broadening mechanisms, Saturation Behavior of homogeneously and homogeneously broadening transitions.

Unit II

Laser Rate Equations : Introduction, The three Level System, The Four level System, Variation of Laser Power around Threshold, Optimum Output coupling. Laser spiking.

Semi classical Theory of Laser: Introduction, Cavity Modes, Polarization of cavity medium : First order & Higher order theory.

Unit III

Optical Resonators: Introduction, modes of a rectangular cavity and the open planar resonator, The Quality factor, The ultimate line width of the laser, Transverse and longitudinal mode selection switching. Mode locking in Lasers Co focal Resonator system, Planar resonators, General Spherical Resonator.

Unit IV

Properties of Laser Beams and laser Structures

Coherence properties of Laser Light : Temporal Coherence, Spatial Coherence, Directionality

Semiconductor: Structure and properties, operating principle, Threshold condition, Power output.

Heterojunction Laser: Principle and structure, Losses in heterostructure laser, Heterostructure laser materials.

Distributed feedback lasers: Principle of working, Coupled mode theory.

Quantum well laser, Strained quantum well laser,

Unit V

Some important application of lasers :

Laser induced fusion: Introduction, The fusion process, laser energy requirements. The laser induced Fusion Reactors.

Lasers in Science: Harmonic Generation, Stimulated Raman Emission, Self focusing, Lasers in Chemistry, Rotation of the Earth, Lasers in isotope Separation.

lasers of light detection and ranging (LIDAR)

REFERENCE BOOKS

1.Lasers Theory and Applications : K. Thyagrajan and A.K. Ghatak, Macmillan Publication

2.W.T. Silfvast, Laser fundamentals, Cambridge University Press

3.Optical Electronics, Ghatak & Thyagarajan, Cambridge U.P. 0-521-31408-9

4.Essentials of Optoelectronic, A Rogers (Chapman Hall), 0-412-40890-2

5.Fowles G.R., Introduction to Modem Optics, 2nd Edition, Holt, Rienhart and Winston

OE-13- OPTOELECTRONICS, ORGANIC ELECTRONICS AND SEMICONDUCTOR DEVICE SIMULATION

Unit I

Optical process in Semiconductors

Electron hole pair formation and recombination, absorption in semiconductor, effect of electric field on Absorption, Franz-keldysh and stark effects, Absorption in Quantum wells and Quantum confined stark effect, relation between Absorption and emission spectra, Stokes shift in optical transition, Deep level transitions, Measurement of absorption and luminescence Spectra, Time resolved Photoluminescence.

Unit II

Materials Growth & Fabrication Growth of optoelectronics materials by MBE, MOCVD, Plasma CVD, photochemical deposition. Epitaxy, interfaces and junctions (advantages/disadvantages of growth methods on interface quality, interdiffusion and doping. Quantum wells and band gap engineering

Equipments for Thin Film Deposition: Working principle of Vacuum Coating Unit , Spin Coating Unit and Spray pyrolysis apparatus and their specifications and features.

Unit III

Organic Electronics

Molecular materials, Electronic state in conjugated molecules, Optical spectra of molecules, Electronic vibration transitions, the Franck Condon principle hydrocarbons, conjugated polymer,

Organic Semiconductors: Conductivity and Mobility of nearly-fee Charge Carriers, Charge Carriers in Organic Semiconductors: Polarons, Shallow Traps and Deep Traps, Generation of Charge Carriers and Charge Transport: Experimental Methods. The TOF Method: Gaussian Transport. Space-Charge Limited Currents. Band or Hopping Conductivity, Electric-field Dependence, Charge Transport in Disordered Organic Semiconductors. The Bassler Model

Unit IV

Organic Optoelectronic Devices :

Organic Light-Emitting Diodes (OLEDs). The Principle of the OLED, Multilayer OLEDs. Structure, Fundamental processes Efficiency, Characterization of OLEDs

Organic photovoltaic diodes (OPVDs): Fundamental process, Exciton absorption, Exciton dissociation, Charge collection characterization of OPVDs, Relevant performance parameters

Unit V

Introduction to Semiconductor Device Simulation: Need of Simulation, Process Simulation, Device Simulation device simulation sequence, hierarchy of transport models, DD Model, Relationship between various transport regimes and significant length-scales.

Numerical Solution Methods - finite difference scheme, discretization of Poisson's and current continuity equations.

REFERENCE BOOKS

1. Organic Electronics: Materials, Manufacturing, and Applications Hagen Klauk Wiley-VCH; 1 edition
2. Organic Molecular Solids Markus Schwoerer (Author), Hans Christoph Wolf, Wiley-VCH; 1 edition (March 27, 2007)
3. Semiconductor Devices Modeling and Technology" by Nandita Das Gupta and Amitava Das Gupta, Prentice Hall of India Pvt.Ltd.
4. Computational Electronics :Dragica Vasileska and Stephen M. Goodnick, CRC Press
5. Semiconductor Optoelectronics Devices: Pallabh Bhattacharya. Pearson Education
6. Optical Electronics, A. Yariv Saunders.
7. Optical Electronics, Ghatak & Thyagarajan, Cambridge U.P. 0-521-31408-9
8. Essentials of Electronic & Optoelectronics properties of semi conductor, Jasprit Singh, Cambridge University Press
9. Hand book of thin film technology, by L. I. Maissel and R. Glang
10. Thin film phenomena, By K. L. Chopra

OE-14- OPTICAL COMMUNICATION

Unit I

Need for fiber optic Communication, evolution of light wave systems and its components. Optical

Fiber – their classification, essentials of electromagnetic theory – total internal reflection, Goos Hanchen shifts Dispersion in Single mode fiber, fiber losses, Non liner optical effects and polarization effect. Analysis of Optical fiber waveguides, electromagnetic mode. Theory for optical propagation attenuation and single distortion in optical waveguide. Characteristic equation of step-index fiber, modes and their cut-off frequencies, single-mode fibers, weakly guiding fibers, linearly polarized modes, power distribution. Graded-index fibers- WKB and other analysis, propagation constant, leaky modes, power profiles, dispersions – material, modal & waveguide, impulse response.

Unit II

Physics and Technology of Optical Fiber

Passive photonic components: FO cables, Splices, Connectors, Couplers, Optical filter, Isolator, Circulator and Attenuator, switches.
Fabrication of optical fibers: MOCVD, OVD, VAD, PCVD; measurement of RI, attenuation. Etc. Fiber devices, fiber Bragg gratings, long period gratings, fiber amplifiers and lasers. Application of optical fibers in science, industry, medicine and defense.

Unit III

Optical fiber systems, modulation schemes, Digital and analog fiber communication system, system design consideration, fiber choice, wavelength conversion, switching and cross connect Semiconductor Optical amplifier (SOA), characteristics, advantages and drawback of SOA, Raman amplifier, erbium doped fiber amplifier, gain and noise in EDFA, Brillion fiber amplifier, wideband Hybrid amplifier, noise characteristic, amplifier spontaneous emission, noise amplifier, noise figure, Cumulative and effective noise figure, Noise impairments, amplifier applications.

Unit IV

Optical Transmitters : Basic concepts, Light emitting diodes, Semiconductor laser, characteristics, Transmitter design, Optical Receivers; Basic concepts, P-n and pin photo detector. Avalanche photo detector MSM photo detector, Receiver design, Receiver noise, Receiver sensitivity, Sensitivity degradation, performance.
Electro-optic effect, electro optic retardation. Phase and amplitude modulators, transverse electro optic modulators, Acousto-optic effect, Raman-Nath and Bragg regime, acousto-optic modulators, magneto optic effects.

UNIT V

Wavelength division multiplexing (WDM): Multiplexing Technique, Topologies and architectures, Wavelength shifting and reverse, Switching WDM demultiplexer, optical Add/drop multiplexer. Dense wavelength division multiplexing (DWDM): System consideration, Multiplexer and demultiplexers, fiber amplifier for DWDM, SONET/SDH Transmission, Modulation formats, NRZ and RZ signaling, DPSK system modeling and impairments.

Text books :

[1] John. M. Senior, Optical fiber communication : principles, Prentice Hall of India.

[2] Gerd keiser, optical fiber communication, McGraw Hill, 3rd edition.

[3] D.K. Mynbaev, LL Scheiner, Fiber optic communication technology, Pearson Technology

[4] R.P. Khare, Fiber optic and optoelectronics, Oxford University press.

[5] John Gowar, Optical Communication Systems, Prentice Hall of India.

[6] Optical Electronics, A. Yariv, Saunders

REFERENCE BOOKS

1 Light wave Communication Systems : A practical prospective : R Papannareddy, Penrum International Publishing.

2 Fiber optic communication Systems: G.P. Agrawal, Hohnawian and Sons.

3 Bahaa E.A. Saleh & Malvin Carl Teich, Fundamentals of photonics, John Wiley & Sons, 1991

OE-17- Fiber Optics, Laser and Optoelectronics and Communication Lab- I

Experiments are to be performed in the Advance Photonics Laboratory of S. O.S. in Electronics Department.

L 1 Fiber Optics Lab :

1. Study of setting up a Optic Analog Link.
2. Study of setting up a fiber Optic Digital Link.
3. Study of Losses in Optical Fiber.
4. Measurement of Numerical aperture of a optical fiber.
5. Study of Manchester Coding & Decoding of optical Signal.
6. Study of Time Division Demultiplexing through fiber optic link – B.

7. Measurement of Bit Error Rate of an optical signal through fiber optic link – B.
8. Study of Eye Pattern of fiber through fiber optic ling – B.
9. Forming PC to PC Communication Link-using Optical Fiber & RS – 232 Interface.

L2 – Laser Lab :

1. Study of Diode Laser characteristic.
2. Construction of laser beam expander.
3. Measurement of screw parameter.
4. Measurement of electro-optic coefficient.
5. Magneto-optic effect (Faraday Rotation)
6. High voltage sensor based on electro-optic effect.
7. Molecular Weight Measurement.
8. Holography.

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

SYLLABUS

M. Tech in Optoelectronics and Laser Technology

SEMESTER – 2

JANUARY – JUNE, 2018

OE-21- PHYSICS OF ADVANCED MATERIALS

UNIT I

Nano Particles and Nano Structured Materials :

Properties of Individual Nano-Particle: metal nanoparticles, geometric and electronic structure, magnetic clusters, Semiconductor nanoparticles, optical properties, rare gas and molecular clusters, methods of synthesis of nanoparticles. Carbon nanostructure, C60 carbon nanotube and Application. **Bulk nano structured materials:** Solid disordered nanostructures, methods of synthesis, properties, metal nano-cluster composite glasses, porous silicon; Nano structured crystals.

UNIT II

Quantum Nanostructures and Nano-Machines/Devices :

Quantum wells, wires and dots, preparation, size & dimensionality effects, excitons, single electron tunneling, applications of quantum nanostructure. Super conductivity. Self assembly, process of self assembly, semiconductor islands, monolayers. Catalysis, surface area of nanoparticles, porous, and colloidal materials. Nanomachines and devices; microelectromechanical system (MEMSs), nanoelectromechanical system (NEMSs).

UNIT III

Material requirement for solid state lasers, Activator ions and centers, Material design parameters for semiconductor laser diode, choosing alloy composition and thickness, making ohmic contracts, Other III-V heterojunction laser materials. Introduction to organic laser. Material selection for light emitting diodes.

Electroluminescent materials:

Inorganic electroluminescence, AC powder EL, ACTFEL device, EL characteristics, EL excitation mechanism. Electroluminescence in Organic solids, Material useful for organic thin film EL devices, polymeric material for EL.

UNIT IV

Characterization of Materials : Introduction to emission and absorption spectroscopy: Nature of electromagnetic radiation, electromagnetic spectrum, atomic, molecular, vibrational and X-ray energy levels Basics of UV-VIS spectroscopy: Radiation sources, wavelength selection, Cells and sampling devices, Detectors, Basic ideal of IR spectrometry: Correlation of Infrared spectra with Molecular Structure.

Fundamental of X-ray diffraction, Powder diffraction method, Quantitative determination of phases; Structure analysis **Epitaxial thin film techniques :** Liquid phase epitaxy, vapour phase epitaxy, Metal Organic chemical vapour deposition, Atomic layer epitaxy.

UNIT V

Experimental techniques: High resolution X ray diffraction, Double Crystal diffraction, Drift mobility and Hall mobility, Hall effect for Carrier density and Hall mobility, Photoluminescence

(PL) and Excitation Photoluminescence (PLE) Optical pump probe experiments. Basic idea of Microscopic Techniques : optical microscope, Scanning Electron Microscope (SEM), Transmission Electron , microscope (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscopy (STM), Thickness measurement – gravimetric method

Basics of Ellipsometry: optical parameter measurements (n and k)

TEXTS & REFERENCE BOOKS

[1] Introduction to Nanotechnology by Charles P. Poole Jr. and Frank J. Owens (Willey Inter. Science pub 2003).

[2] Nanostructures and Nanomaterials – Synthesis properties and Applications by Guozhong Cao (Empirical College Press World Scientific Pub. 2004).

[3] Physics of Semiconductor Devices by S. M. Sze(Willey Int., 1981)

[4] Instrumental methods of analysis, H. H. Willard, L. L. Merritt, J A Dean, F A Sellte, CBs Publishers New Delhi 1996.

[5] Scanning Electron Microscopy : OOtley

[6] Handbook of Electroluminescent Materials Ed. D. R. Vij Inst of Physics, Bristol and Philadelphia

[7] Electronic and Optoelectronic properties of Semiconductor, Jaspreet Singh, Cambridge University Press

OE-22- FIBER OPTICS LASER INSTRUMENTATION AND SOLAR PHOTOVOLTAIC TECHNOLOGIES

Unit I

OPTICAL FIBER AND THEIR PROPERTIES

Principle of light propagation through a fiber – Different types of fiber and their properties – Fiber materials and their characteristics – Transmission characteristic of fibers – absorption losses – scattering losses – Dispersion – measurement of optical fibers – optical sources – Optical detectors.

Unit II

FIBER OPTIC SENSORS IN MEASUREMENTS

Fiber optic instrumentation system – Fiber optic sensors ,Different types of modulators – Application in instrumentation – Interferometric method of length – Measurement of pressure, temperature, current, voltage, liquid level and strain.

Unit III

LASERS IN MEASUREMENTS AND TESTING

Laser for measurement of distance, length, velocity, acceleration, current, voltage, and atmospheric effect, Laser application in Spatial Frequency filtering**.**
Holography: Basic principle, methods; Holographic interferometry and applications; Holography for non – destructive testing – Holographic components

Unit IV

Lasers in Industry – Application in material processing, Laser Welding, Hole Drilling, Laser cutting, Laser Tracking
Medical Application of Lasers
Medical applications of lasers; laser and tissue interaction – Laser instrument of surgery.

Unit V

Solar Photovoltaic Technologies

Generation of Photo voltage, Light Generated current,, I-V equation, Solar Cell Characteristics, parameters of solar cells, Relation of Voc and Eg
Design of solar cells: Upper limit of cell parameters, Losses in Solar Cell, Design for High Isc, Voc and FF Analytical Techniques: Solar Simulator-IV measurement, Quantum efficiency measurement, Minority carrier lifetime & diffusion length measurement.

REFERENCES

1. John and Harry, Industrial Laser and their applications, McGraw Hill
2. John F Ready, Industrial application of lasers. Academic press 1978
3. John Crisp, Introduction to Fibre Optics , an imprint of Elsevier Science 1996
4. Jasprit Singh, Semiconductor Optoelectronics, McGraw Hill 1995
5. Understanding Fiber Optics, 4th or 5th edition; Jeff Hech; Prentice Hall Publishers
6. Optical Fiber Communication Principles and Systems, A. Selvarajan, S. Kar and T. Srinivas TMH
7. Optical Fiber Communication, Keiser, G. McGraw Hill, Int. Student Ed.
8. Fiber Optic Communication System, G. P. Aggarawal, Willey Eastern
9. Introduction to Fiber Optics, A. Ghatak and K. Thyagrajan, Cambridge Univ. Press
10. Solar Photovoltaics: Fundamentals, Technologies and Applications, C. S. Solanki, 2nd Edition , Prentice Hall of India, 2011.

11. Solar cells: Operating principles, technology and system applications, by Martin A. Green, Prentice-Hall Inc, Englewood Cliffs, NJ, USA,

OE-23- OPTICAL NETWORKS

Unit I

WDM Technology and Issue in WDM Optical networks: Introduction – Optical networks – WDM – WDM optical network evolution- Enabling Technology for WDM optical networks – WDM optical network architecture – Issue in Wavelength routed networks – Next generation optical Internet networks

Unit II

Wavelength Routing Algorithms : Introduction – Classification of RWA algorithms – Fairness and Admission control – Distributed control protocols – Permutation routing and Wavelength requirements

Wavelength Rerouting algorithms : Introduction – benefits of wavelength routing – Issue in Wavelength routing – Light path Migration – Rerouting schemes – Algorithm AG – Algorithm MWPG – Rerouting in WDM networks with Sparse Wavelength conversion – Rerouting in Multifiber networks – Rerouting in Multifiber Unidirectional ring Networks .

Unit III

Wavelength Convertible networks : Introduction - need for Wavelength converters – Wavelength convertible switch architecture – routing in convertible networks – Performance evaluation of convertible networks – Networks with Sparse Wavelength conversion – Converter placement problem – Converter allocation problem.

Unit IV

Virtual topology Design : Introduction – Virtual Topology design problem – Virtual topology sub problems – Virtual topology design Heuristics – Regular virtual topology design – predetermined virtual topology and lightpath routes – Design of multi fiber networks.

Virtual Topology Reconfiguration : Introduction – Need for virtual topology reconfiguration – Reconfiguration due to Traffic changes – reconfiguration for fault restoration.

Unit V

Network Survivability and provisioning: Failures and Recovery – Restoration schemes – Multiplexing techniques – Distributed control protocols. Optical Multicast routing – Next generation

optical Internet networks.

REFERENCES :

1. C. Siva Ram Murthy and Mohan Gurusamy, "WDM Optical Networks : Concepts, Design and Algorithms ", Prentice Hall India 2002.
2. Rajiv Ramasami and Kumar N. Sivarajan, " Optical networks : A Practical Perspective", A Harcourt publishers international company 2000.

OE-24-ADVANCED OPTICAL COMMUNICATION

Unit I

Components

Introduction to optical components – optical amplifiers – types – issue in optical amplifiers – photonic switching – cross connect – wavelength conversion – multiplexer – demultiplexer – filters – tunable filters – introduction to OICs and its applications.

Unit II : First Generation optical Networks

SONET/SDH – multiplexing , element of a SONET/SDH infrastructure - SONET/SDH physical layer, Computer interconnects – ESCON, Fiber channel, HIPPI , Metropolitan area networks – FDDI, ATM, Layered Architecture - SONET/SDH layers – Second generation optical network layers.

Unit III : WDM Technology

Introduction – WDM optical networking evolution – enabling technologies for WDM optical networks – WDM optical network architecture – DWDM – issues in WRN

Unit IV

OTDM Technology

Important issues of OTDM – optical solitons – applications of solitons . Optical pulse compression – fiber grating compressor – soliton effect compressor.

Unit V : FTH and PON Technology

Proposed architecture and issues of Fiber to the home (FTH) – Passive Optical Network (PON) –

Near space communication – open air optical communication. Inter satellite link hops(ISL). Introduction to all optical networks(AON) , Military , Civil, consumer and industrial applications

REFERENCES BOOKS :

1. Rajiv Ramaswami and Kumar N. Sivrajan, " Optical networks – A practical perspective", A Harcourt Publishers International Company 2000
2. R. G. Junsperger, " Integrated Optics – Theory and Technology, Springer Series in Optical Sciences", 3rd Edition 1991
3. Gerd Keiser, " Optical Fiber Communications",McGraw Hill International Edition 191
4. G. P. Aggarawal," Non Linear Optics", Academic Press.
5. Stamations V. Kartalopoulos, "Understanding SONET/ SDH and ATM Communication network for Next Millennium", PHI 2000.
6. C. Sivaram and mohan Gurusamy, " WDM Optical Networks : Concepts, Design and Algorithms" PHI India 2002.

OE-27- FIBER OPTICS AND OPTICAL COMMUNICATION LAB – LAB II

Experiments are to be performed in the Advance Photonics Laboratory in S.O.S. in Electronics Department.

EXPERIMENTS

1) To calculate the wavelength of Laser using Michelson interferometer.
2) To determine the size of tiny particles using Laser.
3) To determine the grating pitch of transmission grating.
4) To determine the wavelength of a Laser using meter scale ruling.
5) To find the refractive index of glass (transparent materials) by measuring Brewster angle.
6) To determine the bending losses that occurs in a multimode fiber when it is bent along various radii.
7) To determine the absorption coefficient of transparent materials (glass slide).
8) To study the variation of splice losses due to transverse offset, angular tilt and longitudinal separation.
9) To observe the refraction of light in liquid and to calculate its refractive index.
10) To study the wavelength dependence of attenuation in the given optical fiber.
11) To determine insertion loss of each channel of WDM mux, loss uniformity and optical cross talk in channels.
12) To setup optical Add/Drop multiplexer (OADM) using fiber Bragg grating .
13) To setup the WDM link with the given components and determine the total loss for each wavelength.
14) To find the refractive index of transparent Bar using diode Laser.

15) To observe the absorption of Laser light when various colors are introduced in its path.
16) Preparation of thin films with the help of Vacuum Coating Unit and resistance/impedance measurement using Source measuring unit.
17) Preparation of thin films with the help of Spray pyrolysis method and resistance/impedance measurement using Source measuring unit.
18) Preparation of thin films with the help of Vacuum Coating Unit and optical constant measurement using ellipsometer

Note Students have to perform at least 15 experiments

SEMESTER III (July – December, 2018)
&
SEMESTER IV (January – June , 2019)

Project Work Scheme

The problem may be selected form an appropriate Industry or Institution. The candidate is expected to work under the guidance of a project guide for at least for a period as decided. In case the project work is taken up in an external Industry/Institution, the project shall have two guides: one in the participating organization (Industry/Institution) who is the external guide and the other shall be one of the faculty members form Department who is the internal guide. The dissertation should be submitted within tow calendar years form the starting date of the third semester, Six copies of the dissertation have to be submitted to the M.Tech Course Coordinator. These copies shall be distributed to the External examiner, Internal Examiner, Project guide (Faculty), Department Library and University Library and the Candidate.

Evaluation of Project Work

The project evaluation committee shall be responsible for the project work evaluation The project evaluation committee will be consisting of Chairman, Course Coordinator, an internal examiner and external examiner. The Chairman of the project evaluation committee shall be the Chairman

Departmental Committee constituted as per norms of UGC. The project guide (faculty from department) shall be the internal examiner. The external examiner shall be a technical expert in the concerned subject form any organization other than that of the project guide and is selected form the panel of experts submitted by the Course Coordinator. The project work shall be evaluated through presentations and viva voice. The grade/marks shall be given to the students according to the level and quality of work and presentation/documentation.

SCHEME OF EXAMINATION

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SYLLABUS

FOR M.Phil. (ELECTRONICS)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Electronics

EFFECTIVE FROM JULY 2017

School of Studies in Electronics and Photonics
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262639
WEBSITE: -www.prsu.ac.in

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
SCHEME OF EXAMINATION & SYLLABUS PRESCRIBED FOR THE EXAMINATION OF

M.Phil in Electronics
SESSION 2017-2019

1. Objective of the course:

- To provide academic progression to students obtaining M.Sc. degree willing to pursue an academic career
- To provide academic progression to professionals engaged in academic fields
- To provide a bridge course for an M.Sc. student so as to encourage him / her for research.
- 4. To introduce emerging areas as discourses of study for promoting academic activities and research in related fields.

2. **Course Methodology:** A detailed treatment of each topic will be presented in class but a major portion of each class session will involve interaction and discussion. It is essential, therefore, that each student has a reading of the topic to be taken up in a class prior to attending the session. Written / presentation assignments will explore the issues and their logical consequences. Programming assignments will offer both programming experience and an opportunity to experiment with ideas. Dissertation work will involve students individually carry out a detail study on a topic and implement a related system.

Scheme of Examination :

The Master of Philosophy (M.Phil.) in Electronics is a full time course for one year after completion of M.Sc. in Electronics, Electronic Science, Physics, Instrumentation. Admission to M.Phil (Electronics) programme will be done through entrance examination.

The course structure will contain three theory papers, seminar (two) and dissertation as outlined below:

S.No.	Theory paper	Marks
1.	Paper I : Research Methodology , Quantitative Methods and Computer applications	100
2.	Paper II - Photonics, Advanced Concepts in Solar Cell Technologies and Nano Science and Technology	100
3.	Paper III : Digital Image Signal Processing	100
4.	Seminar - Seminar based on theory paper (Best two out of three)	50
5.	Dissertation –(a) Final Seminar based on Dissertation (b) Dissertation Script evaluation (c) Viva – Voce	50 75 25
Grand Total		**500**

Paper I

Research Methodology, Quantitative Methods & Computer Applications

Unit I - Introduction and Design of research

Meaning, objective and significance of research, types and parameters of research, research process, identification and definition of the research problem, definition of construct and variables, pure and applied research design, exploratory and descriptive design methodology, qualitative Vs quantitative research methodology, field studies, field experiments Vs laboratory experiments, research design in social and physical sciences.

Unit II - Data Analysis

Procedure for testing of Hypothesis, the null hypothesis, determining level of significance , type I and type II errors, grouped data distribution, measures of central tendency, measures of spread/dispersion, normal distribution, analysis of variance: one way, two way, Chi square test and its application, students 'T' distribution, non parametric statistical techniques, binomial test, Correlation and regression analysis- discriminate analysis- factor analysis- cluster analysis, measures of relationship.

Unit III – Solar PV fundamentals and Emerging Solar Cell Technologies

P-N junction under illumination: Generation of Photo voltage, Light Generated current,, I-V equation, Solar Cell Characteristics, parameters of solar cells, Relation of Voc and Eg
Design of solar cells: Upper limit of cell parameters, Losses in Solar Cell, Design for High Isc, Voc and FF
Analytical Techniques: Solar Simulator-IV measurement, Quantum efficiency measurement, Minority carrier lifetime & diffusion length measurement.
Thin film solar cell technologies,: amorphous Si solar cells, CdTe solar cells, Dye Sensitized Solar cells, Present status of different PV technologies, Shockley-Queisser limit.

Unit IV – Molecular Devices and Semiconductor Device Simulation

Molecular Devices: Operation fundamentals of organic LEDs, Organic FETs and Organic solar cells, Basic physics underlying device operation, Fundamental benefits and limitations of the organic materials
Introduction to Semiconductor Device Simulation: Need of Simulation, Process Simulation, Device Simulation device simulation sequence, hierarchy of transport models, DD Model, Relationship between various transport regimes and significant length-scales.
Numerical Solution Methods - finite difference scheme, discretization of Poisson's and current continuity equations.

Unit V - Image Fundamentals –
Digital Image representation, fundamental steps in Digital Image processing, image acquisition, storage, processing, communication & display, Simple image model, sampling

and quantization, some basic relationships between pixels: Neighbors of a pixel, connectivity, labeling of connected Components, Relations, distance Measures.

Image Transforms

Introduction to Fourier Transform, The Discrete Fourier Transform, some properties of two dimensional Fourier transform: Separability, translation, periodicity & conjugate symmetry, rotation, distributive and scaling, average value, convolution and correlation, sampling. The Fast Fourier Transform: FFT algorithm, number of operations, the inverse FFT, implementation. Other Separable Image Transforms: Walsh Transforms, Discrete Cosine Transform, Hadamard Transform, the Haar & Slant transform.

Study of basic functions of image processing toolbox of Matlab software

Reference Books –

1. Research in education, By J W Best and J V Kann. Pearson/ Allyn and Bacon.
2. Research Methodology - Methods and Techniques, C K Kothari, New Age International.
3. Solar Photovoltaic's: Fundamentals, Technologies and Applications, C. S. Solanki, 2nd Edition, Prentice Hall of India, 2011.
4. Solar cells: Operating principles, technology and system applications, by Martin A. Green, Prentice-Hall Inc, Englewood Cliffs, NJ, USA,
5. Physics of Solar Cells: From Basic Principles to Advanced Concepts Peter Würfe Wiley-VCH; 1 edition
6. Organic Electronics: Materials, Manufacturing, and Applications Hagen Klauk Wiley-VCH; 1 edition
7. Organic Molecular Solids Markus Schwoerer (Author), Hans Christoph Wolf, Wiley-VCH; 1 edition (March 27, 2007)
8. Semiconductor Devices Modeling and Technology" by Nandita Das Gupta and Amitava Das Gupta, Prentice Hall of India Pvt.Ltd.
9. Digital Image Processing : Gonzalez and Woods, 2nd Edition, Pearson Education Publication
10. Fundamental of Digital Image Processing - A.K.Jain, PHI.

Paper II

Photonics, Advanced Concepts in Solar Cell Technologies and Nano Science &Technology

Unit I - Photonics

Classification of Optical processes, Optical coefficients, Optical materials, Concept of Excitons, Free and Frenkel excitons,

Light emission in solids, Interband luminescence, direct gap materials, indirect gap materials, Photoluminescence.

General principle of electroluminescence devices, Light emitting diodes, Material selection for light emitting diodes, Diode lasers, Inorganic electroluminescence, ACTFEL device, EL characteristics, EL excitation mechanism.

Unit II - Advanced Concepts in Solar Cell Technologies

Need of sustainable energy sources, Sustainable Sun's energy, Concepts Fundamental limits on conversion efficiency Shockley-Queisser theory, Multiple Junction solar cells, Quantum dot solar cells, Intermediate band solar cells, Photon splitting and multi-application High efficiency c-Si solar cells, Staebler-Wronski effect

Fabrication of crystalline Si solar cells, Thin film crystalline Silicon solar cell technologies, Thin Cadmium Telluride and Copper Indium Gallium Selenide Cell Technologies.

Unit III -

Solar PV modules, Series and parallel connection of cells, Mismatch in series and parallel connection, PV module power output as function of temperature and solar radiation

Concentrators Photovoltaic (CPV) Cells- Light concentration, concentration ratio, Optics for CPV paraboloid reflector Compound parabolic concentrator Fresnel's Lens concentrator

Tracking requirement of CPV

Unit IV -

Introduction to thin films Two dimensional material, various methods of thin films growth, Molecular Beam Epitaxy (MBE), Controlled deposition of single Atomic Layer, Liquid Phase Epitaxy (LPE) ,and Vapour Phase Epitaxy (VPE), Characterization of thin Film. Application of thin film, Metal nanoclusters, semi conducting nanoparticles, rare gas and molecular clusters, methods of synthesis, carbon nanostructures, applications of carbon nanotubes, bulk nanostructured materials, solid disordered nanostructures, nanostructured crystals, photonic crystals.

Unit V -

Introduction to Nano science, Classification of Nano materials, Size dependence of properties, Energy Bands, Chemical Mechanical, Magnetic, Structural, Optical (linear & non-linear) properties of nanoparticles. Emergence of nanotechnology: Bottom-up & Top-down approach.

Reference Books -

1. Optical Properties of Solids Mark Fox Oxford University Press
2. Solar Photovoltaics: Fundamentals, Technologies and Applications, C. S. Solanki, Prentice Hall of India, 2011.
3. Solar cells: Operating principles, technology and system applications, by Martin A. Green, Prentice-Hall Inc, Englewood Cliffs, NJ, USA,
4. Fiber Optic Communication - Govind P. Agrawal, 3rd Edition, Wiley Series in Systems
5. Introduction to Nanotechnology- Charles P.Poole and Frank J.Ovens, Wiley and Sons
6. Nanostructures: Theory & Modelling : C. Delerue & M. Lannoo (Springer)
7. Nanotechnology-Basic Science and Emerging Technologies by M. Wilson, Kamali Kannangara Geoff Smith, Michelle Simmons, B, Raguse
8. Nanotechnology- An Introduction to Nanostructuring Techniques-Wolfgang Fritzsche

9. Nanomaterials- synthesis, Properties & application A.S.Edelstein & R C Cammarata Introduction to Nanotechnology-Charles P. Pool;e. Jr. & Frank J. Qwens)"

Paper III - Digital Image Signal Processing

Unit I - Image Enhancement

Spatial domain methods and frequency domain methods, Enhancement by point processing: histogram processing, Image subtraction, image averaging. Spatial Filtering: smoothing and sharpening filters. Enhancement in the frequency Domain: lowpass, high pass and homomorphic filtering. Generation of spatial masks from frequency domain specifications, Color image processing: color fundamentals, color models, pseudo color image processing, full color image processing.

Unit II - Image Restoration

Degradation Model for continuous functions, discrete formulation, Diagonalization of circulant and Block Circulant matrices: curculant matrices block circulant matrices, effect of diagonalization on the degradation model. Algebraic approach to restoration: unconstrained and constrained restoration. Inverse filtering , least mean square (Wiener) filter , Constrained least squares Restoration, Interactive Restoration , restoration in the spatial domain , geometric transformations : spatial transformations ,gray level interpolation

Unit III- Image Compression

Fundamentals: coding redundancy, inter pixel redundancy, psycho visual redundancy, fidelity criteria. Image compression models: the source encoder and decoder, the channel encoder and decoder. Elements of information theory: measuring information, the information channel, fundamental coding theorems. Error free compression: variable length coding, bit plane coding, lossless predictive coding. Lossy Compression: Lossy predictive coding, transform coding.
Image Compression standards: binary image compression standards, continuous tone image compression standards.

Unit IV - Image Segmentation

Detection of discontinuities: point, line, edge and combined detection. Edge linking and boundary detection: local processing, global processing via the Hough Transform, global processing via graph theoretic techniques. Thresholding: foundation, the role of illumination, simple global thresholding, optimal thresholding, thresholding selection based on boundary characteristics, thresholds based on several variables. Region oriented segmentation, use of motion in segmentation.

Unit V - Image Representation, description and recognition

Representation schemes: chain codes, signature, boundary segments. Boundary descriptors: some simple descriptors, Fourier descriptors, Regional descriptors: topological descriptors, moments, Relational descriptors. Recognition: Elements of image analysis, patterns and patterns classes, Decision theoretic methods: matching, optimum statistical classifiers,

structural methods. Interpretation: logical systems (predictive calculus), semantic networks, production systems.

Reference Books –

1. Digital Image Processing – Gonzalez and Woods, 2nd Edition, Pearson Education Publication
2. Digital Image Processing – Gonzalez and Woods, Pearson Education using Matlab Publication
3. Digital Image Processing – B.Chanda, D.Dutta and Majumdar Analysis, PHI Publication
4. Fundamentals of Digital Image Processing – S. Annadurai ,R.shanmugalakshmi,Pearson education
5. Digital Image Processing - Rafael C Conzalez & Richard E. Woods, AWL.
6. Fundamental of Digital Image Processing - A.K.Jain, PHI.
7. Digital Picture Processing - Rose field Kak.
8. Digital Image Processing - W.K.Pratt.

Dissertation- Marks: 150

Students individually will carry out a detail study on a topic and implement a related system. The study must include literature survey, methodology and proposed work, experimental details and results, modifications to be included and future directions, applications etc. A report is to be prepared and submitted under the guidance of a supervisor. The report should contain design, implementation and experimental details. The topics involved in the work should be related to the courses undertaken by the student till this portion of progression under the programme and have contemporary relevance. It can involve research and development oriented works and be carried out with an eye on the needs of the industry. The work must be defended through a presentation in front of a panel constituted by selected experts. The quality of the work should be reflected by at least one publication in conference proceedings/ journals etc.

SCHEME OF EXAMINATION

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SYLLABUS OF

Course Work For

Ph.D.(ELECTRONICS)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Electronics

EFFECTIVE FROM JULY 2017

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SCHEME OF EXAMINATION & SYLLABUS PRESCRIBED FOR THE EXAMINATION OF

Course Work for
Ph.D. (Electronics)

EFFECTIVE FROM JULY 2017

Scheme of Examination

The Course Work for PhD degree in Electronics is a six month course after completion of P.G. Degree in the subject. There shall be two compulsory papers based on the research areas of Electronics discipline. The structure of the course is given below:

S No	Theory Paper	Marks
1.	Research Methodology, Quantitative Methods & Computer Applications	100
2.	Review of Literature in Concerned Subject, Seminar/ Project Report	100
Total		**200**

Paper I

Research Methodology, Quantitative Methods & Computer Applications

Unit I - Introduction and Design of research

Meaning, objective and significance of research, types and parameters of research, research process, identification and definition of the research problem, definition of construct and variables, pure and applied research design, exploratory and descriptive design methodology, qualitative Vs quantitative research methodology, field studies, field experiments Vs laboratory experiments, research design in social and physical sciences.

Unit II - Data Analysis

Procedure for testing of Hypothesis, the null hypothesis, determining level of significance , type I and type II errors, grouped data distribution, measures of central tendency, measures of spread/dispersion, normal distribution, analysis of variance: one way, two way, Chi square test and its application, students 'T' distribution, non parametric statistical techniques, binomial test, Correlation and regression analysis- discriminate analysis- factor analysis- cluster analysis, measures of relationship.

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Unit V - Image Fundamentals –

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3. Solar Photovoltaic's: Fundamentals, Technologies and Applications, C. S. Solanki, 2nd Edition, Prentice Hall of India, 2011.
4. Solar cells: Operating principles, technology and system applications, by Martin A. Green, Prentice-Hall Inc, Englewood Cliffs, NJ, USA,
5. Physics of Solar Cells: From Basic Principles to Advanced Concepts Peter Würfe Wiley-VCH; 1 edition
6. Organic Electronics: Materials, Manufacturing, and Applications Hagen Klauk Wiley-VCH; 1 edition
7. Organic Molecular Solids Markus Schwoerer (Author), Hans Christoph Wolf, Wiley-VCH; 1 edition (March 27, 2007)
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9. Digital Image Processing : Gonzalez and Woods, 2nd Edition, Pearson Education Publication
10. Fundamental of Digital Image Processing - A.K.Jain, PHI.

Paper – II

Review of Literature in Concerned Subject, Seminar/ Project Report

PT. RAVISHANKAR SHUKLA UNIVERSITY

RAIPUR - 492010, CHHATTISGARH

MSc EnvironmentalScience

SYLLABUS

SEMESTER EXAMINATION

2017-2018
Onward

MSc ENVIRONMENTAL SCIENCE COURSES

The Environmental Science is a multidisciplinary subject includes chemistry, physics, geology, geography & biology. The teaching and research in the environmental science is urgently required for understanding and controlling the complex environmental issues arising at the local, regional and global scales.

Semester-I July-2017 (Credit: 24)					
PAPER	**COURSE**	**DURATION**	**INTERNAL ASSESSMENT**	**THEORY MARKS**	**TOTAL MARKS**
ENV-01	Fundamental of Ecology	3 Hrs	20	80	100
ENV-02	Instrumental Techniques: Principle and Application	3 Hrs	20	80	100
ENV-03	Analytical Methods in Environmental Sciences	3 Hrs	20	80	100
ENV-04	Renewable, Nonrenewable and Perpetual Resources	3 Hrs	20	80	100
ENV-05	Lab work-1	8 Hrs.			100
ENV-06	Lab work-2	8 Hrs.			100
Semester-II January-2018 (Credit: 24)					
ENV-07	Meteorology and Climatology	3 Hrs	20	80	100
ENV-08	Environmental Pollution and Control : Air and Water	3 Hrs	20	80	100
ENV-09	Environmental Pollution and Control: Soil, Solid Waste, Radiation and Noise	3 Hrs	20	80	100
ENV-10	Environmental Geosciences	3 Hrs	20	80	100
ENV-11	Lab work-3	8 Hrs.			100
ENV-12	Lab work-4	8 Hrs.			100

Semester-III July-2017 (Credit: 24)					
ENV-13	Environmental Toxicology	3 Hrs	20	80	100
ENV-14	Environmental Microbiology	3 Hrs	20	80	100
ENV-15	Environmental Biotechnology	3 Hrs	20	80	100
ENV-16	Data Analysis in Environmental Sciences	3 Hrs	20	80	100
ENV-17	Lab work-5	8 Hrs.			100
ENV-18	Lab work-6	8 Hrs.			100
Semester-IV January-2018 (Credit: 24)					
ENV-19	Remote Sensing and GIS	3 Hrs	20	80	100
ENV-20	Environmental Disaster and Risk	3 Hrs	20	80	100
ENV-21	Environmental Impact Assessment, Environ-mental Audit and Environmental Management System Standards (EIA, EA and EMSS)	3 Hrs	20	80	100
ENV-22	Environmental Law, Policies and Society	3 Hrs	20	80	100
ENV-23	Dissertation	8 Hrs.			200

Internal elective paper (Credit: 4)

(i) Food adulteration
(ii) Waste management

External elective paper (Credit: 4)

(i) Renewable, Nonrenewable and Perpetual Resources
(ii) Environmental Disaster and Risk
(iii) Environmental Law, Policies and Society

Semester-I (24 Cr)

Course-1: Fundamentals of Ecology (4 Cr)

Unit-I: Concept of Ecology (1 Cr)

History and scope of ecology: autecology, synecology, population, community, ecosystem, biome, tolerance range and limiting factors; Component parts of an ecosystem; Classification of ecosystems; Ecological factors: temperature, light, water; Bio-geo-chemical cycles: Carbon cycle, nitrogen cycle, sulfur cycle, phosphorous cycle; Functional attributes of an Ecosystem :Biological diversity and stability; Biodiversity: Index of diversity and dominance, Biological indices, relationship between species diversity, dominance and stability; Food chain: Trophic levels & ecological pyramid concept; Types of food chain & significance of food chains, pyramid of number, biomass & energy.

Unit-II: Primary and Secondary Production and Ecosystem Energy Flow (1 Cr)

Concept of Primary Production; Factors affecting primary production; Method for measuring primary production; Relationship between GPP & NPP, atmospheric respiration, primary productivity of different world sites; Secondary production: concept of secondary production and secondary productivity, maintenance cost, production-assimilation efficiency and secondary productivity; Relationship of secondary production to net primary production, Energy flow in Ecosystems, Concept of Energy, Energy source in Ecosystem, Laws governing energy transformation, concept of free energy, Enthalpy and Entropy, Energy flow in producers and consumers, Lindeman's Trophic-Dynamic concept, Ecological efficiencies, Energy flow models.

Unit-III: Population Attributes, Population Fluctuation and Population Interaction (1 Cr)

Biotic potential and natality, mortality, survivorship curves, life table, age structure, population growth forms, concept of carrying capacity and environmental resistance; Life history strategies, r and k selection, extrinsic and intrinsic abiotic, biotic, density dependent and independent factors associated with population fluctuation; Population interaction like symbiosis, commensalism, parasitism, predation, competition etc.; Models for single and interacting population, social behavior in animals. Factors affecting change in size of human population: death rate and net population change, migration, fertility, age structure, Human population control; economic development and demography transition, family planning method of birth control, socio-economic methods of controlling human population growth.

Unit-IV: Biotic Community and Ecological Succession (1 Cr)

Concept of habitat and niche, types of niches: spatial, trophic and hyper volume niche; ecological equivalents, community organization, types of communities, community structure (analytical and synthetic), qualitative features of community (Composition, stratification, Physiognomy, dispersion, sociability, vitality, etc.), quantitative characteristics of community (frequency, density, cover dominance and diversity, important value index),

Ecotone and edge effect. Ecological succession and kind of succession, succession process, concept of climax, monoclimax, and polyclimax theories, examples of succession (hydrosere, lithosere and xerosere) and vegetation of India.

Books & References

1 E. P. Odum, Fundamental of ecology**,** W.B Sounders, 1971.
2 M. Dash and S. Dash, Fundamentals of ecology, Mc Graw Hill Education, India, 2009.
3 R. T. Wright and B. J. Nebel, Environmental science: Toward A sustainable future, Prentice Hall, 2002.
4 P. Stiling, Ecology: Theories and Applications, Prentice Hall, 2001.
5 C. Faurie, Ecology: Science and Practice, Oxford & IBH, 2001.
6 G. T. Miller, Living in the environment: An introduction to environmental science, Wadsworth Publishers, 1998.
7 J. Turk, Introduction to Environmental Studies**,** Saunders, 1980.
8 E. J. Kormondy, Concepts of ecology, Prentice Hall, 1996.
9 M. M. Saxena, Applied Environmental Biology, Agrobios, 1990.
10 E. Odum and G. W. Barrett, Fundamentals of Ecology, Brooks Cole, 2004

Course-2 : Instrumental Techniques: Principale & Application (4 Cr)

Unit-I:Electrochemical Techniques (1 Cr)

Idea of pH and buffer, Buffer capacity and ionic strength; Principle and application of pH-metery, potentiometery, conductometry, coulometry, polarography, voltammetry (cyclic and anode stripping), amerometry and ion selective electrodes.

Unit-II: Spectroscopic Techniques (1 Cr)

The principle, instrumentation and application of the infrared, FTIR, visible, ultraviolet and Raman and fluorescence spectrometry, nephelometry and turbidimetry.

Unit-III: Atomic Spectroscopic Techniques (1 Cr)

Principle, instrumentation and application of atomic absorption (i.e. flame, graphite furnace, hydride generation and cold vapor) spectroscopy and atomic emission (i.e. flame, plasma, spark and arc) spectroscopy.

Unit-IV: Principle, instrumentation and application of X-ray fluorescence spectroscopy (XRF), γ-ray spectroscopy, proton induced X-ray emission spectroscopy (PIXE), NMR and ESR spectroscopy.

Books & References

1 G. D. Christian, Analytical Chemistry**,** 6th Ed**,** John Wiley & Sons, 2007.
2 H. A. Strobel and W. R. Heineman, Chemical instrumentation: a systematic approach, Wiley, 1989.
3 H. H. Willard, Instrumental methods of analysis, Van Nostrand, 1981.
4 Z. Marczenko and M. Balcerzak, Separation, preconcentration and spectrophotometry in Inorganic Analysis, Elsevier, 2000.
5 E. B. Sandell and H. Ōnishi, Photometric determination of traces of metals, Wiley, 1978.
6 B. Welz and M. Sperling, Atomic Absorption Spectrometry**,** John Wiley & Sons, 2008
7 Ed Metcalfe, Atomic absorption and emission spectroscopy, J. Wiley, 1987.

Course-3: Analytical Methods in Environmental Sciences (4 Cr)

Unit- I: Separation techniques (1 Cr)

Concept and application of separation probes: adsorption, centrifugation, chromatography, crystallization, decantation, demister (vapour), distillation, drying, electrophoresis, elutriation, evaporation, leaching, liquid-liquid extraction, solid phase extraction, flotation, flocculation, filtration, reverse osmosis, dialysis (biochemistry) fractional distillation, fractional freezing, magnetic separation, precipitation, crystallization, sedimentation, sieving, stripping, sublimation, vapour-liquid separation, winnowing and zone refining.

Unit- II: Chromatography (1 Cr)

Principle, instrumentation and application of gas, liquid, adsorption, paper, gel, size exclusion, HPLC, TLC, electrophoresis and ion exchange chromatography.

Unit- III: Mass spectroscopy (1 Cr)

Principle, instrumentation and application of mass spectroscopy, types of mass spectroscopy, fragmentation, ionization and characterization of organic and inorganic materials.

Unit- IV: Miscellaneous methods

Principle, instrumentation and application of classical analytical methods(i.e. gravimetric, volumetric and thermal methods); Automatic analytical methods and Hybrid analytical methods.

Books & References

1 E. Katz, Quantitative Anallysis Using Chromatographic Techniques, John Wiley & Sons, 2009.
2 J. Rydberg, M. Cox and C. Musikas, Solvent extraction principles and practice, CRC Press, 2004
3 P. J. Haines, Principles of Thermal Analysis and Calorimetry, Royal Society of Chemistry, 2002.
4 E. de Hoffmann and V. Stroobant, Mass Spectrometry: Principles and Applications, John Wiley & Sons, 2007

Course-4: Renewable, Non-renewable and Perpetual Resources (4 Cr)

Unit-I: Renewable Resources (forest) (1 Cr)

Importance of Forest with reference to major and minor produce, climate, soil erosion, pollution control and water management,. Loss of forest cover with reference to world and Indian Context, Impact of deforestation and shifting cultivation on forest ecosystems, Management of forests involving different silvicultural principles and practices. Raising forest cover through social forestry, agroforestry and extension forestry, Eucalyptus dilemma ,Joint Forest management ,People's participation and role of NGOs, , Concept of Biosphere Reserve , Biodiversity and forest : definition and type of biodiversity, global distribution of biodiversity, mega biodiversity countries, key stone species, dominant species, biodiversity hot spots, significance of biodiversity , factors influencing biodiversity loss, biodiversity conservation (in situ and ex situ).

Unit-II: Renewable Resources (Rangeland and Wildlife) (1 Cr)

Rangeland: Importance and extent of rangeland, causes of rangeland loss, conservation and management of rangeland, Wild Life resources: Wild life & its importance. Human activities and Wild Life, Concept of Endangered Species, IUCN classification and Red data Book, ecological basis of wild Life conservation and management, some case studies on crocodile, sea turtle and project tiger

Unit-III: Non-renewable Mineral and Fossil Fuel Resources (1 Cr)

Mineral Resources :Economic mineral deposits, grouping of ores minerals ,various steps involved in extraction processes of pure metals, uses of common metals and their recycling, Radioactive minerals, Environmental impact of mining and processing mineral resources, conservation of mineral resources. Fossil fuels: Classification, Coal, its type and its analysis, Carbonization, oil : fractionation, cracking Octane and octane number, addition of TEL; natural gas and other gaseous fuels derived from fossil fuels, Environmental Impact of Fossil Fuel use.

Unit-IV: Perpetual & Nonrenewable and Perpetual and Renewable Energy Source (1 Cr)

Geothermal energy: Source, Principle of harnessing energy and its operation. Nuclear Energy : Source, fission and fusion reactions, broad idea of nuclear reactor, its operations, management and electrical power generation, safety measures. Solar energy: its secret, devices based on solar energy, their advantages and drawbacks, wind energy: wind mills and applications, aero-generators, their advantages and disadvantages, Water energy: Hydroelectricity, wave and tidal energy, tidal power plant, their advantages and drawbacks Energy from biomass: Biomass as fuel, Biogas plants and generation, uses of biogas

Books & References

1 F. Ramade, Ecology of natural resources, John Wiley & Sons, 1984.

2 R. Toossi, Energy and the Environment: Sources, Technologies, and Impacts, VerVe Publishers, 2008.
3 K. Singh, Handbook of Environment, Forest and Wildlife Protection Laws in India, Natraj, 1998.
4 S. S. Negi, India's Forests, Forestry and Wildlife, India Book House, 2006.
5 C. A. Simon, Alternative Energy: Political, Economic, and Social Feasibility, Rowman & Littlefield, Lanham, Maryland, 2006.
6 O. Edenhofer, Renewable Energy Sources and Climate Change Mitigation, Cambridge University Press, 2011.
7 A.Karen, Environmental Science: Understanding Our Earth, Cengage Learning, 2011
8 L. R. Berg and M. C. Hager, Visualizing Environmental Science, Second Edition, Wiley and National Geographic, 2009.
9 B. Judy and St. A. Sara, Environmental Science, Pearson – AGS Globe, 2007.

Course-5: Practical (4 Cr)

1. Verification of Beer's law.
2. Determination of detection limit and molar absorptivity.
3. Determination of absorption maximum, λ_{max}.
4. Simultaneous determination of two or more components in a given mixture.
5. Determination of retardation factor (R_f) value of components in a given mixture by using paper chromatography.
6. Determination of pk_a value of weak electrolytes.
7. Determination of electrode potentials.
8. Determination of cell constant.
9. Determination of specific conductivity.
10. Determination of distribution ratio by using solvent extraction technique.
11. Determination of percentage extraction (%) of given substance by using solvent extraction. technique.
12. Other advanced practical.

Course-6: Practical (4 Cr)

1. Determination of dissolved oxygen of water samples.
2. Determination of reduction potential of water samples.
3. Determination of total dissolved solid of water samples.
4. Determination of hardness of water samples.
5. Determination of alkalinity of water samples.
6. Determination of COD and BOD value of water samples.
7. Determination of color value of waste water.
8. Determination of salinity of water.
9. Determination of microbe content of water.
10. Other advanced practical.

Semester-II (24 Cr)

Course-7: Meteorology and Climatology (4 Cr)

Unit-I: Atmosphere, Oceans and Earth's Radiation Balance (1Cr)

Introducing the Atmosphere, The heterosphere, Subdivisions of the homosphere, the troposphere, atmospheric pressure, Introducing the oceans: Composition of Sea water, Density of sea water, Layered structure of Oceans; Solar radiation, Insolation over the Globe, World Latitudinal zones, Insolation losses in the atmosphere, Long wave radiation, Latitude and the radiation balance, Annual and Daily Cycles of radiation, Man's Impact upon the Earth's Energy Balance, Cosmic particles and Ionizing radiation, The magnetosphere, radiation belts Meteorology fundamentals – Pressure, temperature, wind, humidity, radiation, atmospheric stability adiabatic diagrams, turbulence and diffusion. Scales of meteorology. Applications of micrometeorology to vegetated surfaces, urban areas, human beings, animals.

Unit-II: Thermal Environments of the Earth's Surface and Circulation Systems in Atmosphere and Oceans (1Cr)

Heat flow mechanisms, The Heat Balance Equation, The daily and annual heat balance cycles, Heating and cooling of the soil, Arctic permafrost, Energy absorption by water layers, Heating and cooling of lakes and oceans, Sea Surface Temperatures, Sea Ice and its distribution, Daily cycle of air temperature near the ground, Thermal extremes near the ground, The Annual Cycle of Air temperature, Global distribution of air temperatures, Radiation and Heat Environments of High altitudes; Barometric pressure and winds, Idealized circulation on a nonrotating earth, Coriolis effect and the geostrophic wind, Cyclones and anticyclones, The Planetary circulation, Angular momentum transport by air masses, Atmospheric circulation in middle and high latitudes, Heat transport across parallels of latitude, Global patterns of barometric pressure and surface winds, Monsoon winds systems, Local winds, Wind and waves, The causes of ocean currents, The global pattern of ocean currents, Zones of convergence and upwelling, , El Nino, ENSO, The Earth's heat balance, Seasons in India.

Unit –IIII: Atmospheric Energy Releases (1Cr)

Relative humidity and vapor pressure, Absolute and specific humidity, air masses, condensation and adiabatic process, clouds and fog, forms of precipitation, Convective precipitation and thunderstorms, Orographic precipitation, Cyclonic and frontal precipitation, World precipitation regions, Water balance of the atmosphere,

Unit-IV: Man's Impact upon the Atmosphere (1Cr)

Carbon dioxide and oxygen levels in the atmosphere, Man induced changes in Atmospheric temperature, water vapor, clouds, and precipitation, Planned weather modification, Urbanization and balances of radiation and heat, Pollutants in the atmosphere, Inversion and smog, Glacial ice as a recorder of air pollution, Harmful effects of atmospheric pollution, Global effects of particles in the atmosphere, Testimony of the glacial ice layer, Application of meteorological principles to transport and diffusion of pollutants, Scavenging processes, Effects of meteorological parameters on pollutants and vice versa, Wind roses, Topographic effects, concepts of climate change.

Books & References

1 Helmis C. G. and Nastos, P. T. (Eds.), Advances in Meteorology, Climatology and Atmospheric Physics, Springer Atmospheric Sciences, 2013.
2 P. V. Hobbs and J. M. Wallace, Atmospheric Science: An Introductory Survey, Academic Press Inc, 2006.
3 C. Booker, The Real Global Warming Disaster, Continuum Publishing Corporation, 2009.
4 A. Goudie, The nature of the environment, Blackwell, 2001.
5 K. S. Valdiya, Environmental Geology, Tata Mc Graw Hill, 1984.
6 Atmosphere, Weather and Climatology: A textbook on climatology, Kisalaya Pub. Pvt. Ltd, New Delhi, 1984.
7 R. G. Barry and R. J. Chorley, Atmosphere, Weather and Climate, Routledge, 2009.
8 J. E. Martin**,** Introduction to Weather and Climate Science, Cognella Academic Publishing, 2013.
9 J. O. Ayoade, Introduction to Climatology for Tropics, Wiley, 1993.
10 The Atmosphere : An Introduction to Meteorology, Prentice Hall; 12 edition, 20012.

Course-8: Environmental Pollution and Control: Air and Water (4 Cr)

Unit-I: Air Pollution (1Cr)

Atmosphere and its functions, Physical and chemical properties of atmosphere, , natural and anthropogenic sources of atmospheric pollutants, Major and Minor Pollutants in atmosphere (SO_x, NO_x,CO_2, Fluoride etc.),Gas laws governing the behavior of pollutants in atmosphere, transport and dispersion of pollutants – effect of meteorological and topographical factors, significance of these pollutants and their reactions in the lower and upper atmosphere,, Greenhouses effect, Photochemical smog, Ozone layer depletion Acid rain and their impact. History of some major air pollution episodes and case studies of some air polluting industries (thermal power , steel ,aluminum ,cement etc.) ,effect of air pollutants on plants, animals, microorganisms, man, physical structures and materials.

Unit-II: Water Pollution (1 Cr)

History of major water pollution episodes , Sources, Classification and types of Water Pollution, characteristics of domestic, municipal, industrial and agricultural wastes – their effects with special reference to oil and detergents, and Heavy metals (mercury, lead, Arsenic cadmium, chromium), pesticides, and other toxic organics and inorganic constituents, Eutrophication and ecological magnification due to water pollution, History of some major water pollution episodes and case studies of some water polluting industries (Sugar and molasses Pulp and Paper Dairy Textile, Food processing, leather etc.)

Unit-III: Prevention and Control of Air Pollution(1Cr)

Source-emission inventory, Air quality criteria, Air quality standards(Ambient and Emission Standards), Natural self cleansing properties of the environment, Dilution methods for controlling air pollution from stationary source, Prevention Methods for control of gaseous

air pollutants (Combustion ,Absorption and Adsorption), Methods for control of Particulate air pollutants Mechanical device , Filtration , ,Wet scrubber ,Dry Scrubber , Electrostatic precipitator)

Unit-IV: Prevention and Control of Water Pollution (1Cr)

Water quality standard: Drinking Water quality standard, Irrigation water standard , Stream standard and effluent standard, Selection of appropriate unit operation for ETP to achieve desired standards. Methods of treatment of waste water: Preliminary Treatment, Primary treatment, (Sedimentation, Equalization and Neutralization, etc.), secondary treatment (Activated Sludge Technique & Trickling Filter) Tertiary treatment methods for waste water treatment (Evaporation, Ion Exchange ,Adsorption, Electro dialysis, Electrolytic Recovery, Reverse Osmosis) Characteristics of primary, secondary sludge from effluent treatment plant. Sludge dewatering by sludge thickener, sludge drying beds, vacuum filtration and filter press. Sludge disposal and fill and additive in fertilizers.

Books & References

1 N. de Nevers, Air pollution Control Engineering, Mc Graw Hill, 2000.
2 K. Work and C. F Warner, Air Pollution, its origin & Control, New York, 1997.
3 H. Braur and Y. B. G. Verma, Air Pollution Control Equipment, Springer Verlag, 1981.
4 G. Gaur, Air Pollution and its Management, Sarup & Sons, 1997.
5 R. K. Trivedi and P. K. Goel, Air Pollution, Techno-science, 1998.
6 G. Kiely, Environmental Engineering, Tata MC. Graw Hill, 1997.
7 P. K. Goel, Water Pollution , Causes ,effect and Control, New Age International, 2006.
8 S. K. Garg, Sewage Disposal & Air Pollution Engineering, Khana Publisher, 2008.
9 I. J. Higgins and R. Burns, The Chemistry and ecology of pollution, Academic Press, 1975.
10 S. S. Dara, A text book of Environmental Chemistry and Pollution Control, S. Chand, 1993.
11 A. K. De, Environnental Chemistry, New Age International, 2003.
12 J. W. Moore and E. A. Moore, Environmental Chemistry, Academic Press, 1991.
13 T H Y Tebbut, Principal of water quality control, Pergamon Press, 1992.
14 R. K. Trivedy and S. N. Kaul, Advances in Waste water Treatment and Technologies, Vol. II, Global Science, 2000.

Course-9: Environmental Pollution and Control: Soil, Solid Waste, Radiation and Noise (4 Cr)

Unit-III: Soil Pollution and Control (1 Cr)

The nature and importance of soil. Physical and Chemical properties of soil, Industrial wastes of different kinds, their interactions with soil components, problems due to toxic heavy metals and. Contamination of radionuclides, Source translocation, distribution and uptake of heavy metals, toxic and ecological effect, Pollution due to pesticides in soil, persistence, fate and degradation of pesticides in soil, Toxicity and effect of pesticides on soil organisms and plants, Alternate methods of pest control: Biological control, Hormonal control, Integrated pest management, Pollution due to fertilizers (N, P and K) and their interactions with

different components of soil, fate of fertilizers, due to volatilization, leaching and microbial immobulation, their toxicity and pollution, Alternatives to conventional pesticides and fertilizers(biofertilizers, biopesticides and organic farming)

Unit-II: Solid Waste Pollution and Control (1 Cr)

Sources, nature and characterization of municipal solid waste, Hazards from these solid waste, various methods of disposal and management of solid and hazardous waste (composting, recycling, bio-methanation, pelletisation, pyrolysis, incineration, gasification, sanitary disposal etc.), hazardous and biomedical waste: categorization, generation, collection, transport, treatment and disposal, Hazardous waste and biomedical waste. Guidelines for HWM and Biomedical waste management. Treatment and disposal of some industrial solid waste like fly-ash & red mud.

Unit-IIII: Radiation Pollution and Control (1 Cr)

Discovery' of Radioactivity, Units of measurement and definition of radioactivity, Sources and Classification of radioactive pollution, Methods of radioactivity measurements, biological pathways, transport and effects of radiation, Mechanism of Radiation action on living system – Stochastic and Non-stochastic effects: delayed effects; protection and control from radiation, disposal of radio active waste.

Unit-IV: Noise Pollution and Control (1 Cr)

Basic properties of sound waves-plane and spherical waves, sound pressure and intensity levels, decibel, effect of meteorological parameters on sound propagation. Noise sources; (machinery noise, pumps; compressors, building and construction equipment, domestic appliances, traffic – vehicular, train, aircraft) effect of noise on human health, noise standards and limit values. Prevention and control of Noise Pollution (sound absorbing materials, reverberation time, acoustic silencers, mufflers, barriers, vibration and impact isolation, anechoic chamber, greenbelt development).

Books & References

1 S. E. Manahan, Environmental chemistry. Lewis Publ., 1992
2 A.P. Sincero and G.A. Sincero, Environmental Engineering, Prentice, 1996.
3 C. S. Rao, Environmental Pollution Control Engineering, Willey Estern, 2007
4 P. F. Cunniff, Environmental noise pollution, Wiley, 1977.
5 A. Farmer, Handbook of Environmental Protection and Enforcement: Principles and Practice, Earthscan, 2007.
6 S. Dara, Textbook of Environmental Chemistry and Pollution Control, Chand (S.) & Co Ltd ,2006.
7 H. J. Arnikar, Essential of Nuclear Chemistry: New Age International Publishers, 2011
8 P. R.Trivedi and Raj G. (Eds.) Encyclopaedia of Environmental Sciences: Solid Waste Pollution Vol.24. Akashdeep, Publishing House, 1992.
9 D. Mani and S. G. Mishra, Soil Pollution, APH Publishing, 2009.
10 P. K. Gupta, Pesticides in Indian Environment, Interprint, 1986

11 H. D. Forth, Fundamentals of Soil Sciences : New York : Wiley, 1990
12 T. D. Biswas and S. K. Mukherjee, Text-Book of Soil Sciences, Tata McGraw-Hill, 1987

Course-10: Environmental Geosciences (4 Cr)

Unit-I: Fundamentals of Geosciences (1 Cr)

Different spheres in the earth: lithosphere, hydrosphere, atmosphere, biosphere; Primary differentiation and formation of core, mantle, crust, magma generation and formation of igneous rocks: earth dynamic processes: plate tectonics, types of plates, isostasy, geomorphic agents: river, wind, snow, glacier, volcanoes, weathering, erosion, transportation and deposition of earth's materials by running water, wind and glaciers: formation of land forms and sedimentary rocks

Unit-II: Environmental Geochemistry (1 Cr)

Concept of major, trace and rare earth element, Geochemical classification of elements: Abundance of elements in the bulk earth, crust, hydrosphere, atmosphere and biosphere. mobility of trace elements, geochemical cycles, biogeochemical factors in environmental health, human use, trace elements and health, Mineral stability diagrams and controls on the chemistry' of natural waters.

Unit-III: Surface Water Resources and Environment (1 Cr)

Global water balance, ice sheets and fluctuation of sea levels, origin and composition of sea water, hydrological cycle, and its components. Precipitation(Various form of precipitation, interpretation of precipitation data), Evaporation and Evapo-transpiration (Meteorological factors, transpiration, methods of estimating evaporation from land surface using Penman's equation), Infiltration and percolation(Infiltration capacity of soil, Factors influencing infiltration capacity, methods of determining infiltration capacity) Runoff (Duration of runoff, flow rating curves-their determination, adjustment and extension, catchment characteristics and their effects of runoff), climatic factors. Hydrological forecasting: Frequency analysis, probability of the N-year event, series of events, Probability plotting, cyclical nature of hydrological phenomena.

Unit-IV: Ground Water Resources and Environment (1 Cr)

The occurrence of ground water factors of influence, ground water flow, abstraction of ground water, Darcy's law: Darcy's experiment; Fundamental Equation of ground water flow: Generalization of Darcy's law.

Aquifer and its types; Confined and Unconfined aquifers; Properties of Aquifer, permeability, porosity.

Groundwater occurrence & movement; Ground water levels and Environmental influences.

Books and References

1. Environmental Geology: Indian Context by K. S.Valdiya ,Tata Macgraw Hill
2. Environmental Science : E. D. Enger and B. F. Smith
3. Introduction to Geochemistry : Krauskoph K. B.
4. Geology and our environment, Davis, S. N. , Reiton, P. H.& Pestrong, P. Mc.Graw Hill, NY
5. Environmental Geology, Keller, E,.A., Bell &Howell, Columbus, Ohio
6. Physical Geology, Strahler, A. N., John Harper & Row
7. Focus on Environmental Geology, Tank, R.W.Oxford Univ. Press
8. Text Book of Geology, P. K. Mukherjee
9. Environmental geology, Coates, D. R. , John wiley, NY

Course-11: Practical (4 Cr)

1 Determination of NPK in water, soil and sediment.
2 Determination of Al in water, soil and sediment.
3 Determination of Mg and Ca in water, soil and sediment.
4 Detection and determination of micro nutrients in water, soil and sediment.
5 Determination of Cl^- in water, soil and sediment.
6 Determination of SO_4^{2-} in water, soil and sediment.
7 Determination of NO_3^- in water, soil and sediment.
8 Determination of NH_4^+ in water, soil and sediment.
9 Other advanced practical.

Course-12: Practical (4 Cr)

1 Determination of bulk density, moisture content and ash residue of solid fuels.
2 Determination of gross calorific value of liquid and solid fuel.
3 Determination of flash point of oil.
4 Determination of refractive index and viscosity of oil.
5 Detection of glucose, fructose, sucrose, starch, etc.
6 Determination of iodine value of oil.
7 Determination of acid value of oil.
8 Determination of saponification value of oil.
9 Determination of chlorophyll in plant leaves.
10 Other advanced practical.

Semester-III (24 Cr)

Course-13: Environmental Toxicology (4 Cr)

Unit-I:Introducing Toxicology (1 Cr)

History, disciplines and importance of toxicology, Potency and Toxicity, Acute toxicity, chronic toxicity), Hazards ,Risks, Benefit-to-risk-ratio, tolerance limits, Acceptable daily intake, Threshold value. Factors affecting toxicity : Host factor (Age ,species and strain, sex, life stage, health and nutrition, Idiosyncratic toxicity) interaction between chemicals

(synergistic, additive and antagonistic).Environmental factors, Physico-chemical properties of toxic substances, route and rate of exposure, Dose, Effect and response, Dose-response curves , & Dose effect relationships (Graded & Quantal response). Statistical concept of toxicity, margin of safety and therapeutic index

Unit-II Translocation of Toxicity (1 Cr)

Absorption, Distribution and Excretion of toxic substances. Absorption: membrane permeability, mechanism of chemical transfer (passive transport, active transport, facilitated transport), absorption (Gastrointestinal, skin, lungs). Distribution: tissue affecting distributions and tissues retention. Excretion: Renal excretion, Biliary excretion and Gastrointestinal. Receptor Concept, Nature of receptors, Theory of toxicant receptor interaction, Mechanism of action of some Pesticides (organochlorine, carbamate and organophosphate) and heavy metals (lead, arsenic, mercury, cadmium and chromium)

Unit-III: Biotransformation and Bioaccumulation of Toxicants (1 Cr)

Site, Biotransformation reactions, Phase-I (Oxidation, Reduction, Hydrolysis) and Phase- II (Conjugation) reactions and associated enzymes (cytochrome P450 system, cytochrome-b5 system, amine oxidase epoxide hydrolase, esterases and amidases, glutathione-s-transferase),factors(environmental, chemical and organismal) affecting biotransformation of xenobiotics, concept of bioconcentration, bioaccumulation and biomagnifications. Process of accumulation and elimination of toxicants

Unit IV: Toxicity Tests and Safety Evaluation of Chemicals (1 Cr)

Toxicity tests**:** Types of toxicity test based on number of species(single species ,Multipecies and Ecosystem tests) , based on exposure(single dose and multiple dose) , based on duration of exposure (acute and chronic toxicity test), specific toxicity tests(potentiation, teratogenicity, reproductive ,carcinogenicity, skin, eye tests), safety evaluation of chemicals : introduction and definition of safety, process of risk assessment and safety evaluation programmer (nature of chemical, usage pattern, environmental level & fate, human exposure & effect, monitoring, surveillance and follow-up, decision making)

Books and References

1. Toxicology Vol I ,II and III : Gupta, Metropolitan
2. Experimental toxicology : Anderson & Conning
3. Environmental Pollution and Toxicology: Ray Choudhury & Gupta, Today & Tomorrow Publ.
4. Toxicology, Omkar
5. Toxicology, Sood, Sarup and Sons

Course-14: Environmental Microbiology (4 Cr)

Unit – I: Fundamentals of Environmental Microbiology (1 Cr)

An over view of microbial diversity (Archaea, Eubacteria, Eukaryotic microbes) cellular organization of bacteria and their types and distribution, microorganisms as component of the environment. Distribution of microbes in air, Allergic disorders by air micro flora fungal and pollen allergens. The microbial community in Marine and Fresh water environments. Microbiology of soil – soil habitats, Nutritional types of microorganisms.

Unit- II: Microbial Culture, Enumeration, Growth and Metabolism (1 Cr)

Concept of microbial culture (culture media, culture techniques like enrichment culture, pure, synchronous and continuous culture), Collection and enumeration of aeroallergens. Bacteriological analysis of water, sewage and waste water. Microbial examination of milk & dairy products. Microbial growth (different growth phases, multiplication and kinetics of growth) and microbial metabolism (aerobic, anaerobic, fermentative pathways)

Unit-III: Control of Microorganisms (1 Cr)

Physical agents (temperature, pressure, radiation), chemical agent (bacteriocidal and bacteriostatic compounds, halogens and phenolic) for control of microbes, chemotherapeutic agents (drugs and antibiotics) and their mode of action

Unit-IV: Applied Microbiology

Microbes as biofertilizers, biopesticides and single cell protein, mycorrhiza and their significance, microbial leaching of metals, microorganisms as source of fuel, role of microbes in the synthesis of Alcohols, Antibiotics, Amino acids, dairy products enzymes, vitamin productions and other organic acids, role of microbes in degradation of xenobiotics, microbes for biological treatment of waste water, microbiological biodegradation of Industrial wastes

Books & References:

1. Microbiology – Fundamentals and application R.M.Atlas ,Maxwell-Mcmillan International Ed. 1996
2. Broke –Biology of Microorganisms M.T. Madigan , J.M Martinko and J.Parker ,Prentice Hall International 1998
3. Microbiology -L.M. Prescott, J.P. Harley and D.A. Klein, Tata Mc Graw Hill 2003
4. Fundamentals of Microbiology and immunology, A.K. Banerjee and N. Banerjee ,Central Book Deport 2006
5. Microbiology -Michael J. Pelzer, Tata Mcgraw Hill
6. Microbes, Man and Animals : The Natural History of Microbial Interactions : Linton, A. H. and Burns, R.G. (1982) john Wiley and Sons.
7. Elements of Microbiology: Pelczar, M.J. and Chan ECS, 1981 McGraw Hill.

Course-15: Environmental Biotechnology (4 Cr)

Unit-I: Bioremediation (1 Cr)

Scope of bioremediation; types of bioremediation (Natural, solid phase ,slurry phase and bioventing); applications of bioremediation; Bioremediation efficacy testing; Approaches to bioremediation; Role of microbes in biodegradation of xenobiotic compounds:- halocarbons, polychlorinated biphenyls, alkyl benzyl sulfonates and oil mixtures, biodegradation of

pesticides, enzyme catalyzed pesticide degradation reactions. Biosorption, Use of bacteria, fungi and algae in biosorption, biomineralisation & bioleaching: Microorganisms involved in Bioleaching of ores, mechanisms of bioleaching, Bioleaching & Metal recovery. Bio indicators, Biomarkers and Biosensors in waste treatment.

Unit-II: Bioremediation of Contaminated Sites, Wastelands and Industrial Wastes (1 Cr)

Bioremediation of contaminated soils (natural attenuation and in-situ subsurface bioremediation) and aquifers (Root Zone Technology and Water Hyacinth – Based Treatment Systems).; bioremediation in aquaculture, Bioremediation of industrial wastes (distillery, pulp and paper, tannery, textile and dye ,dairy and food processing). Phytoremediation (phyto-extraction, phyto-stabilization, phytovolatilaztion, rhizodegradation and rhizofilteration), phytoremediation of inorganic, metallic and organic pollutants in contaminated sites, bioremediation of problematic soil: Coastal saline soil, Alkali soil and mine waste soil; waste land, types of waste land, microbial and earthwormic way of amelioration of waste lands.

Unit-III: Biotechnology for Air and water Pollution Abatement (1 Cr)

Air Pollution abatement: Bio-scrubber and Bio-filter, Water Pollution Abatement: Aerobic (Activated Sludge Process, Career advanced Activated Sludge Process, Biological Filters ,Rotating Biological Contractors, Fluidized Bed Reactors, Inverse Fluidized and Bed Biofilm Reactor, Expanded Bed Reactor) Anaerobic Biological Treatment (Contact digester, Packed bed or Packed Volume Reactor , Anaerobic baffled digester, Up flow anaerobic sludge blanket reactors), Membrane Bioreactor and Biocatalyst

Unit-IV: Biotechnology for Solid Waste Management (1 Cr)

Potential availability and composition of crop residues and other solid organic wastes. Principles of microbial Composting, Factor influencing composting. Methods of composting (aerobic and anaerobic). Degradation of cellulose, hemicelluloses, chitin, lignin, proteins, fats and waxes) during composting, and end products of composting, Vermicomposting (composting through Earthworms), advantages of vermicomposting over composting. Types of earthworm suitable for vermicomposting. Method of vermicomposting Changes during vermicomposting. Nutrient value of vermicomposts, Effect of vermicomposting on soil fertility and crop productivity, aquatic plant, organic wastes and energy crops for biogas, alcohol and hydrogen production using microorganisms, bioconversion of agricultural, Sewage sludge, Paper waste, sugar mill wastes, tannery sludge) to feed stuffs and fertilizers.

Books & References:

1. Wastewater Engineering Treatment disposal Reuse – Metacalf & Eddy Inc. 4th ed TMGHI ,New Delhi, 2003
2. Environmental Engineering Peavy, HS, Donald RR & G Tchobanoglous MGH Int. Ed. New York 1985
3. Wastewater Treatment for Pollution Control – Soil J Arceivala, Tata Mc Graw Hill 2nd ed. 1998

4. Wastewater Treatment Plants: Planning, Design and Operation- S.R. Qasim, Holt, Rinehart & Winston, 1985
5. Industrial Water Pollution Control – WW Eckenfelder, Jr. McGraw Hill 2nd Edition NY 1989
6. Sewage Disposal and Air Pollution Engineering, S.K. Garg, Khanna Publisher
7. Waste Water Engineering, G.L Karia & R.A Christian ,Prentice Hill Publication,2nd Edition, 2006.
8. Microbial Methods for Environmental Biotechnology: Grainer, J.M. and Lynch, J.M. 1984. Academic Press.
9. Methods in Biotechnology: Hans Peter Schmauder
10. Global environmental Biotechnology: D. L. Wise
11. Basic environmental technology: Jerry A. Nathanson.
12. Basic Biotechnology Ed. Colin Ratledge & B Jorn Kristiasen, Cambridge.
13. Environmental Biotechnology S.K. Agarwal, APH
14. Managing Industrial Pollution S.K. Bhatia, MacMillan
15. Biological and Biotechnological control of insect Pests, Rechcigl and Rechcigl, Lewis
16. Hand book of Bioremediation, Norris et al., Lewis
17. Micro-organism in Action: Lynch & Hobbie
18. Soil Biotechnology: Lynch Blackwel
19. Waste Recycling for energy conversion: Kutand and Hare, Johnwiley and Sons, N Y.
20. Refuse Recycling : Holms, John wiley & Sons, New York

Course-16: Data Analysis in Environmental Sciences (4 Cr)

Unit-I: Fundamentals of Statistics (1Cr)

Population & sample, Variables, Primary and secondary data, Collection of data, Classification and tabulation of data, Need and usefulness of Diagrams & Graphs, Different types of diagrams and graphs. Frequency distribution: Discrete and continuous frequency distribution, sampling methods (random sampling, Stratified random sampling, Systematic sampling), sampling errors, Experimental design: completely randomized block design, randomized block design, Latin square design.

Unit-II: Descriptive Statistics (1 Cr)

Measure of central tendency (Averages), Types of mean: Arithmetic mean, Geometric mean, Harmonic mean; Median, Mode, relation between mean median and mode; Measure of dispersion: Range, Mean deviation & Standard deviation; Skewness and Kurtosis .

Unit-III: Theoretical Probability Distribution (1Cr)

Binomial, Poisson and normal distribution; Testing of Hypothesis: Null and Alternative Hypothesis, level of significance, Student's t distribution and its application, Chi-square(x^2) test & its application.

Unit-IV: Correlation, Regression and ANOVA Analysis (1 Cr)

Types of correlation; simple, partial and multiple correlation, Method of study & testing the significance of correlation coefficient, Rank correlation, Regression analysis: regression equations and regression lines, Properties of regression lines, regression coefficient, testing the significance of regression coefficient. Analysis of variance (ANOVA): One way and two way classification and their applications.

Books and References

1. Walpole, R. and R. Myers (1993). Statistics for Engineers and Scientists, 5th edn. MacMillan, N.Y.
2. Manly (2001) Statistics for environmental science and management, Chapman and Hall / CRC.
3. Statistics : Gupta, Sultan & Chand
4. Fundamental of Statistics: Elhance
5. Biostatics: Mishra & Mishra
6. Statistical Methods: Snedecor and Cochran
7. Introduction to Biostatistics by N. Gurumani, MJB Publisher

Course-17: Practical

1 Sampling of indoor and outdoor aerosols.
2 Detection and determination of trace gases in air.
3 Determination of sound intensity in air.
4 Determination of carbon di-oxide levels in air.
5 Determination of meteorological parameters in air.
6 Determination of ions and metals in aerosols.
7 Determination of toxic elements in air.
8 Other advanced practical.

Course-18: Practical

1 Analysis of ions with ion chromatography.
2 Analysis of metals with flame photometer.
3 Analysis of metals with AAS.
4 Analysis of the VOCs with gas chromatography.
5 Analysis of H, C, N and O.
6 Analysis of organics with HPLC.
7 Analysis of ions with ion-selective electodes.
8 Other advance practical.

Semester-IV (24 Cr)

Course-19: Remote Sensing and Geographical Information System (4 Cr)

Unit-I: **(1 Cr)**

Introduction to Remote sensing Science & Technology: Principles of Remote sensing, Physical basis of Remote sensing. The nature and generation of Electromagnetic radiation (EMR). Interaction of EMR with the atmosphere and earth's surface features. Spectral signatures and characteristic spectral reflectance curves for rocks, soil, vegetation and water. Spectral quantities. Far and near infrared and microwave remote sensing.

Unit-II: (1 Cr)

Remote Sensing Observation and Platforms: Air borne and space borne platforms, their relative importance and applications, Orbital geometry. Remote Sensing Satellites. Sensors, Aerial cameras and type of aerial photography, Photo scale and photo elements, Single and multi band scanners MSS sensor and other type of sensors. Aerial Stereo coverage and. Details of sensors on board. Latest Earth resources Satellites viz. LANDSAT 6/7/8, SPOT, IKONOS, IRS,ERS, MODIS, RESOURCESAT, CARTOSAT, GOES,OCEANSAT. Hyperspectral imaging, RADAR and LIDAR techniques, Indian scenario of remote sensing.

Unit-III: **(1 Cr)**

Digital image processing: Introduction to digital structure and data recording format sets. Visual Photo-Interpretation Techniques based on Photo elements and Terrain elements, Image Restoration, Enhancement and classifications, Significance of Ground Truths and Training Sets in Image Processing and in automated processing.

Unit-IV: **(1 Cr)**

Geographic information system: Introduction, Definition and Terminology, Map Protection and Coordinate system, GIS system hardware, software and infrastructures. Basic components of GIS software. Data structures. Data models, Data acquisition, Data Input and Data processing and management including topology, TIN model, DEM/DTM generation, overlying and Integration and final data product and report generation Integration of Remote sensing and GIS techniques and its applications in land use/land cover and Environmental resource studies .

Books and references:

1. Remote Sensing and GIS, Angi Reddy, The Books Syndicate, Hyderabad, 2000
2. Principles of Geographical Information Systems- P. A Burrough and R. A. Mc Donnel, OUP, Oxford, 1998.
3. Remote sensing for Earth Resource-Rao, D. P., AEG Publication, Hyderabad, 1987.
4. Geographical Information System-Kang Tsung Chang, Tata Mc Graw Hill, Publication Edition, 2002
5. Remote Sensing and Its Application –LRA Narayan University Press
6. Remote Sensing and GIS- Basudeb Bhatta Oxford University Press, 09-Oct-2011 - 752 pages
7. Remote Sensing of the environment, John R. Jensen, Dorling Kindersley India, Pvt. Ltd. 2009 - 592 pages
8. Remote sensing and image interpretation, Thomas M. Lillesand, Ralph W. Kiefer, Jonathan W. Chipman - 2008 – 756

9. Geographical Information Science-Narayan Panigrahi
10. GIS fundamentals, a first text on geographic information system, Paul Bolstad
11. Getting started with geographic information systems, Keith C. Clarke Prentice Hall, 2001 – p. 352

Course-20: Environmental Disaster and Risk (4 Cr)

Unit-I: Hazard, Risk and Disaster (1 Cr)

Hazard in the Environment, the concepts of hazard, risk and disaster, Human vulnerability to hazard, Disaster trends, complexity in hazard and disaster, Hazard zoning and risk assessment, Environmental Security and Hazards Zoning, hazard zoning maps & preparedness plan. Risk Assessment management: Disaster management cycle, Hazards vs. Risk, Evaluation of Risk, Strategies for Hazard Mitigation: Priorities, Prediction, warning & Public information, Minimizing the probability of hazards, Public policy for hazard management.

Unit-II: Earthquakes, Volcanic and Mass movement Hazards (1 Cr)

Origin of Earthquake, its magnitude and intensity, Earthquake prone zones in the Earth, Reservoir induced seismicity, effects of earthquake, stability of structure & Risk Assessment, coping with seismic hazards, seismic zoning map, seism tectonic map, earthquake prediction & control. Types of volcanic eruptions, Active volcanic belts in the world, nature and magnitude of volcanic hazards, prediction of volcanic eruptions, mitigation of volcanic hazards. Mass movement hazards: Landslides, Rock fall, snow avalanche hazards with some case studies.

Unit-III: Floods, Cyclones, Tornados and Tsunamis (1 Cr)

Floods and flood management, causes of excess flows, reduced carrying capacity of rivers, Runoff versus infiltration, sediment load & changing course of rivers, management of floods - strategy, treatment of watersheds, reservoir &detention basis, water spreading , ground water recharge, stream channelization, flood embankments, flood plain zoning, flood forecasting & warning. Regions of flood prone zones in India. Origin of cyclones, tornados and tsunamis, their severity and impacts, coastal hazards mitigation measures.

Unit-IV: Technological hazards: Nature and Definition of Technological Hazards (1 Cr)

Concepts of industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires, chemical spills, and technological hazards as a result of the impacts of a natural hazard. Definition of hazardous waste, solid waste generation, concept of solid waste management. Onsite handling and processing, disposal techniques-open dumping, land filling, incineration, composting, potential methods of disposal-utilization, recovery and recycling. The growth of industrial hazard, Some case studies of Technological Disasters like Bhopal gas Tragedy 3 December, 1984, Chernobyl Nuclear accident 1986, Minnamata Japan, Japan's earthquake- tsunami- Fukushima nuclear disaster: 2011

Books and references:

1. Environmental Hazards: assessing risk and reducing hazards, Smith, K. and Petley, D.N. Routledge publication, London.2009, p.383.
2. Atmosphere, weather and climate, a textbook on climatology, Siddhartha, K. Kisalaya Publications Pvt. Ltd. New Delhi, 2000, p. 511
3. Environmental Geology, Valdiya K.S., Tata Mc-Graw Hill, 1987, p.
4. Landslide risk assessment, Lee E.M. and Jones D.K.C., Thomas Telford, 2004, p. 454
5. Environmental Geoscience: interaction between Natural Systems and Man, Strahler, A.N. and S Trahler A.H., Hamilton Publishing Company, California, p.511.
6. The nature of the Environment, Goudie, A., Blackwell Publications, 2001, p.544.
7. Living with Risk: The Geography of Technological Hazards by Susan L. Cutter (Jun 15, 1993)
8. Technological Disasters, P.C. Sinha, Anmol Publications Pvt. Limited, 1998 - 516 pages
9. Earthquakes and Tsunamis in the Past: A Guide to Techniques in Historical Seismology, E. Guidoboni and John E. Ebel, Cambridge University Press, 2009
10. Earth quakes: Bruce A. Bolt
11. Elementary Seismology: Charles F. Richter

Course-21: Environmental Impact Assessment, Environmental Audit and Environmental Management System Standards (EIA, EA and EMSS) (4 Cr)

Unit-I: Origin and Development of EIA (1 Cr)

Nexus between Development and Environment, Comparison between economic and Ecological criteria, Concept of externalities, shared resources, Global commons & carrying capacities. Origin and Development of EIA. Relationship of EIA to sustainable Development. EIA in Project planning & Implementation, EIA process: Evaluation of proposed action, Scoping, EIA methodologies. Role of GIS in EIA baseline studies. Risk Assessment and Risk Management: Mitigation measures, comparison of alternatives, Reviews and decision making ,compensatory actions, EIA notifications/regulations in India, Green belts: Review of Procedure, Practices and guidelines in India. EIA vs. SEA, Carrying capacity, Cumulative impact assessment.

Unit-II: Case Studies on EIA (1 Cr)

EIA of (a) River valley Projects, (b) Thermal Power Plants, (c) Mining Projects, (d) Integrated Iron and Steel Industries, (e) Cement Industries, (f) Oil Refineries and Petrochemicals, (g)Tourism, (h)Coastal zone Development.

Unit-III: Environmental Audit (1 Cr)

Concept of Environmental Audit, Objectives of Audit, Types of Audit, Audit methodology, Features of effective auditing, Elements of audit process, Program Planning, Organization of auditing Program, Pre-visit data collection, Audit Protocol, On site audit: Data sampling,

Inspection, Evaluation and Presentation, Audit report, Action Plan, Management of audit, Waster audits and pollution prevention assessment, Liability audit and site assessment, auditing of EMS, SWOT Analysis (Strength, Weakness, Opportunities and Threats analysis) for EIA, Audit Assessing, Economic & Environmental benefits direct from Environmental Audit, Life Cycle Assessment

Unit-IV: Environmental Management System Standards (1 Cr)

Core elements of EMS, Benefits of EMS, Certification Body Assessment of EMS, Documentation for EMS, EMS standard (ISO9000 & 14000 series): evolution, principles and structure, supporting systems, EMS specification standards & Certification procedures, EMS specification standards:ISO14001, Benefits of Implementing ISO 14001: Indian scenario.

Books and references:

1. Environmental Impact Assessment: Canter, L.W. 1977. Mc Graw Hill, New York
2. Environmental Impact Assessment Methodologies: Anjaneyulu Y. and Minickam V., BS Publications, Hyderabad
3. Manual of Environmental Impact Evaluation-Rosen JJ 1976 Prentice Hall
4. A practical guide to Environmental Impact Assessment, Erickson, P.A., Academic Press
5. Environmental Impact Analysis Hand book Rao & Woolen (eds) 1980 Mc Graw Hill
6. Environmental Quality Management: Bindu N Lohani 1984, South Asia Publ.
7. Environmental Impact Assessment: Alan Gilpin 1995, Cambridge Univ. Press
8. Manual of Environmental Impact Evaluation-Sharma, J. Rosen. Prentice Hall
9. Current documents on guidelines of EIA, MOEF, Govt. of India.
10. Strategic Environmental Assessment. R. Therirvel, E. Wilson, S. Thampson, D. Heany & D. Pritchard.
11. Environmental Impact Assessment- Cutting edge by 21st century- Cutting edge by Alan Gilpin, Cup, London
12. Environmental Impact Assessment & Practice- Theory, P. Wathem, U. Hynman, Sydney
13. A Practical Guide to Environmental Impact Assessment – Paul A Erickson Academic Press
14 Planning and Implementation of ISO 14001, Environmental Management system-Gyani & Amit Lunia, Girdhar Raj Publ, House Jaipur.
15. A guide to the implementation of the ISO 14000 series on Environmental Management- Ritchie I and Hayes co Prentic Hall, New Delhi .
16. Environmental Management, Kulkarni, V. and Ramachandra, T.V., TERI press, New Delhi, 2009
17. Uberoi, N.K. (2010). Environmental Management, Excel Books, New Delhi.
18. ISO 14004 – Environmental management systems : General guidelines on principles, systems and supporting techniques (ISO 14004 : 1996 (E)).
19. Environmental management systems : Specification with guidance for use (ISO 14001 : 1996b (E)). (International organization for standardization – Switzerland).
20. Handbook of environmental management and technology : Gwendolyn Holmes, Ben Ramnarine Singh, Louis Theodore.
21. Environmental Impact Assessment, L. W. Canter, Mc Graw Hill Publication, New York.

Course-22: Environmental Law, Policies and Society (4 Cr)

Unit-I: Water, Air, Forest and Wildlife act (1 Cr)

Constitution of Central and State Pollution Control Boards, Power ,Function and responsibility of Central and State Boards (Objectives, Area of jurisdiction, responsibility of an industry, power and function of state and central Government, Cognizance of offence, Penalties and Punishment), Brief account of The Forest Act 1927 ,Forest conservation Act. 1980: Objective and Jurisdiction, Responsibility of Industry. Wildlife Protection Act 1972 Authorities under the Act. Wild life Advisory Boards and their functions, Detection and prevention of offences. Cognizance of offences, the wildlife (protection) Amendment Act. 1991

Unit-II: The Environment Protection Act 1986 (1 Cr)

Necessity and Scope of the Environmental Protection Act, Powers of the Central Government , Parallel Provisions with the water and the Air act, The Public Liability Insurance Act 1991, Important rules & notification under the Environment Protection Act 1986 : Public Hearing notification 1997 , Biomedical waste (Handling and Disposal) rules 1998. Recycled plastic manufacture and usage rules 1999 , Municipal Solid Waste (Management and Handling) Rules 2000 ,The Noise Pollution (Regulation and Control) Rules 2000 , , Environmental Impact Assessment Notification 2006 , e-wastes Management and Handling Rules 2011

Unit-III: Environmental Policies (1 Cr)

Environment and constitutional provisions in India, National & International Trend. Changes in Global Prospective, International Treaties, Brief Note on Stockholm Conference 1972 , , Nairobi Declaration, Rio (Brazil) conference 1992, Rio+5 and the Rio+10, Rio+20 ,Kyoto Protocol ,Johannesburg Conference 2002 National Authorities: Green Tribunal ,Global environmental issues and International policies relating to control Global warming, Ozone depletion, hazardous waste, CITES etc. Role of UN authorities in protection of Global Environment, Multinational authorities and agreements

Unit-IV: Economics, Society and Environmental Ethics (1 Cr)

Economic growth, Gross National product and the quality of life: Sustainable-earth economy, Economics and Pollution control, Discount factor, Cost-benefit and cost effectiveness analysis, Human impact on the Earth, Hunting and Gathering Society, Agriculture Society, Industrial Society, Sustainable -Earth Society: Concept of throw-away and sustainable -Earth Society, our future society; Environmental Ethics: Ethics and moral, ethics of Throw-away & Sustainable-Earth Society, Ethical guidelines.

Books and References

1. Hand Book of Environment, Forest and Wild life laws in India, WPSI, Natraj
2. Pollution Control Acts, rules and Notifications issued under CPCB, New Delhi

3. Environmental Laws, New Perspectives, K. C. Agrawal, Nidhi Publisher, Bikaner
4. Wildlife of India, Conservation and Management, K. C. Agrawal, Nidhi Publisher
5. Environmental laws in India, Gurdip Singh, Quality Law Books
7. The Economics of the Environment, Oates W.E.
8. Kanchan Chopra, et al., Ecological Economics and Sustainable Development
9. Economy and the Environment, Goodstein
10. Sumi Krishna : Environmental Politics, Peoples' Lives and Developmental Choices, Sage, New Delhi, 1996
11. Cone J.D., Hayes S.C., Environmental Problems / Behavioral Solutions (1980) California
12. Declaration of The Stockholm Conference, Rio
13. Constitution of India [Referred articles from Part-III, Part-IV and Part-IV-A].

Course-23 Dissertation (8 Cr)

Review or case studies on detection, determination, mapping, sources and control of environmental contaminants.

Elective courses

FOOD ADULTERATION

Courses

UNIT-I: **Food chemistry**

Chemistry of Food, Introduction to Food Processing & Preservation, Technologies of Milk & Milk Products, Introduction to Food Microbiology, Processing & Preservation of Fruits & Vegetables, Processing Technology of Meat & Meat Products, Cereals, Food Packaging, Cereals & Legume Processing, Food Additives, Processing Technology of Beverages, Preservative, Jam, Jellies & Marmalade, Fermentation & Unfermented Products, Food Adulteration, Team Management, Project & Case Study, Industrial Training.

UNIT-II: **Adulteration, preservatives and colouring agents**

Adulteration, Chemical preservatives, Colouring matters, Baking powder and baking-powder chemicals, adulteration of specific foods (i.e. Beverages, Alcoholic, Non-alcoholic, Canned vegetables, Cereal products, Breakfast foods, Flour, Cocoa and chocolate, Coffee and tea, Condimental sauces, Dairy products, Butter, Cheese, Cream, Milk, Edible fats and oils, Flavouring extracts, Fruit products, Meat preparations, Spices, Sugars, sirups,Vinegar, etc.

UNIT-III: **Characterization of food preservatives and colors**

Detection of salicylic acid, Detection of benzoic acid, Detection-of boric acid and borax, Detection of formaldehyde, Detection of saccharin, Detection of coal-tar dyes, Detection of copper, Detection of turmeric, Detection of caramel

UNIT-IV: **Characterization of adulterants in major foods**

Detection and determination of adulterants (pesticides, POPs & others) in cereals, seeds, vegetables, fruits, milk, butter and dairy products, meats, chicken, coffee and tea, spices, Condimental sauces, flavoring agents, oils.

Books

1. Introduction to Food Analysis. S.S. Nielsen, 1998. Aspen Publishers - The best general overview of food analysis techniques currently available. (Required).
2. Food Analysis: Theory and Practice. Y. Pomeranz and C.E. Meloan, Chapman and Hall - General overview of food analysis techniques (Useful)
3. Food Analysis: Principles and Techniques. D.W. Gruenwedel and J.R. Whitaker, Marcel Dekker - General overview of food analysis techniques (Useful)
4. Analytical Chemistry of Foods. C.S. James, Blackie Academic and Professional - General overview of food analysis techniques (Useful)
5. Official Methods Of Analysis, Association of Official Analytical Chemists - Officially recognized methods of analysis for many food components (Very Useful - Available in my office).

WASTE MANAGEMENT

Courses

UNIT-I: Domestic waste

Definitions
The Earth environment
Conservation and use of resources
Value of resources: economic, ecological and aesthetic
Damage being caused by urbanization
The impact of humans
Sewage and it's treatment
Characteristics of Sewage
Components of Sewage –solids, organic material, industrial waste
Decomposition of Sewage
The nitrogen cycle
Classification of Sewerage Systems
Storm Water Systems and Management
Dry Rubbish
Nature of Refuse
Placement and protection of nins
Trade waste
Refuse Collection Systems
Refuse Collection vehicles
Salvage materials
Safe disposal of household chemicals

UNIT-II: Street Cleaning & Disposal of Refuse

Types of Street Refuse
Methods of street cleaning –gritting, sanding, sweeping, washing, etc
Cleaning storm water pits
Managing snow
Refuse disposal-separation, controlled tipping, combustion, pulverization, etc
Refuse for fertilizer
Methods of Refuse Sorting –screening, magnetic, hand sorting
Types of incinerators
Vacuum systems for refuse collection –Garchey system, gandillon
Harvesting energy from combustion

UNIT-III: Industrial Waste & recycling

Types of industrial pollution
The greenhouse effect
Ozone depletion
Nuclear power
Nuclear fission
Mining nuclear fuel
Uranium enrichment
Gas Diffusion
Gas centrifuge
Nuclear waste
Transporting nuclear waste
Reprocessing
Health risks of nuclear waste
Scope and nature of recycling
Rubbish tips (dumps)
Recycling plastics
Recycling metals
Recycling glass
Recycling paper
Recycling rubber
Actions by individuals (at home or work) –reducing, reusing and recycling waste

UNIT-IV: Water Quality & Treatment

Industrial effluent
Pricing control compared with direct control
Types of water impurities
Scope of purification
Managing water for public supply
Water treatment methods
Purification methods –sedimentation, filtration, disinfection, aeration, screening, etc .
Recycling sewage water
Recycling waste water
Reed bed treatment
Improving water quality from any source –physical, chemical, biological impurities
Water borne diseases

Books

1 M. Georgacarakos, Guide to waste management including information on recycling, landfills, sustainability, composting, and ways to protect the environment, Webster's Digital Services, USA, 2011.

2 A. S. Weinberg, D. N. Pellow, A. Schnaiberg, Urban recycling and the search for sustainable community development, Princeton University Press, 2000.

3 L. F. Diaz, M. de Bertoldi, W. Bidlingmaier, Compost Science and Technology, Elsevier, 2007.

4 S. R. Rao, Resource recovery and recycling from metallurgical wastes, Elsevier, 2006.

5 M.H. van Agteren, Sytze Keuning, Jan Oosterhaven, Handbook on Biodegradation and Biological Treatment of Hazardous Organic Compounds, Springer; 1998.

M.A./M. Sc. GEOGRAPHY
SEMESTER I (2017-18)

M. A. /M. Sc. Geography Semester I shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	I	Geomorphology	80	20	100
2.	II	Climatology	80	20	100
3.	III	Geographical Thought	80	20	100
4.	IV	Geography of India	80	20	100
5.	V	Practical-I : Advanced Cartography	---	---	100

1. The M. A. /M. Sc. Semester I examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper I Geomorphology

Paper II Climatology

Paper III Geographical Thought

Paper IV Geography of India

Paper V Practical-l: Advanced Cartography

2. The theory papers shall be of three hours duration.

3. Candidates will be required to pass separately in theory and practical examinations.

4. (a) In the practical examination the following shall be the allotment of time and marks.

(i) Practical record 20%

(ii) Lab work (up to three hours) 70%

(iii) Viva on i. ii. 10%

(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

PAPER –I (2017-18)

GEOMORPHOLOGY

UNIT – I Nature and scope of Geomorphology; Fundamental concepts-Geological Structures and landforms, uniformitarians, multicylic and polygenetic evolution of landscapes, concept of threshold, Environmental change – climatic change and geochronological methods-documentary evidence, artifacts. Applied Geomorphology urban Geomorphology environmental geomorphology Geomorphic Hazards.

UNIT – II Earth movements – eperiogenic, organic and cymatogenic earth movements. Forces of crustal instability, isostasy, plate tectonics, seismicity, volcanicity, organic structures with reference to the evolution of the Himalaya.

UNIT – III Exogenic Processes : Concept of gradation, Agents and processes of gradation, causes, types and classification of weathering, mass movement erosion, and depositional processes and resultant landforms and soil formation. Slope evolution, down warping, parallel retreat and slope replacement models.

UNIT – IV Geomorphic processes dynamics of fluvial, glacial, periglacial Aeolian (Arid & Semi Arid) marine, and karst processes and resulting landforms' Erosion surfaces.

SUGGESTED READINGS:

1. Ahnned, E.: Coastal Geomorphology of India.
2. Chorley, R.. J.: Spatial Analysis in Geomorphology, Methuen, London, 1972.
3. Cooke R.IJ. and Doornkamp, J.C. : Geomorphology in Environmental Management. An Introduction, Clarendon press, Oxford, 1974.
4. Dayal, P. : A Text book of Geomorphology, R.K. Books, New Delhi.
5. Dury, G.H.: The Face of the Earth, Penguin Hormondsworth 1959.
6. Fairbridge, R.W. Encyclopedia of Geomorphology, Reinholdts, New York, 1968.
7. Goudie, A.: The Nature of the Environment Oxford & Blackwell, London, 1993.
8. Gautam, Alka : Geomorphology, Sharda Pustak Bhawan, Allahabad.
9. Garner, H.F. : The Origin of landscape- A Synthesis of Geomorphology, Oxford University Press. London, 1974.
10. Holms, A.: Principles of Physical Geology, Thomas Nelson, London.
11. Jha, V.C. : Geomorphology, Vasundhara Publication, Gorakhpur.
12. Mitchell, C.W.: '1'erra.ii'i Evaluation. Longman, London, 1973.
13. Oilier, C.D. : Weathering, Longman, London, 1979.
14. Pitty, A.F.: Introduction to Geomorphology, Methuen, London, 1971.
15. Stoddart, D.R. (ed.) : Process and Form in Geomorphology, Roullcdge, New York, 1996.
16. Skinner, B.J. & Porter, S.C.: The Dynamic Earth John Wilely. New York, 1995.
17. Sparks, B.W. Geomorphology, Longman, London, 1960.
18. Sharma, H.S. (cd.): Perspective in Geomorphology, Concept, New Delhi, 1980.

19. Singh, S : Geomorphology, Prayag Publication, Allahabad, 1998.
20. Steers, J.A. : The Unstable Earth Methuen, London.
21. Thornbury, W.I.). Principles of Geomorphology, John Wiloy, New York, 1960.
22. Strahler, A.N.: Physical Geography, Willey, New York.
23. कौशिक, एस.डी. : भू–आकृति विज्ञान के सरल सिद्धांत, आर.के. बुक्स, नई दिल्ली
24. नेगी, बी.एस. : भू–आकृति विज्ञान, आर.के. बुक्स, नई दिल्ली
25. दयाल, परमेश्वर : भू–आकृति विज्ञान, आर. के. बुक्स, नई दिल्ली
26. यादव, रामसुरेश : भू–आकृति विज्ञान, ग्रन्थम, रामबाग, कानपुर, 1976
27. सिंह, सविन्द्र के. भू–आकृति विज्ञान, शारदा पुस्तक भवन, इलाहाबाद
28. प्रसाद, गायत्री : भू–आकृति विज्ञान, शारदा पुस्तक भवन, इलाहाबाद
29. गौतम, अलका : भू–आकृति विज्ञान, रस्तोगी पब्लिकेशन, मेरठ
30. शर्मा, एच.एस. एवं प्रमीला कुमार : भू–आकृति विज्ञान, पंचशील प्रकाशन, जयपुर, 2011

PAPER - II (2017-18)

CLIMATOLOGY

UNIT – I Nature and scope of climatology and its relationship with meteorology; composition of atmosphere; Insolation, heat balance of the earth, stability and instability, green house effect, vertical and horizontal distribution of temperature.

UNIT – II Jet stream; General circulation in the atmosphere; Acid rain; concept of air masses and Front. EL Nino and La Nina. Monsoon winds and cyclones.

UNIT – III The application of general principles of elementary physical and synoptic meteorology to the study and classification of climate. Climatic classification of Koppen and Thornthwaite. Major climate of the world-tropical, temperate, desert and mountain climate.

UNIT – IV Climatic changes during geological and historical times, evidences, possible causes, global warming, Applied climatology.

SUGGESTED READINGS:

1. Barry, R.G. and Chorley P..1.; Atmosphere, Weather and Climate, Roulledge, London and New York, 1998.
2. Critchfiedid, J.H. : General Climatology, Prentico Hall, India, New Delhi, 1993.
3. Das, P.K. : Monsoons 'National Book Trust, New Delhi, 1987.
4. Fein, J.S. and Slephens, P.N. : Monsons. Wiley Interscience, 1987.
5. India Met. Deptt : Climatologically Tables of Observatories in India, Govt. of India 1968.
6. Lal, D.S. : Climatology, Chaitanaya Publications, Allahabad, 1986.
7. Lydolph, P.H. : The Climate of the Earth, Rowiman, 1985.
8. Menon, P.A. : Our Weather, N.B.T.., New Delhi, 1989.

9. Oliver, C. : Climatology : An Atmospheric Science, R.K. Books, New Delhi.
10. Pelerson, S. : Introduction to Meteorology, Me G-r-aw Hill Book, London, 1969.
11. Robinson, P.J. and Henderson S. : Contemporary Climatology, Henlow, 1999.
12. Sing, Savindra : Climatology, R.K. Books, New Delhi.
13. Thompson, R.D. and Perry, A (ed.) : Applied Climatology, Principles and Practice. Raoutledge, London. 1997.
14. तिवारी अनिल कुमार : जलवायु विज्ञान, राजस्थान हिन्दी ग्रंथ अकादमी
15. सिंह, सविन्द्र : जलवायु विज्ञान, प्रयाग पुस्तक भवन, इलाहाबाद
16. नेगी, बी.एस. : जलवायु तथा समुद्र विज्ञान.
17. लाल, डी.एस. : जलवायु विज्ञान
18. गौतम, डॉ. अल्का : जलवायु एवं समुद्र विज्ञान
19. शर्मा, बी.एल. एवं तिवाड़ी, अनिल कुमार : जलवायु विज्ञान के मूल तत्व, राजस्थान हिन्दी ग्रन्थ अकादमी, जयपुर
20. सिंह, डॉ. रामाश्रय एवं उपाध्याय, डॉ. डी.पी. : जलवायु विज्ञान और समुद्र विज्ञान, वसुन्धरा प्रकाशन, गोरखपुर
21. लाल, डी.एस. : जलवायु विज्ञान, आर.के. बुक्स, नई दिल्ली
22. सिंह, सविन्द्र : जलवायु विज्ञान, आर.के. बुक्स, नई दिल्ली

PAPER – III (2017-18)

GEOGRAPHICAL THOUGHT

UNIT – I Definition, scope and functions of Geography ; The Field of geography, its place in the classification of science, Geography as a social science, and natural science. Geography as science of relationship, as science of areal differentiation, as spatial science. Spatial Organization, Geography and environmentalism : forms of man-nature relationship and current view; Dualism in geography; Regional Concept.

UNIT – II The growth of Geographical knowledge from earliest times up to the 15th century. Contributions of Greek and Roman thinkers. Arab Geographers and their contributions. Geographical information in Ancient Indian literature. The Dark age in Geography. The Great Age of Maritime Discovery and Exploration.

UNIT – III Contributions of various schools of thought in modern Geography:

(i) German School (ii) French School
(iii) British School (iv) American and Russian Schools
(v) Status or Indian Geography.

UNIT – IV Scientific explanations: routes to scientific explanation (inductive/deductive); Type of explanation: cognitive description, cause and effect, temporal, functional/ecological and systems; Laws, theories and models in Geography; Quantitative revolution and philosophy of positivism. Behaviourlism, relevance movement and radical geography Changing paradigms.

SUGGESTED READINGS:

1. Abler, Ronald; Adams, John S. Gold, Peler : Spatial Organization : The Geographer's view of the world. Prentice Hall, N.J. 1971.
2. Adhikari, S. : Fundamental of Geographical Thought, R.K. Books, New Delhi.
3. Ali S.M. : The Geography of Puranas, Peoples Publishing House, Delhi, .1968.
4. Amedeo, Douglas : An Introduction to Scientific Reasonign in Geography, John Wiley, U.S.A. 1971.
5. Dikshit, R.D. (ed.): The Art & Science of Geography Rand Me Nally & Co., 1959.
6. Hartshorne, R.: Perspectives on Nature of Geography Rand Me Nally & Co., 1959.
7. Hussain, M. : Models in Geography, R.K. Books, New Delhi.
8. Husain, M. : Evolution of Geographic Thought, Rawat Pub., Jaipur, 1984.
9. Johnston, R.J.: Philosophy and Human Geography, Edward Arnold, London, 1983.
10. Johnston, R.J.: The Future of Geography, Methuen, London, 1988.
11. Minshull, R.: The Changing Nature of Geography, Hutchinson University Library, London, 1970.
12. Ali, S. M.- Arab Geography.
13. Taylor, G.: Geography in the 20th Century.
14. Dikshit, R.D.: Geographical Thought : A Contexual History of Ideas, Prentice Hall of India, New Delhi.
15. Harvey D. : Explanation in Geography.
16. सिंह उजागर : भौगोलिक चिन्तन का विकास
17. त्रिपाठी एवं बिरले : भौगोलिक चिंतन का विकास एवं विधितंत्र
18. कौशिक , एस.डी. : भौगोलिक विचारधाराएं एवं विधितंत्र, आर.के. बुक्स, नई दिल्ली, 2010
19. सिंह , जगदीश : भौगोलिक चिंतन का क्रम विकास, आर.के.बुक्स, नई दिल्ली, 2010
20. हुसैन, माजिद : भौगोलिक चिंतन का इतिहास, रावत पब्लिकेशन, नई दिल्ली, 2004
21. सिंह, देवेन्द्र प्रसाद : भौगोलिक चिन्तन की समीक्षा, शारदा पुस्तक भवन, इलाहाबाद
22. बंसल, सुरेश चन्द्र : भौगोलिक चिन्तन के मूल तत्व, आर.के. बुक्स, नई दिल्ली
23. श्रीवास्तव, वी.के. : भौगोलिक चिन्तन के आधार, आर.के. बुक्स, नई दिल्ली
24. दीक्षित, रमेश दत्त : भौगोलिक चिन्तन का विकास : एक ऐतिहासिक समीक्षा, आर.के. बुक्स, नई दिल्ली
25. जाट, बी.सी. : भौगोलिक विचारधाराएँ तथा विधितंत्र, मलिक एण्ड कंपनी, जयपुर एवं दिल्ली, 2013

PAPER – IV (2017-18)

GEOGRAPHY OF INDIA

UNIT – I Physical and Biological elements in the Geography of India: Geological structure, relief, climate Drainage, vegetation and soils.

UNIT – II Agriculture: Major characteristics and problems, Impact of infrastructural and institutional factors on agriculture. Important crops-wheat, rice, cotton, sugarcane, oil-seeds, tea and coffee, Agricultural regions. Green revolution, Agro-climatic regions.

UNIT – III Sources of power: Coal; Petroleum, Natural gas. Hydroelectricity and Atomic energy. Mineral resources with special reference to iron ore, manganese and bauxite. Industrial development with special reference to iron and steel, cement, cotton, jute, sugar and paper industries; Industrial regions.

UNIT – IV Regional division of India: Purpose and Methodology. Major schemes of regions of India: O.H.K. Spate and R.L. Singh. Physical and cultural geography of Chhattisgarh State.

SUGGESTED READINGS:

1. Centre for Science & Environment (1988) State of India's Environment, New Delhi.
2. Desphande C.D. India. : a Regional Interpretation ICSSR & Northern Book Centre 1992.
3. Dreza, Jean & AMartya. Sen (ed.) India Economic Development and Social opportunity Oxford University Person, New Delhi. 1996.
4. Gautam, Alka : Advanced Geography of India, Sharda Pustak Bhawan Allahabad.
5. Khullar, D.R. : India : A Comprehensive Geography, R.K. Books, New Delhi.

. Kundu A. Raza Moonis : lndian Economy : the Regional Dimension Speclaum Publishers, New Delhi, 1992.

5. Robinson, Francs : The Cambridge Encyclopedia of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan & Maldives Cambridge University Press, London, 1989.
6. Singh R.L. (ed.) : India - A Regional Geography National Geographical Society, India Varanasi, 1971.
7. Spale OHK & ATA Learnont-India & Pakistan Methuen, London. 1967.
8. Tirtha R. & Gopal Krishna, Emerging India Reprinted by Rawat Publications, Jaipur 1996.
9. Sharma T.C. and O. Coutinho : Economic and Commercial Geography of India.
10. अग्रवाल पी.सी. भारत का भौतिक भूगोल, एशिया प्रकाशन कं.,रायपुर 2003
11. बंसल सुरेशचंन्द, भारत का भूगोल, मिनाक्षी प्रकाशन, मेरठ.
12. वर्मा रामविलास, भारत : एक भौगोलिक विवेचन, भवदीय प्रकाशन श्रृंगारघाट–अयोध्या, फैजाबाद, पिन –224123, 2007.

PAPER – V (2017-18)

PRACTICAL I - ADVANCED CARTOGRAPHY

Graphs and Diagrams: Triangular graph. Logarithmic and semi logarithmic graphs, scatter graphs; climatograph. Proportional circles, spheres and cubes.

Thematic Maps: Choropleth maps, isolines, Flow maps, isochrones and class intervals. Morphometric Analysis: Profiles, Slope Analysis; Altimetric, and Clinographic curves; Block Diagrams.

SUGGESTED READING:

1. Monk house F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
2. मॉक हाउस तथा विल्किन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख, म.प्र. हिंदी ग्रंथ अकादमी.
3. हीरालाल : प्रायोगिक भूगोल, किताब घर, कानपुर
4. चौहान, पी.आर. एवं वी.के. श्रीवास्तव : प्रयोगात्मक भूगोल, वसुन्धरा प्रकाशन, गोरखपुर
5. सिन्हा, एम.पी. : कार्टोग्राफी, शारदा पुस्तक भवन, इलाहाबाद
6. चौहान, पी.आर. : प्रयोगात्मक भूगोल, वसुन्धरा प्रकाशन, गोरखपुर, 2009

M.A./M. Sc. GEOGRAPHY (2017-18)

SEMESTER – II

M. A. /M. Sc. Geography Semester II shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	VI	Economic and Natural Resource Management	80	20	100
2.	VII	Oceanography	80	20	100
3.	VIII	Regional Development and Planning	80	20	100
4.	IX	Social Geography	80	20	100
5.	X	Practical-II : Map Projections, Map Interpretation and Surveying	---	---	100

1. The M. A./M. Sc. Semester II examination in Geography shall consist of 500 marks.

There shall be four theory papers each of 100 marks and one practical of 100 marks as follows:

Paper VI Economic and Natural Resource Management.

Paper VII Oceanography

Paper VIII Regional Development and Planning

Paper IX Social Geography

Paper X Practical-II : Map Projections, Interpretation and Surveying.

2. The theory papers shall be of three hours duration.

3. Candidates will be required to pass separately in theory and practical examinations.

4. (a) In the practical examination the following shall be the allotment of time and marks.

(i) Practical record	20%
(ii) Lab work (up to three hours)	40%
(iii) Field work (up to three hours)	30%
(iv) Viva on i, ii & iii above	10%

(b) The external and internal examiners shall jointly submit marks.

(c) Candidates shall be examined in survey individually. They will however be allowed to take the help of a labourer each at their own expense.

(d) All the candidates shall present at the time of the practical examination their Practical record regularly signed by the teachers concerned.

PAPER- VI (2017-18)

ECONOMIC AND NATURAL RESOURCE MANAGEMENT

UNIT – I Nature and scope of economic Geography; fundamental concepts in economic geography; classification of economies, sectors of economy (primary, secondary, tertiary). Meaning, nature and classification of resources, Resource appraisal : human want and social objective, technological status and resources. Appraisal of quality and quantity of human resources, relation between population and resource, natural resources and economic development, resource adequacy and scarcity, limits to growth.

UNIT – II World pattern of major natural resources: land and soils, biotic resources, water resources mineral and energy resources, oceanic resources.

UNIT – III Classification of Industries, Theories of industrial location; case studies of selected industries; Iron and Steel; Aluminum, Chemical, Textile. Means of transport, International trade, trade blocks, globalization and Indian economy.

UNIT – IV Conservation and management of resources; evolution of the concept, principles, philosophy and approaches to conservation, resource conservation and management methods. Policy making and resource management; sustainable development of resources.

SUGGESTED READING:

Ahemd, Jaleel	-	Natural Resources in Low Income Countries.
Bennet, II.II.	-	Elements of Soil Conservation.
Ciriacy, Wantrup,S.V.& Persons (eds.)	-	Natural resources: Quality & Quantity
Betall,R.C. & R.O.Buehanan	-	Industrial Activity and Economic Geography.
Edvard and Rosers	-	Agricultural Resources.
Freeman, T.W.	-	Geography and Planning.
Fryer, D.M.	-	World Economic Development.
Isard, Walter	-	Method of Regional Analysis.
Mehta, M.M.	-	Human Resource Development Planning.
Owen, O.S.	-	Natural Resource Conservation.
Peach, W.N.& James, A.	-	Zimmerman's World Resources Contenting and Conservation.
Parkin's,E.A. & J.R. Whitakr	-	Our Natural Resource and their conservation.
Renner, G.T.	-	Conservation of National Recourses.
Stamp, L.D.	-	Land of Britain Its use and Misue.
Smith, G.H.(ed.)	-	Conservation. of Natural Recourses.
Symoos, L.	-	Agriculture Geography.
Thomas W.L.(et.al.reds.)	-	Man's Role in Changing the face of the Earth.
Wales, H.& H.O. Lathrop	-	The Conservation of Natural Recourses.
Wheeler, T.O. et al	-	Economic Geography, John Wiler New York 1995.

गौतम, अल्का : आर्थिक भूगोल के मूल तत्व, शारदा पुस्तक भवन, इलाहाबाद

मौर्य, एस.डी. : संसाधन एवं पर्यावरण, प्रयाग पुस्तक भवन, इलाहाबाद, 2006

राव, बी.पी. : संसाधन और पर्यावरण, वसुंधरा प्रकाशन, गोरखपुर, 2010

PAPER – VII (2017-18)

OCEANOGRAPHY

UNIT – I Nature and scope of Oceanography; Distribution of land and water; Major features of ocean basins; Marine sediments. Physical and chemical properties of sea water.

UNIT – II Interlink between atmospheric circulation and circulation pattern in the oceans, surface currents, themohaline, waves and tides.

UNIT – III Marine biological environment : Bio geochemical cycle in the ocean. biozones, types of organisms; plankton, nekton and benthos, food and mineral resources of the sea. Major marine environments; coastal : esturary, deltas, barrier island, rocky coasts : Open : reefs, continental shelf, continental slope and deep : Pelagic environment and floor of the ocean basins.

UNIT – IV Impact of Humans on the marine environment. Law of the sea; exclusive economic zone; marine deposits and formation of coral-reefs.

SUGGESTED READINGS:

1. Davis Rechard J.A. : "Oceanography-An Introduction to the Marine Environment". Wm. C. Brown Iowa, 1986.
2. Duxbury, C.A. and Duxbury B. : An Introduction to the world's Oceans-C. Brown. Iowa 2nd ed., 1986.
3. Garrison, T. : "Oceanography - An Introduction to Marine Science" Books/Cole, Pacific Grove, USA, 2001.
4. Gross, M. Grant : Oceanography, a View of the earth, prantice-Hall inc, New Delhi, 1987.
5. King C.A.M. Oceanography for Geographers 1962.
6. Lal, D.S. : Oceanography, Sharda Pustak Bhawan, Allahabad
7. Sharma, R. C. "The Oceans" Rajesh N. Delhi, 1985.
8. Urnmerkutty, A.N.P. Science of the Eceans and Human life, NBT, New Delhi, 1985.
9. Ornmany, F.D. : The Ocean.
10. Sharma, R. C. & M. Vital : Oceanography : A Brief Introduction kislaya Pub. New Delhi.
11. Siddartha, K.. : Oceanography : A Brief Introduction, Kislya Pub. New Delhi.
12. नेगी, बी.एस. : जलवायु तथा समुद्र विज्ञान, केदारनाथ, रामनाथ प्रकाशन, मेरठ, 1996
13. सिंह, सविन्द्र : समुद्र विज्ञान, प्रयाग पुस्तक भवन, इलाहाबाद
14. सिंह, डॉ. रामाश्रय एवं उपाध्याय, डॉ. डी.पी. : जलवायु विज्ञान और समुद्र विज्ञान, वसुन्धरा प्रकाशन, गोरखपुर
15. लाल, डी.एस. : जलवायु विज्ञान, शारदा पुस्तक भवन, इलाहाबाद

PAPER – VIII (2017-18)

REGIONAL DEVELOPMENT AND PLANNING

UNIT – I Regional Planning: Definition, Scope, evolution and Objectives. Region and Regionalism, Planning Regions: Concept and Delineation. Type of Regions. Central Place Theory, Concept of core and periphery Friedmann's Model of Spatial Organisation and Economic Growth.

UNIT – II Regional Development Theories: Development Theories of Myrdal and Hirschman, Economic and Export Base model, Frank's Theory of Under development.

UNIT – III Approaches and Strategies of Regional Development: Growth Pole Theory Agropolitan Development, Community Development, River Basin Planning, Metropolitan Planning (with reference to India)

UNIT – IV Regional Planning in India. Regional Imbalances and Inequalities, Indicators of Regional Development; Regional Policies in Five Year Plans, Centre State Relations and Multilevel Planning, Planning for special

problem Regions: Hill area, Tribal areas, Drought prone areas, Command areas and River basins. Regional development and planning in India.

SUGGESTED READING:

1. Daysch, C.H.J. & others: Studies in Regional Planning.
2. Deckinsonm R.E. : City Region and Regionalism.
3. Freeman, E.W. : Geography arid Planning.
4. Golksin A. : Regional Planning and Development.
5. Keeble, L. : Principle and Practice of Town and Country Planning.
6. Stamp L.D. : The Land of Britain : Its use and Misure.
7. Sdasyuk. Gatina and Dengupta, P. : Economic Regionalization of India problems and Approaches.
8. Desai, P.B. & others : Regional Perspective of Industrial and Urban Growth the case of Kanpur, Bombay, 1969.
9. Prakash, Rao V.L. & S.P. : Regional Planning.
10. Censuts of India : Economic and Socio Cultural Dimensions of regionalization (An Indo-USSR Collaborative Study)
11. Friedmann J. & Alonsow : Regional Development and Planning, M.I.T. Press.
12. Misra R.P. (ed.) : Regional Planning : Concept; Techniques, Policies and cade studies Mysore 1969.
13. Misra, R.P. & others : Regional Development and Planning in India.
14. Timbergen : Essays on World Regional Planning.
15. Lord, W. : Methods of Regional Analysis, M.I.T., I960.
16. Zimmerinan, E.W. : World Resources and Industries.
17. Burton & Kates : Reading in Resource Management Conservation.
18. Burton & Kates : Regional Planning in India.
19. Ahamed, Enayet : Regional Planning with particular Reference to India. Vol. I and li New Delhi.
20. Bhatt L.S. and others: Micro level planning - A Case Study of Karnal Area, Hyryana (K.B. Publishing, New Delhi)
21. Bhatt LS : Regional Planning in India, Statistical Publishing Society, Calcutta, 1973.
22. Gosal GS, and G. Krishanan : Regional Disparities in levels of Socio-economic Development in Punjab, Vishal Publications Kurukshetra, 1984.
23. Chandna, R.C. : Regional Planning : A comprehensive 'Text-Kajyani Publishers.
    Chand, Pun; Regional Planning in India, 2009, RK Books, New Delhi.
    Chandna, RG. Regional development and Planning 2009, RK Books, New Delhi.
24. Ray Choudhari, Jayasri : An Introduction to Development and Regional Planning Orient Longman.
25. Sundaram, KV (ed) Geography and Plann8ing, Essaya in houour of VLS Prakasa Rao, Concept Publishing Co., New Delhi, 1985.
26. Raza, Meomis (ed) Regional Development, Hefitage Publishiers, Delhi, 1988.
27. Mishra R.P. et al : Multilevel Planning, Heritage Phulishers Delhi,1980
28. श्रीवास्तव व्ही.के. एवं अन्य : प्रादेशिक नियोजन एवं संतुलित विकास, वसुन्धरा प्रकाशन, गोरखपुर
29. ओझा, रघुनाथ : प्रादेशिक नियोजन का भूगोल, किताब घर, कानपुर, 1986
30. शर्मा, राजीवलोचन : प्रादेशिक एवं नगरीय नियोजन, किताब घर, कानपुर, 2005
31. चाँदनी, आर.सी. : प्रादेशिक नियोजन तथा विकास, आर.के. बुक्स, नई दिल्ली, 2010.
32. सिंह एवं दुबे, प्रादेशिक विकास नियोजन, आर.के. बुक्स, नई दिल्ली, 2009.

33. देहरे, टी.आर. क्षेत्रीय नियोजन एवं समान्वित विकास, वसुन्धरा प्रकाशन, गोरखपुर 2006.
34. जाट, बी.सी. : प्रादेशिक भूगोल, पंचशील प्रकाशन, जयपुर

PAPER – IX (2017-18)

SOCIAL GEOGRAPHY

UNIT – I Definition, meaning and scope of Social geography and it's Nature and relationship with other Social sciences. Development of Social Geography, Approaches to the study of Social Geography.

UNIT – II Concept of Society – Social Environment, Geographic bases of Social Formation. Social Geography of India - Social Stratification, Caste and Class. Social organization and groups, Social transformation and change in India, Religion and linguistic group of India. Evolution of Socio-Cultural Regions of India.

UNIT – III Social well- being– meaning and indicators of Social well- being. Quality of life, Pattern and bases of rural and urban society. Deprivation and discrimination issues relating to women and under privileged groups. Cultural Realms and Cultural Region of the World.

UNIT – IV Social development planning – meaning and importance. Public policy and Social planning in India : Review of Five year Plans strategies to improve Social well being in tribal, hill, drought and flood prone Areas.

SUGGESTED READINGS:

1 Ahmad Aijazuddin, Social Geography, Rawat Publication, New Delhi, 1999.
2 De Blij. H.D. Human Geography. John Wiley and son, New York.
3 Dreze Jean, Amariya Sen,Economic Development and Social opportunity. Oxford University Press. New Delhi. 1996
4 Dubey. S.C : lndian Society. National Book Trust, New Delhi, 1991.
5. Gregory. D . and J. Larry (Eds.) Social. relations and spatial structures. MCMillan. 1985.
6. Haq. Mahbubul : Reflections on Human Development. Oxford University Press, New Delh6.
7. Jones, Emrys, Reading in Social Geography, Oxford University Press, Ely House, London, 1977.
8. Jones, Emrys and John Eyles, An Introduction to Social Geography, Oxford University Press, London,1977.
9. Maioney. Clarence: People of South Asia, Winston, New York, 1974.
10. Planning Commission, Government of India: Report on Development of Tribal areas, 1981.
11. Rao, M.S.A.. Urban Sociology in India, Orient Iongman, 1970.
12. Schwartzberg Joseph : An Historical Atlas of South Asia, University of Chicago Press, (Chicago, 1978.

13. Sen, Amartya & Dreze Jean. Indian Development : Selected Regional Perspectives. Oxford University Pres-s, 1996
14. Sharma, K.L. : Indian Social Structure and Change, Rawat Publication, Jaipur, 2011
15. Smith, David: Geography : A welfare Approach, Edward Arnold, London, 1977.
16. Sopher, David. An Expoloration of Inda, Cornell University Press, 1980.
17. Subba. Rao. Personality of India : Pre and Proto Historic foundation of India and Pakistan, M.S. University Baroda. Vadodai'a, 1958
18. मौर्य,एस.डी., सामाजिक भूगोल शारदा पुस्तक भवन,11,युनिवर्सिटी रोड, इलाहाबाद–2 , 2004.
19. आहूजा, राम, भारतीय समाज, आर.के. बुक्स, नई दिल्ली, 2004.
20. शर्मा, के.एल. : सामाजिक स्तरीकरण, रावत पब्लिकेशन, जयपुर, 2011

PAPER – X (2017-18)

PRACTICAL II- MAP PROJECTIONS, INTERPRETATION AND SURVEYING

Map Projections: Mathematical construction of world projections.

Interpretation of Maps: Geological Maps.

Principles and methods of topographical surveying involving the use of Theodolite and Dumpy level. Solution of problems in Surveying.

Topographical Information – International series, South east Asia Series, Indexing, Classification & Interpretation of topographical sheets.

SUGGESTED READINGS:

1. Davis, R. C. & E. S. Forte : Surveying : Theory and Practical.
2. Kanetkar, T.R. & S.V. Kulkarni: Surveying and leveling part I & IJ A.V.G. Prakashan, Poona.
3. Monkhouse F.J. & H.R. Wilkinson: Maps and Diagrams, Methuen, London.
4. मॉक हाउस तथा विलकौन्सन (अनु.प्रो.प्रेमचन्द अग्रवाल) : मानचित्र तथा आरेख, म.प्र. हिंदी ग्रंथ अकादमी.
5. हीरालाल : प्रयोगिक भूगोल, किताब घर, कानपुर
6. मिश्र, पी.एल. : प्रयोगात्मक भूगोल, विश्वभारती पब्लिकेशन, नई दिल्ली, 2013

M.A./M. Sc. GEOGRAPHY
SEMESTER III (2017-18)

M.A./M. Sc. Geography Semester III shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Inte. Asse.	Total
1.	XI	Population Geography	80	20	100
2.	X II	Settlement Geography	80	20	100
3.	XIII (A)	Remote Sensing Techniques	80	20	100
	OR	**OR**			
4.	XIII (B)	Biogeography and Ecosystem	80	20	100
5.	XIV	Research Methodology	80	20	100
	XV	Practical-III : Remote Sensing and Quantitative Techniques	---	---	100

1. The M.A. /M. Sc. Semester III examination in Geography shall consist of 500 marks. There shall be four theory papers each of 100 marks and one practical of 100 marks as' follows:

Paper XI : Population Geography
Paper XII : Settlement Geography
Paper XIII (A) : Remote Sensing Techniques

OR

Paper XIII (B) : Biogeography and Ecosystem
Paper XIV : Research Methodology
Paper XV : Practical – III: Remote Sensing and Quantitative Techniques

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. (a) In the practical examination the following shall be the allotment of time and marks.

(i) Practical record : 20%
(ii) Lab work (up to Four hours) : 70%
(iii) Viva on i.& ii. Above : 10%

(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

Note: IV – Semester, Paper – XIX, Field Work (Physical and Socio-economic) will be conducted by Field Survey of the households with structured questionnaire Completed in duration of III- Semester.

SEMESTER – III (2017-18)

PAPER - XI

POPULATION GEOGRAPHY

UNIT – I Definition and scope of Population Geography. Relation of Population Geography with other subjects of social sciences. Historical development of Population Geography in western countries and in India. Sources of population data, Census and its history.

UNIT – II Distribution of Population: The concept of population density and its types. Factors affecting population distribution. Distribution & Density of population in the world with special reference to Europe, Asia and India. Growth of population: Measure of decennial and annual rates of population growth, prehistoric and modern trends of population growth in the world. Regional aspect of population growth in India. Population theories. Demographic transition.

UNIT – III Population composition in terms of age and sex, rural, urban residence, educational status and occupational structure. Significance of these elements in population analysis, factors affecting their composition in population, broad world patterns and detailed spatial patterns in India. Fertility and Mortality of population: Significance and factor. Indices and rates. World pattern and pattern in India. Human Development Index and its Components.

UNIT – IV Migration of population: Causes, characteristics and types. Methods of estimating value of internal migration. Important international migrations of the world, internal migration in India: Population and Resources: Population-Resource regions. Population Regions: Concept and methods, population regions of India, population policies of India.

SUGGESTED READINGS:

1. Bilasborruw, Richard Ii and Daniel Hogan, Population and Deforestation in the Humid Eropics, International Union for the Scientific Study of Population, Belgium 1999.
2. Boglia, D.J. Principles in Demography, John Wiley, New York 1969.

3. Bose, Ashish el at. : Population in India's Development (1947-2000); Vikas Publishing House, New Delhi, 1974.
4. Census of India, India : A State Profile, 1991.
5. Chandna, R. C. Geography of Population, Concept, Determinants and Patterns. Kalyani Publishers, New York, 2000.
6. Clarke, John 1. Population Geography, Pergamon Press, Oxford, 1973.
7. Crook, Nigel Principles of Population and Development Pergmaon Press. New York 1997.
8. Daugherty, Helen Gin, Kenneth C.W. Kammeyir, An Introduction to Population (Second Edition), The Guilford Press, New York, London, 1998.
9. Garnicr, B.J. Geography of population Longrrian, London. 1970.
10. Koclihar, Ra)esh, The Veclic People : Their History and Geography Orient I ongman Ltd., New Delhi, 2000.'
11. Mamoria, C.B. India's Population Problem, Kitab Mahal New Delhi, 1981.
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24. शर्मा, सरला : छत्तीसगढ़ बेसिन में ग्रामीण शिशु मर्त्यता प्रतिरूप, पं. रविशंकर शुक्ल वि.वि., रायपुर, 2007
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30. शर्मा, सरला : नगरीय शिशु मर्त्यता. होरीजन बुक्स, नई दिल्ली, 2015.
31. मौर्य, एस.डी. : जनसंख्या भूगोल, शारदा पुस्तक भवन, इलाहाबाद
32. त्रिपाठी, रामदेव : जनसंख्या भगोल, वसुन्धरा प्रकाशन, गोरखपुर, 2006

SEMESTER – III (2017-18)

PAPER - XII
SETTLEMENT GEOGRAPHY

UNIT – I Meaning, Objectives and Scope of Settlement Geography; Evolution, Distribution, Types and Patterns of Rural Settlements; Rural House Types; Rural Service Centers.

UNIT – II Evolution and growth of urban settlements; The Geographical setting of Urban Centers: Site, Situation and Location.

UNIT – III Rank- size-relationship; Cities as Central Places, Central Place Theory, Growth Pole Theory.

UNIT – IV City- Country Relationship : Umland, Rural-Urban Fringe.

SUGGESTED READINGS:

1. Alam, Shah Manzoor : Hyderabad Secundrabad (Twin Cities) : A. Study in Urban Geography)
2. Alam, S.M. & V.V. Pokshishevesky : Urbanization in Developing Countries.
3. Berry Brain J. L. : Geographic Prospective on Urban .Systems.
4. Bresse, C. & D.F. Whiteman : An approach to Urban Planning
5. Dickinson, R.E, : City, Religion and Regionalism.
6. Gallion and Fisher : The Urban Pattern.
7. Grifitth, , J.P : A study of Urban Constructions in India.
8. Gibbs : Urban Research Methods.
9. Mayor, H.M. & C.F. Kohn : Readings in Urban Geography.
10. Morgan, F.W. : Ports and Harbours.
11 Mumford L. : Culture of cities.
12. Robson, W.A. : Great cities of world.
13. Robson, B.T. : Urban Growth : An approach, Methuen, London.
14. Carter, Harold : Study of Urban Geography, London, Edward Arnold, 1979.
15. Singh R.L. & K.N. Singh : Readings in Rural Settlement Geography, NGSI Varanasi, 1975.
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19. यादव, रामसुरेश, अधिवास भूगोल
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22. त्रिपाठी, आर.डी. : जनसंख्या भूगोल, वसुन्धरा प्रकाशन, दाऊदपुर, गोरखपुर, 2011
23. वर्मा, लक्ष्मीनारायण : अधिवास भूगोल, राजस्थान हिन्दी ग्रंथ अकादमी, जयपुर, 2008

SEMESTER – III (2017-18)

PAPER – XIII (A)
REMOTE SENSING TECHNIQUES

UNIT – I Historical development of remote sensing as a technology - Relevance of remote sensing in Geography - Concepts and basics: Energy source, energy and radiation principles, energy interactions in the atmosphere and earth surface features, remote sensing systems: platform sensors and radiation records. Microwave sensing interpretation of SLAR imageries, thermal imageries. Data Products.

UNIT – II Remote Sensing Satellite: platforms LANDSAT, SPOT, NOAA, RADARSAT, IRS, INSAT: principles and geometry of scanners and CCD arrays, orbital characteristics and data products - MSS, TM, LISS I & II, SPOTPLA & MLA, SLAR. Recent trands in Satellite & Sensor System (World & India).

UNIT – III Image Processing: Types of imagery, techniques of visual interpretation, ground verification transfer of interpreted thematic information to base maps-digital processing: rectification and restoration, image enhancement - contrast manipulation,

Classification: Supervised and Unsupervised, post-classification analysis and accuracy assessment. Selection of appropriate data for different applications.

UNIT – IV Applications : Air photo and image interpretations : mapping land use and land cover, land evaluation, urban land use, landform and its processes, weather studies and studies of water resources : integration of Remote Sensing and GIS. Remote sensing and hazard management, remote sensing and environmental management.

SUGGESTED READINGS:

1. American Society of Photogrammetry: Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J.: Introduction to Remote Sension, Guilford, New York, 1989.
4. Curran, Paul J.: Principles of Remote Sensing. Longman, London, 1985.
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6. Luder D,, Aerial Photography Interpretation: Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.): Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.

9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S. Geographic Information Systems : A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washingron, 1991.
14. Mark S. Monmonier. Computer - assisted Cartography, Prentice-Hall, Englewood Cliff, Jersey, 1982.
15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990.
16. Star J. and J. Estes, Geographic Information Systems : An Introduction, Prentice Englewood Cliff, New Jersey, 1994.
17. चौनियाल, देवी दत्त : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली, शारदा पुस्तक भवन, इलाहाबाद

PAPER – XIII (B) (2017-18)

BIOGEOGRAPHY AND ECOSYSTEM

UNIT – I Definition and scope of Biogeography Environment, Habitat and Plant-animal association, Biome Types.

UNIT – II Elements of plant geography, distribution of forests and major communities. Plant successions in newly formed land forms. Zoogeography and its Environmental Relationship. Pale botanical and Palaeo climatological records of environmental change.

UNIT – III Ecosystems: concept and components, Ecosystem-form and function: tropic level, ecological pyramids, ecological niche, energy and nutrients in the ecosystem, hydrological cycle, food chains and food webs. Major terrestrial ecosystems of the world : agriculture, forests, grassland and desert. Population growth and environment.

UNIT – IV Biodiversity and its Conservation. Preservation and conservation of the ecosystem through resource management, Environment legislation. The Stockholm conference, the Earth summit, Environmental laws in India (the Wild Life Act, Water Act, Forest Act, Environment Protection Act and National Environment Tribunal Act).

SUGGESTED READINGS -

1. Agrawal D.P. : Man and Environment in India through Ages, Book & Books, 1992.
2. Bradshaw, M.J. : Earth and Living Planet, ELBS. London, 1979.
3. Cox, C.D. and Moore, P.D. : Biogeography : An Ecological and Evolutionary Approach 5th edn. Blackwell, 1993.
4. Gaur, R. : Environment and Ecology of Early Man in Northern India R. B. Publication Corporation 1987.
5. Hoyt, J.B. Man and the Earth, Prentice Hall, U.S.A. 1992.
6. Huggett. R.J. : Fundamentals of Biogeography, Routledge, U.S. A. 1998.

7. Illes, J. : Introduction to Zoogeography, Mcmillan, London, 1974.
8. Khoshoo, T. N. and Sharma. M. (eds) : Indian Geosphere-Biosphere Har-Anand Publiction, Delhi 1991
9. Lapedes, D.N.(ed) : Encyclopedia of Environmental Science, McGraw Hill, 1974.
10. Mathur H.S. : Essentials of Biogeography, Anuj Printers, Jaipur, 1998.
11. Pears, N. : Basic Biogeography, 2nd edn. Longman, London, 1985.
12. Simmons, I.G. Biogeography, Natural and Cultural, Longman, London, 1974.
13. Tivy J. : Biogeography: A Study of Plants in Ecosphere 3rd edn. Oliver and Boyd, U.S. A., 1992.
14. Ackerman, E.A. : Geography as a Fundamental Research Discipline, University of Chicago Research Papers, 1958
15. Agarwal, A. and Narain, S. : The Citizens Fith Report. Centre for Science and Environmental, New Delhi, 1999.
16. Bertalanffy, L. : General Systems Theory, George Bragiller, New York, 1958.
17. Bodkin, E. : Environmental studies, Charles E Merril Pub. Co., Columbus, Ohio, 1982.
18. Chandana, R.C. : Environmental Awareness, Kalyani Publishers, New Delhi, 1958.
19. Chorley, R.J. : Geomorphology and General Systems Theory, U.S.G.S. Professional Paper, 500B, 1962.
20. Eyre, S.R. and Jones, G.R.J. (eds) Geography as Human Ecology, Edwares Arnold, London, 1966.
21. Kormondy, E.J. : Concepts of Ecology, Prentice Hall, 1989.
22. Manners, I.R. and Mikesell, M.W. (eds.) Prespectives on Environment, Commission on College Geography, Publ. No. 13 Washington, D.C., 1974.
23. Nobel and Wright : Environmental Science, Prentice Hall, New York, 1996.
24. Odum, E.P.: Fundamentals of Ecology, W.B. Saunders, Philadelphia, 1971.
25. Russwurm, L.H. and Sommerville, E. (eds.) : Man's Natural Environment-A Systems Approach, Duxbury, Massachuselts, 1985.
26. Sharma, H.S. : Ranthambhore Sanctuary – Dilemma of Eco-development, Concept, New Delhi, 2000.
27. Simmons, I.G. : Ecology of Natural Resources, Edward Arnold, London, 1981.
28. Singh S. : Environmental Geography, Prayag Publications, Allahabad, 1991.
29. Smith, R.L. : Man and his Environment : An Ecosystem Approach, Harper & Row, London, 1992.
30. U.N.E.P. : Global Environmental Outlook, U.N. Pub. , New ork, 1998.
31. World Resources Institute : World Resoources, (Latest Report) Washington.
32. कुलश्रेष्ठ, कामता प्रसाद : जैव भूगोल, किताब घर, कानपुर 1964
33. होता, जीतेन्द्र कुमार : जैव भूगोल एवं पारिस्थितिक तंत्र, शताक्षी प्रकाशन, समता कालोनी, रायपुर द्वितीय संस्करण 2014, ISBN – 9789351042822
34. सिंह, सविन्द्र : पर्यावरण भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद, 2015

SEMESTER – III (2017-18)

PAPER - XIV
RESEARCH METHODOLOGY

UNIT – I Research Methodology-An Overview; Procedure of scientific Research, Defining Research Problem; Formulating Hypothesis; Research Design.

UNIT – II Methods of Data Collection: Observation, Questionnaire, Schedule and Interview; Sampling: Sampling Methods, Size of Sample;

UNIT – III Processing and Analysis of Data: Processing- Editing, Coding, Classification and Tabulation, Analysis ; Measurement of Central Tendency, Dispersion, Correlation.

UNIT – IV Preparation of Research Reports: Steps, Layout and Types of Reports

SUGGESTED READING:

1. Selltiz, C.M. Jahoda, M. Deutsch and others.	Research Methods in Social Relations, Holt, . New York, 1961.
2. Goode, W and P.K, Hatt	Methods in Social Research, Mc Graw Hill, .Tokyo, 1962.
3. Harvey, David	. Explanation in Geography, Edward Arnold, London, 1971
4. Chorley, R.J. and P. Haggett (ed)	Models in Geography, Methuen, London, 1967.
5. Minshull, R.	Introduction to Models in Geography. Longman London, 1975.
6. Sheskin, I.M.	Survey Research for Geographers Scientific Publisher, Jodhpur, 1987.
7. Kothari, C. R.	Research Methodo!ogy : Methods and Techniques, Wishwa Prakashan, 1994.
8. Misra H.N. and V.P. Singh	Research Methodology in Geography: Social, Spatial and Policy Dimensions, Rawat Publications New Delhi, 1998.
9. Har Prasad	Research Methods and Techniques in Geography, Rawat Publications, New Delhi. 1992.
10. आहूजा राम	सामाजिक अनुसंधान, रावत पब्लिकेशन, जयपुर, 2015.
11.शुक्ला संतोष (संपादक)	शोध विधितंत्र एवं भौगोलिक विश्लेषण, वर्धमान महावीर खुला विश्वविद्यालय, कोटा (राजस्थान) 2009
12. शर्मा, वीरेन्द्र प्रकाश	रिसर्च मेथेडोलाजी, पंचशील प्रकाशन, जयपुर, 2008
13. यादव, हीरालाल,	शोध प्रविधि एवं मात्रात्मक भूगोल, 2008, दिल्ली
14.त्रिवेदी, आर.एन. एवं डी.पी. शुक्ला,	रिसर्च मेथेडोलाजी, कालेज बुक डिपो, जयपरु, 2013
15. जैन, बी.एम.,	रिसर्च मेथेडोलॉजी, रिसर्च पब्लिकेशन, जयपुर, 2012
16. त्रिवेदी, आर.एन.	रिसर्च मेथेडोलॉजी, कालेज बुक डिपो, जयपुर

SEMESTER – III (2017-18)

PAPER - XV

PRACTICAL -III

Remote Sensing, Interpretation of Topographical Sheets and Quantitative Techniques

1. **Principles of Photogrammetery: -** Air Photo- Stereo test, Orientation of stereo model under mirror stereoscope, Preparation of photo/line index and determination of photo scale, Use of parallax bar and determination of heights, Identification of features on aerial photo graph, Tracing of details from stereo pair, Interpretation of physical and cultural details, Preparation of Land use map pre field interpretation, Field visit for ground truthing.
2. **Remote Sensing:–** Study of satellite Image – Annotation Identification of features on FCC imageries, Tracing of details from satellite imageries, Basic Principles of Image interpretation, Interpretation of Physical and Cultural details and preparation of land use and land cover map using IRS Images. Pre field visit.
3. **Land use Processing System:-** Familiarization and startup procedure, Visualization of satellite image data, importing data, Creating a subset image, Identification of object on video display, Display of Histogram and image information, Image rectification and registration, Image to image registration, Image Enhancement techniques, Filtering techniques, Band Rationing, Principal component Analysis, Image classification.

Statistical Techniques:

Product moment and Rank Correlation Coefficients, Linear Regression. Hypothesis Testing:

Chi-Square test, t-test & F test, Sampling Techniques, Point, Line and Area Sampling.

SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A. 1983.
2. Barren E.C. and I...F. Clirtis : Fundamentals of Remote Sensing and Air Photo Interpretation 'on, Memillan, New York, 1992.
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16. Star J. and J. Estes, Geographic Information Systems; An Introduction, Prentice Eaglewood Cliff, New Jersey. 1994.

M.A./M. Sc. GEOGRAPHY
SEMESTER IV (2017-18)

M.A./M.Sc. Geography Semester IV shall consist the following papers:

S. No.	Paper	Title	M. M.		
			Written	Int. Ass.	Total

1.	XVI	Urban Geography	80	20	100
2.	X VII	Agricultural Geography	80	20	100
3.	XVIII (A)	Geographical Information System	80	20	100
	OR	**OR**			
4.	XVIII (B)	Environmental Geography	80	20	100
	XIX	Field Work (Physical and Socio-Economic)	---	---	100
5.	XX	Practical-IV:Geographical Information System and Quantitative Techniques	---	---	100

1. The M.A./M.Sc. Semester IV examination in Geography shall consist of 500 marks.

There shall be three theory papers and one Field Work report each of 100 marks and one practical of 100 marks as follows.

S. No.	**Paper**		**Title**
1.	XVI	:	Urban Geography
2.	XVII	:	Agricultural Geography
.3.	XVIII (A)	:	Geographical Information System
			OR
	XVIII (B)	:	Environmental Geography
4.	XIX	:	Field Work (Physical and Socio-Economic)
5.	XX	:	Practical-IV: Geographical Information system and Quantitative Techniques

2. The theory papers shall be of three hours duration.
3. Candidates will be required to pass separately in theory and practical examinations.
4. Candidates will be required to submit their Field Report in three copies in hard bound at least one hundred pages for Valuation.
5. (a) In the practical examination the following shall be the allotment of time and marks.

(i) Practical record 20%
(ii) Lab work (up to Four hours) 70%
(iii) Viva on i. & ii. above 10%

(b) The external and internal examiners shall jointly submit marks.

(c) All the candidates shall present at the time of the practical examination their practical record regularly signed by the teachers concerned.

SEMESTER – IV (2017-18)
PAPER-XVI
URBAN GEOGRAPHY

UNIT – I Definition, Objective and Scope of urban geography, General Nature of City Structure.

UNIT – II Internal structure: Morphology and Land use. Theories of Urban Structure: The Concentric Zone Theory, The Sector Theory, the Multiple Nuclei Theory. Commercial Structure of Cities; The Central Business District (CBD).

UNIT – III Centrifugal and Centripetal forces in Geography, Economic Base of Towns: Basic, Non-basic concept. Urban Functions: Functional Classification of Towns: Webb, Harris, and Nelson.

UNIT – IV Contemporary Urban Issues: Urban renewal, Urban sprawl, Slums, Environmental Pollution, Urban Planning; Landuse Planning, Urban and Metropolitan Planning in India.

SUGGESTED READINGS:

1. Abercrombee, Sir P. : Town and Country planning 1961.
2. Alam, Shah Manzoor : Hyderabad Secundrabad (Twin Cities) A. study in urban geography
3. Alam, S.M. & V.V. Pokshishevesky : Urbanization in Developing Countries.
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12. Mayor, H.M. & C.F. Kohn : Readings in Urban Geography.
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17. Smailes, A E : The Geography of Towns, Hutchinson, London, 1953.
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20. Carter, Harold: Study of Urban Geography, London, Edward Arnold, 1979.
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22. सिंह, उजागर : नगरीय भूगोल.
23. Khan, Z.T., Bilaspur : A Study in Urban Geography, Northern Book Center, New Delhi.
24. Mandal, R.B., Urban Geography, R.K. Books, New Delhi.
25. Ramchandran, Urbanization and urban systems in India 2009, R.K. Books, New Delhi.
26. Dubey, R.N. Urbanization and urban planning in India, R.K. Books, New Delhi.
27. करन, एम.पी. : नगरीय भूगोल, किताब घर, कानपुर, 1982
28. बंसल सुरेश चन्द्र : नगरीय भूगोल, मिनाक्षी प्रकाशन, मेरठ, 2006

29. सिंह, ओमप्रकाश : नगरीय भूगोल, तारा पब्लिकेशन, वाराणसी, 1979
30. तिवारी आर.सी. : आधिवास भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद, 1997.
31. करण एवं यादव : आधिवास भूगोल, किताब घर, कानपुर, 2002
32. यादव रामसुरेश : अधिवास भूगोल
33. वर्मा, लक्ष्मीनारायण : अधिवास भूगोल, राजस्थान हिन्दी ग्रंथ अकादमी, जयपुर, 2008

SEMESTER – IV (2017-18)

PAPER – XVII

AGRICULTURAL GEOGRAPHY

UNIT – I Nature, scope, significance arid development of agricultural geography. Approaches to the study of agricultural geography: Commodity, systematic and regional systems. Origin and dispersal of agriculture. Sources of agricultural data.

UNIT – II Determinants of agricultural land use - Physical, economic, social, and technological Land holding and land tenure systems, Land reforms, land use Agriculture policy and planning. Selected agricultural concepts and their measurements; cropping pattern, crop concentration, intensity of cropping, degree of commercialization, diversification and specialization, efficiency and productivity, crop combination regions and agricultural development.

UNIT – III Theories of agricultural location based on several multi-dimensioned factors:-Von Thunen's theory of agricultural location and its recent modifications; Whittlesey's classification of agricultural regions; land use and land capability. Agro-climatic & Agriculture Ecological region.

UNIT – IV Contemporary Issues: Food, nutrition and hunger, food security, drought and food-security, .food aid Programmers; role of irrigation, fertilizers, insecticides and pesticides, technological know-how. Employment in the agricultural sector: landless labourers, woman, children: occupational and agricultural activities.

SUGGESTED READINGS:

1. Bayliss Smith, IP.: The Ecology of Agricultural Systems. Cambridge University London, 1987.
2. Berry, BJ.L et. al. : The Geography of economic Systems. Prentice Hall, New York, 1976.
3. Brown, L.R. : The Changing World Food Prospects - The Nineties and Beyond, World Watch Institute, Washington D.C., 1990.
4. Dyson, T. : Population and Food - Global Trends and Furure Prospects. Routledgle. London, 1996.
5 Gregor, H.P. : Geography of Agriculture. Prentice Hall, New York, 1970.

6. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York 1974.
7. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988
8. Mannion, A.M. : Agriculture and Environment Change, John Wiley, London, 1995.
9. Mitra, Manju : Agriculture Geography of Chhattisgarh Basin, Sahitya Ratnalaya Kanpur, 1980
10. Morgan W.B. and Norton , R.J.C. : Agricultural Geography. Mathuen, London, 1971.
11. Morgan, W.B.:Agriculture in the Third World - A Spatial Analysis. Westview Boulder, 1978.
12. Sauer, C.O. : Agricultural Origins and Dispersals,. M.I.T. Press, Mass, U.S.A., 1988.
13. Singh, J. and Dhillon, S.S. : Agricultural Geography. Tata McGraw Hill' Pub.; Delhi, 1988.
14. Tarrant, J.R. : Agricultural Geography. Wiley, New York, 1974.
15. बघेल, अनुसुइया : कृषि भूगोल, होरीजन्स बुक्स, नई दिल्ली, 2015
16. जोशी, वाय.जी. : नर्मदा बेसिन का कृषि भूगोल, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 1972
17. कुमार, प्रमिला : कृषि भूगोल, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 2008
18. हुसैन, माजिद : कृषि भूगोल, रावत पब्लिकेशन, जयपुर, 2000
19. कुमार, प्रमीला एवं श्री कमल शर्मा : कृषि भूगोल, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल, 1985

SEMESTER – IV (2017-18)

PAPER – XVIII (A)
GEOGRAPHICAL INFORMATION SYSTEM

UNIT – I Spatial Science : Geography as a spatial science, maps and spatial information dynamics of spatial information, elements of information technology, Geographic objects and their relations definition and development of GIS, computer environment for GIS.

UNIT – II Spatial Data: Elements of spatial data: data sources: Primary and secondary census and sample data, quality and error variations Raster and vector data structures, data conversion comparison of raster and vector data bases, methods of spatial interpolation – GIS data formats for the computer environment.

UNIT – III GIS Technology: Coordinate system-basic principles of cartography and computer assisted cartography for GIS – remote sensing data as a data source for GIS integration of GIS and remote Sensing-GPS and GIS: technology, data generation and limitations – visualization in GIS-Digital Elevation Models (DEM and TINS).

UNIT – IV GIS Application: GIS as a Decision Support System –expert system for GIS-basic flow chart for GIS application – GIS standard legal system and national GIS policy application of GIS in Land Information System, Urban Management, Environmental Management and Emergency Response System.

SUGGESTED READINGS:

1. American Society of Photogrammetry : Manual of Remote Sensing. ASP, Falls Church V.A., 1983.
2. Barrett E.C. and L.F. Curtis : Fundamentals of Remote Sensing and Air Photo Interpretation on, Memillan, New York, 1992.
3. Compbell J. : Introduction to Remote Sension, Guilford, New York, 1989.
4. Curran, Paul J. : Principles of Remote Sensing. Longman, London, 1985.
5. Hord R.M.:Digital Image Processing of Remotely Sensed Date, Academic, New York, 1983.
6. Luder D,, Aerial Photography Interpretation : Principles and Application, CcGraw Hill, New York, 1959.
7. Pratt W.K. Digital Image Processing. Wiley, New York, 1978.
8. Rao D. P. (eds.) : Remote Sensing for Earth Resources, Association of Exploration Geophysicist, Hederabad, 1998.
9. Thomas M. Lollesand and Ralph W. Kefer, Remote Sensing and Image Interpretation, Wiley & sons, New York, 1994.
10. Aronoff S.Geographic Information Systems: A. Management Perspective, Publication Offiawa, 1989.
11. Burrough P.A. Principles of Geographic Information Systems for Land Reson Assessment Oxford University Press, New York, 1986.
12. Fraser Taylor D.R. Geographic information Systems. Pergamor Press, Oxford 1990.
13. Maquire D.J.M.F. Goodchild and D.W. Rhind (eds.). Geographic information System 'Principles arid Application. Taylor & Francis, Washingron, 1991.
14. Mark S. Monmonier. Computer-assisted Cartography,Prentice-Hall, Englewood Cliff, Jersey, 1982.
15. Peuquet D. .1. and D.F.- Marble, Introductory Reading in Geographic. Information System Taylor & Francis, Washington, 1990..
16. चौनियाल, देवी दत्त, : सुदूर संवेदन एवं भौगोलिक सूचना प्रणाली.

SEMESTER – IV (2017-18)

PAPER – XVIII (B)
ENVIRONMENTAL GEOGRAPHY

UNIT – I Environment: Meaning, definition, concepts and theories related to environment.

Environment and its components: Classification, Characteristics and their interdependent relationship, Development of the environmental studies and their approaches: Development of environmentalism in Geography.

UNIT – II Environment and development. Ecological concepts; Geography as human ecology; Ecosystem: meaning definition, Concept and components. Main terrestrial ecosystems of the world-forests and agriculture.

UNIT – III Environmental hazards- natural and human made, environmental pollution : meaning definition, nature and types-air, water, noise and others. Ecological impacts of pollution. Resource use and ecological imbalance with special reference to soil, forests and water resources.

UNIT – IV Environmental Management : meaning, importance and approaches, need for environmental policy and laws. Preservation and conservation of environment through resource management (Green revolution, Chipko movement, National Parks). Environmental Actions: Concept, need and importance Stockholm Conference, Earth Summit, E.I.A. definition and methods and need for EM Environmental education and People's participation.

Suggested Readings :

1. Agrawal, Anil and Sunita Narain. Dying Wisdom : The Fourth citizen Report. Centre for Science and Environment, New Delhi, 1998.
2. Burton I.; R.W. Kates & G.F. Whiley. The Environment as Hazards. O. U.P. New York, 1978, Carledge, Bryen. Population and the Environment, O.U.P., New York, 1995.
3. Chandna, R.C. Environmental Awareness Kalyani Punlishers, New Delhi, 1998.
4. Dawson, J. and J.C. Doornkamp, eds.: Evaluating the Human Environment. Edward Amold, London, 1975
5. Detwyler, J.R.: Man,s impact on Environment. Pelican, 1970.
6. Edington, J.M. & M.A. Edington : Ecology and Environmental Planning. Chapmap & Hall, London, 1977.
7. Goudie, Andrew. The Human Impact on the Natural Environment, Blackwell Oxford, U.K. 1994
8. Jain, R. K., L.V. Urban and G.S. Stacy; Environmental Impact Analysis-A New Dimension in Decision-Making. Van Norstrand Reinhold Co. New York, 1977.
9. Khoshoo, T.N. Environmental Concepts and Strategies. Ashish Publishing House, New Delhi.
10. Mohan, M. Ecology and Development. Rawat Publications; Jaipur, 2000.
11. Munn, R.E. Environmental Impact Assessment : Principles and Procdures. John Wiley & Sons, New York, 1979.
12. Narain, Sunita. The Citizen Fifth Report. Centre for Science and Environment, New Delhi 2003.
13. Mukherji, A and V. K. Agnihotri : Environment and Development. Concept Pu. Co. New Delhi, 1993.
14. Rudig Wolfgeng. Environmental Policy Edward Elger Publishing Ltd. UK. 1998.
15. Saxena, H.M. Environmental Geography. Rawat Punlications, Jaipur, 1999
16. Saxena, H.M. Environmental Management. Rawat Punlications, Jaipur, 2000

17. Sharma, B.L. & Puar P: Global Environmental Challenges. Rohini Books, Publishers & Distriburors, Jaipur, 2004.
18. Singh, K.N. and D.N. Singh : Population Growth, Environment and Development Issues, Impacts and Responds. Environment & Development Study Centre, Varanasi, 1991.
19. Singh, R. B. and S. Mishra : Environmental Law in India : Issues and responses, Concept Pub. Co. New Delhi, 1966.
20. Singh, S. Environmental Geography. Prayag Pustak Sadan, Allahabad, 2000.
21. Smith, R.L. : Man and his Environment: An Ecosystem Aproach. Harper & Row. London, 1992.
22. U.N.E.P.: Global Environmental Outlook. U.N. Pub. New York.
23. अवस्थी एन. एम. एवं आर.पी. तिवारी पर्यावरण भूगोल, मध्यप्रदेश ग्रथ अकादमीए भोपाल ।
24. नेगी, पी. एस. : परिस्थितिकीय विकास एवं पर्यावरण भूगोल, रस्तोगी एन्ड कम्पनी, मेरठ, 1995।
25. रघुवंशी अरूण और चन्द्रलेखा रघुबंशी : पर्यावरण तथा प्रदूषण, मध्यप्रदेश हिन्दी ग्रथ अकादमी, भोपाल, 1989 ।
26. सविन्द्र सिंह : पर्यावरण भूगोल, प्रयाग पुस्तक सदन इलाहाबाद, 1993 ।
27. शर्मा, बी एल : पर्यावरण : साहिन्य भवन, आगरा, 1992।
28. तिवारी, विजय कुमार : पर्यावरण और परिस्थितिकी, हिमालय पब्लिशिंग हाउस, दिल्ली 1998 ।
29. तिवारी, विजय कुमार, : पर्यावरण अध्ययन, हिमालय पब्लिशिंग हाउस, दिल्ली, 1998 ।
30. प्रसाद गायत्री, गौतम अल्का, पर्यावरण भूगोल
31. रामकुमार गुर्जर एवं जाट बी.सी., पर्यावरण अध्ययन, पंचशील प्रकाशन, जयपुर
32. व्यास, हरिशचन्द्र : पारिस्थतिकी एवं पर्यावरण, पंचशील प्रकाशन, जयपुर
33. आसरे, राम, पर्यावरण भूगोल, आर. के. पब्लिकेशन, नई दिल्ली, 2009
34. मौर्य, एस.डी. : संसाधन एवं पर्यावरण, प्रयाग पुस्तक भवन, इलाहाबाद, 2006
35. राव, बी.पी. : संसाधन एवं पर्यावरण, वसुन्धरा प्रकाशन, गोरखपुर, 2010

SEMESTER – IV, (2017-18)

PAPER - XIX

FIELD WORK (PHYSICAL AND SOCIO- ECONOMIC) Physical

UNIT – I Trace the prominent features of area to be surveyed. Identify salient landform features of selected area on a topographical sheet. Identify the landforms on the surface, while in the field. Also note the agents of erosion, transportation and deposition associated with the landforms.

UNIT – II Identity and classify the Bio-diversity in the area (Flora & fauna). Observe the relationship of various landforms, flora and fauna with land-use, settlement structure and life style of people.

Socio – Economic

UNIT – III Procure a cadastral map of the village/town for field mapping of the features of land-use and land quality. Procure/prepare the settlement –site map through rapid survey to map the residential, commercial, recreational (parks, playground), educational, religious and other prominent features. Conduct a socio-economic survey of the households with a structured questionnaire. Supplement the information by personal observations and perceptions.

UNIT – IV Based on observations of the land-use and results of the socio-economic enquiry of the households, prepare a critical field-survey report. Photographs and sketches, in addition to maps and diagrams, may supplement the report.

SEMESTER – IV, (2017-18)

PAPER - XX

PRACTICAL-IV

GEOGRAPHICAL INFORMATION SYSTEM AND QUANTITATIVE TECHNIQUES

Geographical Information System

An overview of GIS software, Elements of GIS: Data capture-verification and preprocessing-data storage and maintenance of databases-Database Management Systems: Spatial data creation, Editing the layers and table creation, Creation of non Spatial data, data manipulation, analysis (integrated analysis of spatial and attribute data, overlay analysis, neighborhood operations and connectivity functions) and spatial modeling-output format and generation. Buffer analysis, Network Analysis, Creation of DEM & TIN Generation of thematic map.

GPS – Demonstration and handling of Hand held GPS receivers. Ground truthing. Checking and updating of existing map, Use of GPS to Check/update the existing topographical map.

Quantitative Techniques:

Running mean, Mean centre, Nearest Neighbor Analysis; Lorenz Curve, Normal distribution curve, Probability.

SUGESSTED READINGS:

1. Singh, R.L. & P.K. Dutt : Elements of Practical Geography Students trends.
2. Monkhouse, F.J. & H.R. Wilkinson; Maps and Diagrams Mathuen, London.
3. Mahmood, Aslam 1971 : Statistical Methods in Geographical studies Rajesh Pub., New Delhi.
4. Gregory, S. Statistical Methods and The Geographer.

5. Hammond & Mccullah 1977 : Quantitative Techniques in Geography, Clarendon Press,Oxford.
6. Fitz, Gomid, B.P. : Science in Geography, Developments in Geographical Method, Oxford University Press.
7. Yeaters, M. : An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York.
8. मॉक हाउस तथा विल्किन्सन 1976 : मानचित्र तथा आरेख, म.प्र. केदारनाथ , रामनाथ, मेरठ.
9. नेगी, डी.एस. : भूगोल में आधारभूत सांख्यिकी, केदारनाथ , रामनाथ, सेठ.
10. हीरालाल : प्रायोगिक भूगोल, किताबघर, कानपुर.
11. आर.सी. तिवारी एवं सुधाकर त्रिपाठी : अभिनव प्रयोगात्मक भूगोल, प्रयाग पुस्तक भवन, इलाहाबाद.
12. श्रीवास्तव, वी.के. : भूगोल की सांख्यिकीय विधियाँ, वसुन्धरा प्रकाशन, गोरखपुर, 2007

M. Phil (2017-18)

Geography

The duration of the M. Phil Course shall be one academic year (Two Semester)

The M. Phil. course shall be spread over two semesters. In first semester there shall be two theory papers and seminar based on theory papers. The second semester would consist of Lab course and Dissertation. Written and Practical Examination shall be completed by the end of the each semester. There shall be numerical marking in evaluation.

Allotment of Marks

Semester I			
	Theory/Lab Course		**Marks**
i	Theory - I	Research Methodology and Computer Application in Geography	100
ii	Theory-II	Modern Concepts and Approaches in Geography	100
iii	Seminar	Based on Theory	50
Total Marks			**250**
Semester II			
iv	Lab Course	Cartographic and Quantitative Techniques, Remote Sensing & GIS	100
v	Dissertation	Seminar based on dissertation	50
		Script Writing	75
		Viva-voce	25
Total Marks			**250**
Grand Total			**500**

(1) The M. Phil in Geography Examination, 2016-17 shall be of two theory paper, a Practical and Dissertation as follows :-

(2) SEMESTER I (THEORY PAPERS) :-

Paper – I : Research Methodology and Computer Application in Geography.

Paper – II : Modern Concepts and Approaches in Geography

SEMESTER II (PRACTICAL AND DISSERTATION):

Practical: Cartographic and Quantitative Techniques, Remote Sensing and GIS

Dissertation:

The distribution of marks shall be as follows:-

(a) Each theory paper shall carry 100 marks.

(b) 50 marks shall be allotted to the seminar based on theory.

(c) The Practical shall carry 100 marks of which 20 marks shall be allotted to the practical record, 20 marks on viva-voce and 60 marks to the examination held at the time of annual examination

(d) The Dissertation shall carry 150 marks divided as under

(i) Script - 75 Marks

(ii) Viva - 25 Marks

(iii) Seminar - 50 Marks

(3) Note :

(A) The assessment in the seminar shall be done by the Internal Examiners.

(B) The assessment of the Practical Record, carrying 20 marks and viva voce carrying 20 marks shall be done at time of the annual examination jointly by the external and internal examiners.

(C) The Candidate shall submit at the time of their Practical examination, their Practical Records duly signed by the teachers concerned with dates of signature.

Paper - I

Research Methodology and Computer Application in Geography

UNIT – I : Research Methodology-An Overview; Procedure of Scientific Research; Defining Research Problem; Formulating Hypothesis; Research Design. Explanation in Geography.

UNIT - II : Sources of Data in Different Branches of Geography; Measurement and Scaling Techniques, Measurement in Research, Measurement Scales, Sources of Error in Measurement; Scaling: Meaning of Scaling, Scale\of Classification Bases, Important Scaling Techniques.

UNIT – III : Processing and Analysis of Data: Processing-Editing, Coding, Classification and Tabulation, Analysis- Probability; Hypothesis Testing.

UNIT – IV : Interpretation and Preparation of Research Reports: Meaning and Techniques of Interpretation, Steps, Layout and Types of Reports: Computer application.

BOOKS RECOMMENDED;

Selltiz, C.M. Jahoda, M. Deutsch and S.	Research Methods in Social Relations, Holt, . New York, 1961.
Goode, W and P.K, Hatt	Methods in Social Research, Mc Graw Hill, .Tokyo, 1962.
Harvey, David	. Explanation in Geography, Edward Arnold, London, 1971
Chorley, R.J. and P. Hagg~tt (ed)	Models in Geography, Methuen,London, 1967.
Minshull, R.	Introduction to Models in Geography. Longman London, 1975.
Sheskin, I.M.	Survey Research for Geographers Scientific Publisher~, Jodhpur, 1987.
Kothari, C. R.	Research Methodology : Methods and Techniques, Wishwa Prakashan, 1994.
Misra H.N. and V.P. Singh	Research Methodology in Geography: Social, Spatial and Policy Dimensions, Rawat Publications New Delhi, 1998.
Har Prasad	Research Methods and Techniques in Geography, Rawat

Publications, New Delhi. 1992.
आहूजा राम सामाजिक अनुसंधान, रावत पब्लिकेशन, जयपुर, 2015.
शुक्ला संतोष (संपादक)
शर्मा, वीरेन्द्र प्रकाश रिसर्च मेथेडोलाजी, पंचशील प्रकाशन, जयपुर, 2008
यादव, हीरालाल, शोध प्रविधि एवं मात्रात्मक भूगोल, 2008, दिल्ली
त्रिवेदी, आर.एन. एवं डी.पी. शुक्ला, रिसर्च मेथेडोलाजी, कालेज बुक डिपो, जयपरु, 2013
जैन, बी.एम., रिसर्च मेथेडोलॉजी, रिसर्च पब्लिकेशन, जयपुर, 2012

Paper – II

Modern Concepts and Approaches in Geography

UNIT – I : Modern Concepts and Approaches In Geography Changes in the Philosophy of Geography, Paradigm of Geography, Quantitative Revolution in Geography, The Question of Relevance and Ethics in Geography.

UNIT – II: Welfare Geography, Future of Geography, Analytical Approaches: Spatial Analysis, Ecological Analysis, Complex Regional Analysis, Systems Approach in Geography.

UNIT – III **:** Environment - Environmental Problems Pollution, Concept of Resources, Resource Evaluation and Conservation. Geography and Environmentalism: The Current View of Man-Environment Relations.

UNIT -IV**:** Core and Periphery. Geography and Planning. Theories, Laws and Models in Geographic Explanation.

BOOKS **RECOMMENDED:**

Dikshit, R.D. Geographical Thought: A Contextual History of Ideas, Prentice-Hall of India, New Delhi.
Harvey, Milton E. & Brian P. Holly: Themes in Geographic Thought, Rawat, Jaipur.
Husain, Majid Evolution of Geographical Thought, Rawat, Jaipur.
Johnston, R.J. (ed.) The Future of Geography, Methuen, London.
Johnston, R.J. and P. Claval (eds) : Geography since the Second World War; Helm, Sydney
Chorley, R.J. and P. Haggett. Models in Geography, Methuen.
Haggett, P. Geography: A Modern Synthesis,; Harper and Row.
Abler, Adams and Gould Spatial Organization, Prentice Hall
Brookfield, Harold Interdependent Development, Methuen.
Mitchell, Bruce Geography and Resource Analysis, Longman.
Forbes, D.K. The Geography of Underdevelopment, New Delhi.
Singh J. and D. N. Singh. An Introduction to Our Earth and Environment, Varanasi.
Kayastha, S.L. and V.K. Kumra Environmental Studies, Varanasi.

Singh, Savindra	Environmental Geography, Allahabad.
Misra, R.P.	Growth Poles and Growth Centers in Urban and Regional Planning in India, Mysore.
सिंह, उजागिर,	भौगोलिक चिंतन का विकास
त्रिपाठी एवं विरले	भौगोलिक चिंतन का विकास एवं विधि तंत्र
कौशिक, एस.डी.	भौगोलिक विचारधाराओं का इतिहास एवं विधितंत्र
सिंह, जगदीश,	भौगोलिक चिंतन का मूलाधार
हुसैन, माजिद	भौगोलिक चिंतन
प्रसाद गायत्री, गौतम अलका	पर्यावरण भूगोल
गुर्जर रामकुमार एवं जाट, बी.सी.	पर्यावरण अध्ययन, पंचशील प्रकाशन, जयपुर
व्यास, हरिशचंद्र,	पारिस्थितिकी एवं पर्यावरण, पंचशील प्रकाशन, जयपुर

PRACTICAL

Cartographic and Quantitative Techniques, Remote Sensing and GIS

A. Cartographic Techniques: 20 marks

1. Lear month's Cross Tabulation Method.
2. Divided Strips: Population structure.
3. The Sieve Techniques.
4. Drainage Analysis.
5. Sex-age Snail Diagram.

B. Quantitative Techniques: 20 Marks

1. Sampling Techniques: Point, Line and Area Sampling.
2. Line Patterns: Detour Index and Shape Index.
3. Tests: 't' Test; 'F' Test; Chi square Test.
4. Rank Size Rule; Functional Classification of Towns; Centrality Index of Central Places.
5. Crop Combination Region, Agricultural Efficiency.
6. Gravity and Potential Models.

C. Remote Sensing and GIS: 20 Marks

1. Interpretation of Aerial Photographs.
2. Remote Sensing Applications in Land use/Land cover Mapping- data Storage, Georeferancing, Image Processing-Visual and Digital Image Processing, Image Classifications.
3. GIS Application and Computer Cartography- Creation of Base map, Georeferancing, digitizing and Map Design.

BOOKS RECOMMENDED:

Monkhouse F.J. and H.R. Wilkinson.	:	Maps and Diagrams, Methuen London (Hindi Translation, 1976)
Gregory, S	:	Statistical Methods and the Geographer, 1964.
Fitz Gerald, Barian P.	:	Science in Geography Series 1 to 4, Oxford University Press London.
Yeates, Maurice	:	An Introduction to Quantitative Analysis in Human Geography, Mc Graw Hill, New York, 1968.
Nag, Prithvish	:	Thematic Cartography and Remote Sensing, Concept Pub. Co. New Delhi, 1992.
Rampal K.K.	:	Hand Book of Aerial Photography and Interpretation, Concept Pub.Co. New Delhi, 1999.
Rampal K.K.	:	Mapping and Compilation, Methods and Techniques, Concept Pub. Co.1993
Hammond, Rand P.S. Me Cullagh		: Quantitative Techniques in Geography An Introduction, Clarendon Press, London, 1974.

DISSERTATION

Within 15 days from the date of admission in the M. Phil. Course, the candidate will finalise his topic of Dissertation and submit to the M. Phil Committee for approval in three copies a brief outline in consultation with a faculty teacher to whom candidate is assigned for guidance.

The Dissertation will be a phased and time bound assignment. The candidate will show his monthly progress to the supervisor.

A candidate will be required to submit three typed copies of his/her dissertation within a month after the completion of theory examination. The dissertation and Viva-Voce shall be valued by both internal and external examiners. A Declaration (Appendix – 1) by the candidate and a certificate (Appendix-2) from the Supervisor/ Co-supervisors shall be included in the dissertation.

The evaluation of the seminar on the dissertation will be done internally by the supervisor and at least one other teacher connected with the course.

Syllabus for Ph.D. Course work in Geography (2017-18)

Paper – II Geography – elective (15 C)

There are two papers: each with 15 credits. Total credit: 15 X2 = 30

I credit = Five lecture of 1 hour each.

C= credit; L = Lecture

Paper - I Research Methodology, Computer Fundamentals, Statistical tools and techniques in Geography (15 C)

Paper – II Geography – elective (15 C)

Paper - I : Research Methodology, Computer Fundamentals, Statistical tools and techniques in Geography (15 C)		
A	Research Methodology : An overview; explanation in Geography Defining Research Problem' Procedure of Scientific Research Formulation Hypothesis; Research design	
B	Sources of data in Geography Methods of data collection: observation, schedule, questionnaire and interview, Processing of data: Processing, editing, coding and classification and tabulation; Sampling, sampling methods and size of the sample.	
C	Analysis of data: measurement of Central Tendency, dispersion and relationship; probability Measurement in research, measurement scale, sources of error in measurement, important scaling techniques: Quantitative techniques: Correlation: Rank order Correlation, Product Movement Correlation;	
D	Running mean; describing point patterns: Mean Centre, Nearest Neighbour Analysis, Line Pattern: Detour Index and Shape index, Tests: 't' Test' 'F' Test, Chi square Test; Rank Size Rule; Lorenz Curve; Functional Classification of towns; Centrality index for central place; Crop Combination Region, Agricultural Efficiency; Gravity and Potential Models: Linear Regression.	
E	Interpretation and preparation of Research Report: Meaning and techniques of interpretation, steps, layout and type of reports;	
F	Computer application: couputer fundamentals, Microsoft office (wird, exel and Power Point), internet, Computer cartography, Remote sensing and GIS application.	

Paper – II - Elective (15 C)

A1	Geomorphology	
A2	Population Geography	
A3	Social Geography	
A4	Settlement Geography (Rural and Urban)	
A5	Agriculture Geography	
A6	Resource Geography	
A7	Regional Development and Planning	
A8	Remote Sensing and GIS	
B	Review writing-Topic of review relevant to the proposed Ph. D. work	
C	Writing of research proposal, statement of problem, objective, hypothesis, and plan of the thesis.	
D	Thesis writing, Formats of report writing, Formats of Publications in research Journals; Bibliography	
E	Seminar presentation; Preparation of Research Paper	

Scheme of examination for the pre-Ph.D. course work for Geography		
	Examination scheme	
1	The question paper will be of 100 marks	
2	There will be five questions. All the five questions shall be compulsory.	
3	The pattern of the question paper shall be as follows:	
	Q. 1 Objective questions of multiple choice type (40 questions to be answered) covering contents of both papers equally.	40
	Q.2. Short answers type questions (in about 50-100 words)	10
	Q.3. Shorts notes (in about 200-250 words)	10
	Q.4. Preparation of any suitable research proposal	20
	Q. 5. Preparation of any research paper	20
4	The answer papers will be assessed independently by two examiners.	
5	The candidate must obtain 50% or more marks to qualify in the course work	

BOARD OF STUDIES IN GEOLOGY
COURSE CURICULUM FOR
M. Sc. GEOLOGY (Four Semesters Course)
Academic Session 2017-18

CHOICE BASED CREDIT SYSTEM (CBCS)

There shall be four semesters in two academic years. Semester I and III consist of Four Theory courses and two Lab courses carrying 100 marks each. Semester II consists of Four Theory papers carrying 100 marks each, Lab course I of 150 marks and the Lab course II of 50 marks. In IVth Semester, there will be Three Major/Core Theory Papers and One Major/core ELECTIVE Paper, along with respective practical. Theory papers carry 100 marks each, Lab course I carries 150 marks and Lab course II, 50 marks. Each semester carries 20 credits. Besides this, a student will have to clear two Papers of 3 credits each out of the Minor ELECTIVE courses from other Subjects/Disciplines as per his/her choice. A student will clear 80 core credits and 6 credits from choice based elective papers offered during Sem II and III. Thus, a student will have to clear total 86 credits for obtaining M. Sc. Degree.

The practical examination would be of 3 to 4 hours duration. In each practical 20 % marks shall be allotted for Sessional work, 10% marks are allotted for viva-voce.

Fieldwork: Fieldwork is an essential component of the course, and carries 2 Credits. Every student will have to do 2 to 3 weeks of fieldwork (in continuation or in breaks) during the first academic year. He will be required to submit a field report for evaluation under FIELD WORK of second semester examination.

A student has to submit his choice of Major/Core ELECTIVE Papers at the beginning of III Semester. If a candidate chooses for The Project Oriented Dissertation in lieu of Core ELECTIVE Paper, he/she shall be allotted a topic for the Project work. He/She will have to complete his fieldwork related to Project before the commencement of Fourth Semester, while Laboratory work can be completed along with regular course of study during Fourth Semester. M. Sc. Dissertation thesis must be submitted within 30 days after the completion of IVth Semester theory examination.

SCHEME OF EXAMINATION

SEMESTER – I CORE COURSES (2017-18)

Course No	Title of Paper	Max Marks			Credits
		Theory	Internal Assmt.	Total	
I	Structural Geology	80	20	100	4
II	Mineralogy	80	20	100	4
III	Geochemistry	80	20	100	4
IV	Crystallography & crystal optics	80	20	100	4
Lab Course -I	Structural Geology & Survey	100	-	100	2
Lab Course –II	Crystallography, Crystal Optics, Mineralogy & Geochemistry	100	-	100	2
	Total	520	80	600	20

SEMESTER – II CORE COURSES (2017-18)

Course No	Title of Paper	Max Marks			Credits
		Theory	Internal Assmt.	Total	
I	Igneous Petrology	80	20	100	4
II	Metamorphic Petrology	80	20	100	4
III	Sedimentalogy & Crustal Evolution	80	20	100	4
IV	Stratigraphic principles and Indian Geology	80	20	100	4
Lab Course -I	Petrology and Stratigraphy	150	-	150	2
Lab Course -II	Fieldwork	50	-	50	2
	Total	520	80	600	20

SEMESTER – III CORE COURSES (2018-19)

Course No	Title of Paper	Max Marks			Credits
		Theory	Internal Assmt.	Total	
I	Paleontology	80	20	100	4
II	Ore & Fuel Geology	80	20	100	4
III	Geomorphology and Remote Sensing	80	20	100	4
IV	Mineral Exploration	80	20	100	4
Lab Course -I	Ore Geology and Mineral Exploration	100	-	100	2
Lab Course -II	Paleontology, Geomorphology and Remote sensing	100	-	100	2
	Total	520	80	600	20

SEMESTER – IV CORE COURSES (2018-19)

Course No	Title of Paper	Max Marks			Credits
		Theory	Internal Assmt.	Total	
I	Mining and Engineering Geology	80	20	100	4
II	Environmental Geology	80	20	100	4
III	Hydrogeology	80	20	100	4
Lab Course -I	Hydrogeology, Engineering Geology and Mining geology	150	-	150	2
	Total	390	60	450	14

CORE ELECTIVE COURSES (ANY ONE)

Course No	Title of Paper	Max Marks			Credits
		Theory	Internal Assmt.	Total	
ME I	Advanced Hydrogeology	80	20	100	4
Lab course ME- I	Advance hydrogeology	50		50	2
ME II	Project Oriented Dissertation	100		100	4
	Script Evaluation and Viva Voce on Project Dissertation	50		50	2
	Total	130		150	6
	Total credits of IV Semester				20

		Max Marks			Credits
		Theory	Internal Assmt.	Total	
	Grand Total Minor elective courses	2080	320	2400	80 06
	Total credits				86

MINOR ELECTIVE COURSES

		Max Marks	Credits
		Total	
GMnE-1	Fundamentals of Geology	100	3
GMnE-2	Disaster Management	100	3

SEMESTER – I **COURSE: I - STRUCTURAL GEOLOGY (2017-18)**

UNIT – I

1.1 Rock deformation: Theory of stress & strain, their relationship; Factors controlling rock deformation

1.2 Properties of elastic, plastic and brittle materials; Progressive deformation.

1.3 Strain analysis: types of strain; strain ellipse; strain ellipsoid; Geological application of strain theory.

1.4 Stress analysis: compressive and shear stress; biaxial and triaxial stress. Mohr's Circle and envelope.

UNIT – II

2.1 Fold: Definition; Classifications - Geometrical and Genetic; Fleuty, Ramsay and Dip Isogon

2.2 Mechanism of Fold formation and types of fold

2.3 Superimposed fold; Outcrop pattern of superimposed structure comprising of two fold system.

2.4 Joints its types; their analysis and relation with major structures

UNIT – III

3.1 Fault: Types and mechanism of faulting.

3.2 Principal stress orientation for the main fault types; Relationship between stress and strain ellipsoid.

3.3 Analyses of brittle-ductile and ductile shear zones

3.4 Petrofabric Analysis: Field and laboratory techniques; Preparation of petrofabric diagrams and their interpretation.

UNIT – IV

4.1 Cleavage & Schistosity: definition and types.

4.2 Mechanism of formation of Cleavage & Schistosity; its relationship with major deformation structures

4.3 Lineation: definition and its types; their mode of development and relation to major structures.

4.4 Plutons: Definition & description; its role in progressive deformation.

UNIT – V

5.1 Tectonites: definition and its types

5.2 Stereographic Projection: Principles and application

5.3 Tectonics and structural characteristics of Plate Boundaries; associated structures in extensional, compretional and strike-slip terranes

5.4 Geodynamic evolution of the Himalayas

Books Recommended:

Ghosh, S.K. (1993): Structural Geology: Fundamental and Modern Development. Pergamon Press.

Hobbs, B.E., Means, W.D. and Williams, P.F. (1976): An outline of Structural Geology, John Wiley and Sons, New York.

Ramsay, J.G. (1967): Folding and fracturing of rocks, McGraw Hill.

Ramsay, J.G. and Huber, M.I. (1983): Techniques of Modern Structural Geology, Vol. I Strain Analysis, Academic Press.

Ramsay, J.G. and Huber, M.I. (1987): Techniques of Modern Structural Geology, Vol. II, Folds and Fractures, Academic Press.

Ramsay, J.G. and Huber, M.I. (2000): Techniques of Modern Structural Geology, Vol. III (Application of continuum mechanics), Academic Press.

Turner, F.J. and Weiss, L.E. (1963): Structural analysis of Metamorphic Tectonites, McGraw Hill.

Windley B. (1973): The Evolving continents, John Wiley and Sons, New York.

SEMESTER - I **COURSE: II – MINERALOGY (2017-18)**

UNIT- I

1.1 Composition of minerals and Mineraloids.
1.2 Physical Properties of Minerals depending on Crystal Growth, Crystal Structure, Chemical Composition and Interaction with light.
1.3 Electrical Magnetic, Luminescence, Thermal and Radioactive Properties of Mineral.
1.4 Structure of Silicates.

UNIT- II

2.1 Ionic Radius, Coordination Principles, Close Packing, Pauling's Rules.
2.2 Unit Cell, Bonding Forces in crystals Ionic Bond, Covalent Bond, Van Der Waal's Bond, Metallic Bond.
2.3 Solid solution - Substitution, Interstitial and Omission solid solution. Ex-solution.
2.4 Polymorphism, polytypism, pseudomorphism.

UNIT – III

Classification of Minerals. Systematic Mineralogy of common rock forming silicate groups.

3.1 Classification of Minerals
3.2 Nesosilicates – a) Olivine Group b) Garnet Group c) Al2SiO5 Group d) Zircon,
3.3 a) Topaz, b) Staurolite, c) Sphene.
3.4 Sorosilicates - Epidote

UNIT- IV

Systematic Mineralogy of common rock forming silicate groups

4.1 Cyclosilicates- a) Cordierite b) Tourmaline c) Beryl
4.2 Inosilicates - a) Pyroxene Group
4.3 Inosilicates – a) Amphibole Group
4.4 Phyllosilicates- a) Serpentine Group b) Mica Group c) Chlorite Group d) Clay Mineral Group – Kaolin and Talc,

Unit – V

Systematic Mineralogy of common rock forming silicate, carbonate and phosphate groups

5.1 Tectosilicates- a) SiO2 Group b) Zeolite Group
5.2 Tectosilicates – a) Feldspar Group b) Feldspathoid Group
5.3 Carbonates and Phosphates
5.4 Gem and Semi precious minerals.

Books Recommended:

Berry, L.G., Mason, B. and Dietrich, R.V. (1982): Mineralogy, CBS Publ.
Dana, E.S. and Ford, W.E.(2002): A textbook of Mineralogy (Reprint).
Kerr, P.F. (1977): Optical Mineralogy, McGraw Hill.
Moorhouse, W.W. (1951): Optical Mineralogy, Harper and row Publ.
Nesse, D.W. (1986): Optical Mineralogy, McGraw Hill.
Perkins, D. (1998): Mineralogy, Prentice Hall.
Winchell, E.N. (1951): Elements of Optical Mineralogy, Wiley Eastern.

SEMESTER - I **COURSE: III - GEOCHEMISTRY (2017-18)**

UNIT – I

1.1 Cosmic Abundance of the Elements and Nucleosynthesis. Formation of Solar System and Planets. Geology and Chemistry of Moon.

1.2 Composition and Classification of Meteorites, Chondrules, Chondrites and Achondrites. Geochemical classification of elements.

1.3 Trace, Volatile, Semi volatile, Alkali and Alkaline earth elements its behaviour in magmatic processes.

1.4 REE and Y, HFSE elements, Transition & Noble elements-its importance and concentrations in various igneous rocks and its behaviour in various magmatic processes.

UNIT – II

2.1 Partition coefficient, Factors governing partition co-efficient.

2.2 Compatible and incompatible elements, behaviour of these elements in various magmatic processes.

2.3 Fundamental Laws of Thermodynamics. Free energy. Phase equilibrium and Gibb's Phase Rule. Thermodynamics of magmatic Crystallization.

2.4 Geochemistry of Crust.

UNIT – III

3.1 Geochemistry of island arcs.

3.2 Composition of Mantle, mineralogy of lower mantle.

3.3 Phase transition in the Mantle, mineral-phase transition in lower mantle.

3.4 Geochemical evolution of Mantle Plume.

UNIT – IV

4.1 Aquatic Chemistry- Acid Base reaction, Dissolution and Precipitation of $CaCO_3$. Solubility of Mg, SiO_2 and $Al(OH)_3$.

4.2 Geochemical properties of clays - Kaolinite, Pyrophyllite and Chlorite Groups. Ion exchange properties of clays

4.3 Redox in Natural Waters. Eutrophication.

4.4 Factors controlling Weathering. Soil profile. Chemical and biogeochemical cycling in the soil

UNIT - V

5.1 Basics of radiogenic isotope geochemistry. Scope of stable isotope geochemistry

5.2 Composition of Rivers. Composition of Seawater- Temperature variation.Density structure and deep circulation

5.3 Distribution of CO_2 in Ocean. Carbonate dissolution and precipitation.

5.4 Sources and sinks of Dissolved matter in seawater.

Books Recommended:

Drever, J. I., 1988. *The Geochemistry of Natural Waters,* Prentice Hall, Englewood Cliffs, 437 p.

Garrels, R. M. and C. L. Christ. 1965. *Solutions, Minerals and Equilibria*. New York: Harper and Row.

Burns, R. G. 1970. *Mineralogical Applications of Crystal Field Theory*. Cambridge: Cambr Univ. Press.

Henderson, P. 1986. *Inorganic geochemistry*. Oxford: Pergamon Press.

Brownlow, A. H. 1996. *Geochemistry*. New York: Prentice Hall.

Krauskopf, K. B. and D. K. Bird. 1995. *Introduction to Geochemistry*. New York: McGraw-Hill.

Bowen, R. 1988. *Isotopes in the Earth Sciences*, Barking (Essex): Elsevier Applied Science Publishers.

Condie, K. C. 1989. *Plate Tectonics and Crustal Evolution*. Oxford: Pergamon.

Faure, G., 1986. *Principles of Isotope Geology,* 2nd ed., Wiley & Sons, New York, 589p.

White, W. M. Geochemistry (Online)

SEMESTER – I **COURSE: IV - CRYSTALLOGRAPHY & CRYSTAL OPTICS (2017-18)**

UNIT – I

1.1 Crystal growth. Development of ideas of internal structure of crystals.
1.2 Space lattices and point systems. X-ray analysis of crystal structure, SEM, TEM.
1.3 Morphology of crystals. Fundamental Laws of Crystal Zones and Zonal Symbols.
1.4 Symmetry elements, operations. Classification of Crystals in 32 Classes.

UNIT – II

2.1 Symmetry and forms of crystals of isometric, tetragonal and hexagonal systems.
2.2 Symmetry and forms of crystals of orthorhombic, monoclinic and triclinic systems.
2.3 Goniometry of Crystals. Crystal Projections – Spherical, Gnomonic and Stereographic.
2.4 Crystal Aggregates, Twinning, Irregularities & Imperfections in Crystals.

UNIT – III

3.1 Principles of transmission and reflection of light from crystals. Classification of minerals according to interaction of light, Interference colour.
3.2 Refraction and Refractometry. Methods of determination of R.I.
3.3 Birefringence in Crystals. Significance and use of plates, wedge and Bereck Compensator.
3.4 Pleochroism in Crystals.

UNIT-IV

4.1 Classification of Crystals into isotropic, Uniaxial and Biaxial minerals.
4.2 Isotropic, uniaxial and biaxial indicatrix.
4.3 Optical characters of Isotropic and uniaxial minerals.
4.4 Optical characters of biaxial minerals.

UNIT - V

5.1 Optical Orientation – Extinction angle, Universal stage. Construction & Use.
5.2 Dispersion in mineral optic axial angle.
5.3 Optical anomalies.
5.4 Systematic determination of optical properties of minerals.

Books Recommended:

Phillips, F.C (1971): Introduction to Crystallography,Longman Group Publ.
Dana, E.S. and Ford, W.E. (2002): A textbook of Mineralogy (Reprint).

SEMESTER – I **PRACTICALS (2017-18)**

LAB COURSE – I

A] Structural Geology

1. Concept of line and plane, attitude of plane and line. Bedding plane, dip and strike, and their measurement
2. Criteria for determination of top and bottom of strata in structurally deformed terrain and its study in hand specimen.
3. Preparation and interpretation of geological maps for simple structure contour maps, as well as, for fold, fault and unconformity
4. Stereographic projection – problems in angular relationship true dip, apparent dip plunge and rake of the intersection of planes.
5. Three point problems: Geometric solutions for three point problems

B] Survey

1. Field techniques of geological mapping using:
2. a) Chain tape; Plane table and Prismatic compass,
3. b) Global Positioning System.

LAB COURSE – II

A] Mineralogy and Geochemistry

1. Megascopic study of common rock forming minerals.
2. Microscopic study of common rock forming minerals.
3. Principles and methods of geochemical analysis. Calculation of mineral formulae.
4. Determination of total hardness in water.
5. Spot test for qualitative analysis.

B] Crystallography and Crystal Optics

1. Morphological study of crystal models and twins.
2. Stereographic projection of crystals.
3. Optical determination of
   1. Refractive Index.
   2. Order of Interference colour and birefringence.
   3. Interference figure and optic sign.
   4. Scheme of pleochroism.
   5. An content (Michel Levy's method)
   6. 2V.

SEMESTER – II **COURSE: I – IGNEOUS PETROLOGY (2017-18)**

UNIT- I

1.1 Factors affecting magma and its evolution. Composition of primary magma; mantle mineralogy.
1.2 Partial melting of mantle – different models. Trace element behavior during partial melting.
1.3 Magmatic differentiation processes.
1.4 Behavior of major and trace elements during fractional crystallization.

UNIT – II

2.1 Concurrent assimilation and fractional crystallization. Magma mixing.
2.2 Various criterion for classification of Igneous rocks
2.3 Petrographic Province. Different variation diagrams and their applications.
2.4 Crystallization of basaltic magmas. Generation of magma with reference to plate tectonics.

UNIT - III

Study the petrogenetic significance of following silicate systems:

3.1 Albite-Anorthite and Forsterite – Silica
3.2 Diopside-Albite-Anorthite
3.3 Diopside-forsterite-silica
3.4 Nepheline-kalsilite-silica

UNIT – IV

Petrogenetic study of the following rock types and their distribution in India:

4.1 Basalt and Ophiolite
4.2 Peridotite, Ultramafite
4.3 Granite, Anorthosite
4.4 Komatite, Kimberlite and Lamproite

UNIT- V

5.1 Petrogenetic study of the Carbonatite, Lamprophyre, and their distribution in India.
5.2 Mid-ocean ridge volcanism and oceanic intra-plate volcanism.
5.3 Magmatism associated with subduction related igneous activity- continental and island arcs.
5.4 Magmatism in Large Igneous Plutons and continental alkaline magmatism.

Books recommended:

Bose, M.K. (1997): Igneous Petrology, World Press, Kolkata.
Best, Myron G. (2002): Igneous and Metamorphic Petrology, Blackwell Science.
Cox, K.G., Bell, J.D.and Pankhurst, R.J. (1993):The Interpretation of Igneous Rocks, Champman and Hall, London.
Faure, G. (2001): Origin of Igneous Rocks, Springer.
Hall, A. (1997): Igneous Petrology, Longman.
LeMaitre R.W. (2002): Igneous Rocks: A Classification and Glossary of Terms, Cambr University Press.
McBirney (1994): Igneous Petrology, CBS Publ., Delhi.
Phillpotts, A.R. (1994): Principles of Igneous and Metamorphic Petrology, Prentice Hall of India.
Sood, M.K. (1982): Modern Igneous Petrology, Wiley-Interscience Publ., New York.
Srivastava, Rajesh K. and Chandra, R., (1995): Magmatism in Relation to Diverse Tectonic Settings, A.A. Balkema, Rotterdam.
Wilson, M. (1993): Igneous Petrogenesis, Chapman and Hall, London.
Winter, J.D. (2001): An Introduction to Igneous and Metamorphic Petrology, Prentice Hall, New Jersey.

SEMESTER – II **COURSE: II - METAMORPHIC PETROLOGY (2017-18)**

UNIT – I

1.1 Definition of metamorphism, significance of metamorphic rocks.
1.2 Agents and kinds of metamorphism.
1.3 Phase rule and its application in metamorphism.
1.4 Structure and texture of metamorphic rocks and their significance. Classification of metamorphic rocks.

UNIT – II

2.1 Fabric of metamorphic rocks.
2.2 Evolution of the concept of depth zones. Systematic study of Barrovian and Abukuma zones of metamorphism.
2.3 Grade of metamorphism, Isograde & Isoreactiongrade and construction of petrogenetic grids.
2.4 Concept of facies and facies series.

UNIT- III

3.1 Study of ACF, AKF and AFM diagrams.
3.2 Polymetamorphism and paired metamorphic belts.
3.3 Metamorphic differentiation.
3.4 Retrograde Metamorphism and Crystalloblastic series.
3.5

UNIT - IV

4.1 General Characters of thermal and regional metamorphism of limestone, shale and basic igneous rocks.
4.2 Metamorphism in relation to magma and orogeny.
4.3 Metasomatism-Principles and types of metasomatism. Granitization.
4.4 Anataxis, Palingenesis. Origin of Migmatites in the light of experimental studies.

UNIT-V

5.1 Kinetics of metamorphic mineral reaction. Pressure – temperature – time paths.
5.2 Ultra-high temperature and ultra-high pressure and ocean floor metamorphism.
5.3 Layering in metamorphic rocks.
5.4 Petrogenetic significance of following rocks with special reference to Indian occurrences: charnockite, amphibolite, Khondalite, Gondite, Eclogite, and Blue schist.

Books Recommended:

Blatt, H. and Tracy, R.J. (1996): Petrology (Igneous, Sedimentary, Metamorphic), W.H. Freeman and Co., NewYork.

Bucher, K. and Martin, F. (2002): Petrogenesis of Metamorphic Rocks (7th Rev. Ed.), Springer–Verlag,.

Kerr, P.F. (1959): Optical Mineralogy, McGraw Hill Book Company Inc., New York.

Philpotts, A.R. (1994): Principles of Igneous and Metamorphic Petrology, Prentice Hall.

Powell, R. (1978): Equilibrium thermodynamics in Petrology: An Introduction, Harper and Row Publ., London.

Rastogy, R.P. and Mishra, R.R. (1993): An Introduction to Chemical Thermodynamics, Vikash Publishing House.

Spear, F. S. (1993): Mineralogical Phase Equilibria and pressure – temperature – time Paths, Mineralogical Society of America.

Spry, A. (1976): Metamorphic Textures, Pergamon Press.

Winter, J.D. (2001): An introduction to Igneous and Metamorphic Petrology, Prentice Hall.

Wood, B.J. and Fraser, D.G. (1976): Elementary Thermodynamics for Geologists, Oxford University Press, London.
Yardley, B.W.D., Mackenzie, W.S. and Guilford, C. (1995): Atlas of Metamorphic Rocks and their textures, Longman Scientific and Technical, England.
Yardlley, B.W.D. (1989): An introduction to Metamorphic Petrology, Longman Scientific and Technical, New York.

SEMESTER- II **COURSE: III - SEDIMENTOLOGY AND CRUSTAL EVOLUTION (2017-18)**

UNIT- I

1.1 Earth surface system – liberation and flux of sediments.
1.2 Processes of transport and generation of sedimentary structures. Flow regimes and related bed forms
1.3 Stromatolites and their significance.
1.4 Textural analysis of sediments, Graphical representation, statistical treatment and geological significance.

UNIT – II

2.1 Classification of sandstone and carbonate rocks. Dolomite and dolomitization.
2.2 Volcaniclastics. Sedimentary environments and facies.
2.3 Continental: alluvial-fluvial facies, Lacustrine, Desert – Aeolian and glacial sedimentary environments.
2.4 Shallow coastal clastics and shallow water carbonates.

UNIT – III

3.1 Evaporites. Deep-sea basins.
3.2 Paleocurrents and basin analysis.
3.3 Clastic Petrofacies. Plaeoclimates and paleoenvironment analysis.
3.4 Diagenesis of sandstone and carbonate rocks – changes in mineralogy, fabric, and chemistry.

UNIT- IV

4.1 Petrogenesis of arkoses, greywacke and quartz arenites.
4.2 Evolution of lithosphere, hydrosphere, atmosphere and biosphere.
4.3 Application of Trace, REE and stable isotopes geochemistry to sedimentalogical problems.
4.4 Surface features of earth – island arcs, mid-oceanic ridges, Young mountain belts and their distribution. Evolution of continental and oceanic crust.

UNIT - V

5.1 Lithological, geochemical, stratigraphic characteristics of granite-greenstone belts
5.2 Evolution of Proterozoic sedimentary basins of India.
5.3 Anatomy of Orogenic belts and formation of mountain roots
5.4 Life in Pre Cambrians, PreCambrian Cambrian boundary with special reference to India

Books Recommended:

Blatt, H., Middleton, G.V. and Murray, R.C. (1980): Origin of Sedimentary Rocks, Prentice-Hall Inc.

Collins, J.D., and Thompson, D.B. (1982): Sedimentary Structures, George Allen and Unwin, London.

Lindholm, R.C. (1987) A Practical Approach to Sedimentology, Allen and Unwin, London.

Miall, A.D. (2000): Principles of Basin Analysis, Springer-Verlag.

Pettijohn;, F.J. (1975): Sedimentary Rocks (3rd Ed.), Harper and Row Publ., New Delhi.

Reading, H.G. (1997): Sedimentary Environments and facies, Blackwell Scientific Publication.

Reineck, H.E. and Singh, I.B. (1973): Depositional Sedimentary Environments, Springer-Verlag.

Selley, R. C. (2000) Applied Sedimentology, Academic Press.

Tucker, M.E. (1981): Sedimentary Petrology: An Introduction, Wiley and Sons, New York.

Tucker, M.E. (1990): Carbonate Sedimentolgy, Blackwell Scientific Publication.

Allen P. A. and J.R.L. Allen (2005): Basin Analysis: Principles and Application, Blackwell Publ.

Perry, C.T. and Taylor, K.G. (2006): Envoronmental Sedimentology, Blackwell Publ., U.K.

Bird, J.M. (1980): Plate Tectonics, American Geophysical Union, Washington D.C.

Briggs, J.C. (1987): Biogeography and Plate Tectonics, Elsevier.

Lieberman, B. L.(2000): Paleobiogeography: using fossils to study Global Change, Plate Tectonics and Evolution, Plenum Publ., New York.

Jacquelyne Kious, J. and Tilling, R.I. (2007): This Dynamic Earth: The story of Plate Tectonics, USGS Information Services.

Gass I.G. (1982): Understanding the Earth. Artemis Press (Pvt) Ltd.U.K.

Windley B. (1973): The Evolving continents, John Wiley and Sons, New York.

SEMESTER – II **COURSE: IV - STRATIGRAPHIC PRINCIPLES AND INDIAN GEOLOGY (2017-18)**

UNIT – I

1.1 Principles of stratigraphic scales and its divisions, dual classification.
1.2 Stratigraphic units – lihtostratigraphic, biostratigraphic and chronostratigraphic.
1.3 Rules of stratigraphic nomenclature.
1.4 Stratigraphic correlation.

UNIT – II

2.1 Concept of sequence stratigraphy.
2.2 Chief divisions of Indian sub continent and their physiographic characters.
2.3 Archaean Era. Distribution and classification in Peninsula (Mysore, Bihar, M. P. and Rajasthan) and extrapeninsular regions. Their correlation and economic importance.
2.4 Dharwar Supergroup (Classification, Distribution, Economic importance)

UNIT – III

3.1 Cuddaph Supergroup its distribution, classification & equivalent in extra peninsula.
3.2 Vindhyan Supergroup – its distribution classification age economic importance and correlation.
3.3 Chhattisgarh Group, Indravati Group and Khairagarh Group, their classification, age correlation and economic importance.
3.4 Palaeozic formations of extra peninsular regions with special reference to their classification distribution and correlation.

UNIT – IV

4.1 Distribution, geological succession, classification and climate of Gondwana Supergroup. Age and correlation of Gondwana formations.
4.2 Jurassic system of rocks – in extrapeninsular region.
4.3 Distribution, Classification & correlation of cretaceous formations of Peninsula and extra peninsulas regions of India.
4.4 Distribution, structural features and age of the Deccan Traps. Inter trappeans and infra trappeans of India

UNIT – V

5.1 Problems of Permo-triaassic and Cretaceous – Palaeocene boundaries.
5.2 Distribution, succession, correlation and life of Siwalik formations.
5.3 Distribution, lithology, correlation & life of the Cenozoics of Assam & Western India and Pleistocence (Quaternary) deposits, Karewa Beds, Indogangetic Alluvium.
5.4 Quaternary climate, glacial and interglacial cycle, Eustatic changes

Books Recommended:

Boggs, S. (2001): Principles of Sedimentology and Stratigraphy, Prentice Hall.
Danbar, C.O. and Rodgers, J. (1957): Principles of Stratigraphy, John Viley and Sons.
Doyle, P. and Bennett. M.R. (1996): Unlocking the Stratigraphic Record, John Viley and Sons.
Krishnan,M.S. (1982): Geology of India and Burma, C.B.S. Publ. and Distributors, Delhi.
Naqvi, S.M. and Rogers, J.J.W. (1987): Precambrian Geology of India, Oxford University Press.
Pascoe, E.H. (1968): A Manual of the Geology of India and Burma (Vols.I-IV), Govt. of India Press, Delhi.
Pomerol, C. (1982): The Cenozoic Era? Tertiary and Quaternary, Ellis Harwood Ltd., Halsted Press.
Schoch, Robert, M. (1989): Stratigraphy: Principles and Methods, Van Nostrand Reinhold, New York.
Krumbein and Sloss (1963): Stratigraphy and sedimentation II Ed.Freeman & Co.

SEMESTER – II **PRACTICAL (2017-18)**

LAB COURSE – I A: IGNEOUS & METAMORPHIC PETROLOGY

1. Megascopic description and identification of igneous and metamorphic rocks.
2. Study of textures and structures of Igneous and metamorphic rocks.
3. Microscopic identification of Igneous and metamorphic rocks.
4. C.I.P.W. Norm calculations and classification of igneous rocks.
5. Constructions of variation diagrams of igneous suits of rocks.
6. Construction of A.C.F., A.K.F. and A.F.M. diagrams.
7. Plotting the Geographical distribution of Igneous and Metamorphic rocks types in and outline map of India.
8. Use of software for norm calculation and geochemical modeling

LAB COURSE – I B: SEDIMENTARY PETROLOGY AND STRATIGRAPHY

1. Megascopic description and identification of sedimentary rocks.
2. Study of sedimentary structures in hand specimen.
3. Microscopic study of sedimentary rocks.
4. Graphic representation of sedimentary data and interpretation.
5. Heavy mineral studies of sediments.
6. Distribution of Important geological formations on outline map of India.
7. Construction of fence diagrams
8. Correlation diagrams. Recognition of transgressive-regressive cycles based on vertical columns.

LAB COURSE - II: GEOLOGICAL FIELD WORK

1. Geological mapping in type areas of India to study structural relations and stratigraphic formations in sedimentary, igneous and metamorphic terrains.
2. Collection and study of primary and secondary structures of rock bodies and their interpretation.
3. Sampling of rocks, minerals and fossils in the field from study areas.
4. Preparation of geological maps and sections from the geological data obtained in the field.
5. Preparation of geological report based on field studies.
6. Viva-Voce on fieldwork and geological report.

SEMESTER – III **COURSE: I – PALAEONTOLOGY (2018-19)**

UNIT – I

1.1 Definition of fossil and modes of fossilization their application in age determination, paleoclimatology, palaeogeography and evolution.
1.2 Modes and theories of organic evolution, concept of bathymetric distribution of animals, migration and extinction of species.
1.3 Outline classification of organisms.
1.4 Study of morphology, classification, evolutionary trends and geologic and geographic distribution of Brachiopod.

UNIT – II

Study of morphology, Classification, Evolutionary geologic history of the following

2.1 Pelecypoda (Lamellibranches)
2.2 Gastropoda.
2.3 Cephalopoda
2.4 Trilobites.

UNIT – III

Study of morphology, Classification, Evolutionary geologic history of the following

3.1 Echinoids. Graptolites and Rugose Corals.
3.2 An elementary idea about the origin of major groups of vertebrates.
3.3 Study of evolutionary history of Horse and Elephant Man.
3.4 Study of evolutionary history of Man.

UNIT – IV

4.1 General study of Siwalik mammalian fauna.
4.2 Plant life through geologic ages.
4.3 Study of fossil flora of Gondwana Group and Tertiary Formations of India.
4.4 Definition and scope of micropaleontology.

UNIT - V

5.1 Techniques in micropaleontology.
5.2 Application of microfossils in stratigraphic correlation, age determination and palaeoenvironmental interpretations.
5.3 Study of morphology of foraminifers.
5.4 Classification, evolution and geological distribution of foraminifers.

Books Recommended:

Boardman, R.S., Cheethan, A.M. and Rowell, A.J. (1988): Fossil Invertebrates, Blackwell.
Clarksons, E.N.K. (1998): Invertebrate Paleontology and Evolution, Allen and Unwin, London.
Dobzhansky, Ayala, Stebbins and Valentine (1977): Evolution, Freeman.
Horowitz, A.S. and Potter, E.D. (1971): Introductory Petrography of Fossils, Springer Verlag.
Mayr, E. (1971): Population, Species and Evolution, Harvard.
Prothero, D.R. (2004): Bringing Fossil to Life – An Introduction to Paleontology (2nd Ed.), McGraw Hill.
Raup, D.M. and Stanley, S.M. (1985): Principles of Paleontology ,CBS Publ..
Smith, A.B.(1994): Systematics and Fossil Record – Documenting Evolutionary Patterns, Blackwell.
Strean, C.W. and Carroll, R.L. (1989): Paleontology – the record of life, John Wiley.
Bignot, G., Grahm and Trottman (1985): Elements of Micropaleontoogy, London.
Romer, A.S. (1966): Vertebrate Paleontology (3rd Edn.) Chicago University Press

SEMESTER - III **COURSE: II - ORE AND FUEL GEOLOGY (2018-19)**

UNIT – I

1.1 Modern concepts of ore genesis. Spatial and temporal distribution of ore deposits- Global perspective.
1.2 Concept of ore bearing fluids, their origin and migration. Fluid inclusion in ores – limitations and applications.
1.3 Texture, papargensis and zoning in ores.
1.4 Wall rock alteration. Structural, physico-chemical and stratigraphic controls of ore localization.

UNIT – II

2.1 Orthomagmatic ores of mafic-ultramafic association _ Diamonds in Kimberlites, REE in Carbonatite, Ti -V Ores, Chromite and PGE, Ni Ores.
2.2 Cyprus type Cu-Zn Ores.
2.3 Ores of Silicic igneous rocks- Kiruna type Fe-P. Pegmatoids, Greisen and Skarn deposits.
2.4 Porphyry associations – Kuroko type Zn-Pb-Cu, Malanjkhand Type Cu-Mo deposits.

UNIT – III

3.1 Ores of Sedimentary affiliations- Chemical and Clastic sediments. Stratiform and Stratabound ore deposits. (Fe, Mn, non ferrous). Placers and paleoplacers.
3.2 Ores of Metamorphic affiliations. Metamorphism of ores and metamorphogenic ores.
3.3 Ores related to weathered surfaces – Bauxite, Ni and Au laterite.
3.4 Mineralogy, genesis, distribution in India and uses of Cu, Pb, Zn.

UNIT- IV

Mineralogy, genesis, distribution in India and uses of following ore deposits:
4.1 Ion and manganese
4.2 Gold and Silver
4.3 Aluminum and chromium
4.4 National Mineral Policy and mineral concession rules.

UNIT – V

5.1 Definition and origin of Kerogene and coal. Rank, Grade and type of coal. Microscopic constituents of coal.
5.2 Chemical characterization of coal Proximate and Ultimate analysis. Coal bed methane.
5.3 Distribution of Coal in India. Origin, nature and migration of oil and gas. Characteristics of reservoir rocks.
5.4 Oil bearing basins of India. Geology of productive oil fields of India. Mode of Occurrence and association of atomic minerals in nature. Productive geological horizons.

Books Recommended:

Branes, H.L. (1979): Geochemistry of Hydrothermal Ore Deposits, John Willey.
Cuilbert, J.M. and Park,Jr. C.F.(1986): The Geology of Ore Deposits, Freidman.
Evans, A.M. (1993): Ore Geology and Industrial Minerals, Blackwell.
James R. Craig and David J.Vaughan (1994): Ore Microscopy and Petrography.
Klemm, D.D. and Schnieder, H.J. (1977): Time and Strata Bound Ore Deposits, Springer-Verlag.
Mookherjee, A. (2000): Ore Genesis-A Holistic Approach, Allied Publisher.
Ramdhor, P. (1969): The Ore Minerals and their Intergowths, Pergamon Press.
Stanton, R.L. (1972): Ore Petrology, McGraw Hill.
Wolf, K.H. (1976-1981): Hand Book of Stratabound and Stratiform Ore Deposits, Elsevier Publ.
Chandra,D.Singh, R.M.Singh,M.P.(2000):Textbook of Coal (Indian context), Tara Book Agency, Varanasi.
Singh, M.P. (1998): Coal and organic Petrology, Hindustan Publishing Corporation, New Delhi.
Texbook of Coal petrology, Gebruder Borntraeger,Stuttgart.

Van Krevelen, D. W. (1993): Coal, Typology-Physics-Chemistry-Constitution), Elsevier Science, Netherlands.
North, F.K. (1985): Petroleum Geology, Allen Unwin.
Selley, R.C. (1998): Elements of Petroleum Geology, Academic Press.
Mineral Concession Rules 1960 (2005), IBM, Nagpur.
Sinha, R.K. and Sharma, N.L. (1976): Mineral economics, Oxford and IBH Publ.

SEMESTER - III **COURSE: III - GEMORPHOLOGY AND REMOTE SENSING (2018-19)**

UNIT – I

1.1 Geomorphic concepts and geomorphic cycle. Geomorphic agents: Running water, Groundwater, Glaciers, Winds, Sea waves; Geomorphic processes: Gradation, degradation-Weathering, Mass-Wasting and Erosion, aggradation. Soil formation.

1.2 Valley development, classification of valley, cycle of erosion, rejuvenation; Drainage patterns and their significance.

1.3 Fluvial landforms: Flood plain deposits, Meander belt deposits, Deltaic plain deposits, Alluvial fans and bajadas.

1.4 Glaciers: Continental and High land glaciers. Glacial erosional features: Cirque, Glacial troughs, Hanging valleys, Aretes, Truncated spurs, Fjords, Fiards, Trough lakes. Depositional features: Glacial till, glacial forms (Moraines, Drumlines), glacio-fluviatile forms (Valley trains, Eskers, Kame terraces, Kame, Kettles), glacio- lacustrine features (Lakes).

UNIT – II

2.1 Karst topography: Characteristic features of Karst (Lapies, Sink holes, Natural tunnels and bridges), Erosional remnants (Hums, Haystack hills), Depositional features of caves (Cave travertine, stalactites, stalagmites, Columns). Eolian landforms: Erosional features (Yardang), Depositional features (Dunes and Loess).

2.2 Coastal landforms: Erosional features (Headland and Bays, Cliffs and wave cut platforms, caves, arches, stacks and stumps); Depositional features (Beaches, Dunes, Berms, Spits, Bars, Tombolos and Islands). Volcanic landforms. Types of volcanoes, volcanic depressions, volcanic plateaus and plains, volcanic skeletons.

2.3 Structural landforms: Types of domal structures, topographic expression of domes; Folded structures, adjustment of topography to folded structures; Fault scarps and Fault line scarps, Horsts and Grabens, topographic expressions of various types of faults.

2.4 Terrain classification, Terrain evaluation, Drainage basin morphometry and analysis, Geomorphic regions of India.

UNIT – III

3.1 Remote sensing- active and passive, physical basis of remote sensing. Matter and EMR: electronic, vibrational and rotational transition; energy partitioning- reflection, transmission, absorption, scattering. Irradiance, Exitance, Lambertian surface. Conservation of energy principle: Reflectance, Absorptance, Transmittance.

3.2 Interaction of EMR with atmosphere: Scattering- Rayleigh, Mie, Non-selective. Atmospheric windows. Interaction of EMR with rocks and minerals: Charge transfer transition, Bond stretching transition, Bond bending transition, emissivity, selective radiators, thermal inertia.

3.3 Interaction of EMR with vegetation and water.

3.4 Platforms: Terrestrial, Aerial and Space borne. Satellite orbits: Polar and equatorial orbits. Types of satellite: Earth resource and communication satellites.

UNIT – IV

4.1 Remote sensing sensors: Photography camera, Vidicon camera, Line-scanning systems-MSS, TM, Pushbroom sensors- SPOT, IRS.

4.2.1 Microwave imaging system: Passive method- emitted energy from the earth, antenna, resolution, microwave emittance imaging. Active method- wavebands, radar, range, resolution, real aperture radar, synthetic aperture radar, slant range image, ground range image.

4.2.2 Data collection: Microwave telemetry, analogue images, picture elements and digital numbers, single band image, FCC.

4.3 Visual interpretation elements and image interpretation. Introductory digital image processing: Image histogram, Contrast stretch, Composite generation.

UNIT – V

5.1 Aerial photography: Planning and execution of photographic flights. Photogrammetry: Geometry of aerial photograps- Parallel, orthogonal and central projections, tilt. Image displacement, Parallax, Stereoscopy.
5.2 Application of remote sensing in geology
5.3 Application of remote sensing in Geomorphology
5.4 Application of remote sensing in terrain evaluation

Books recommended:

Drury, S.A. (2001): Image Interpretation in Geology, Allen and Unwin.
Gupta, R.P. (1991): Remote Sensing Geology, Springer-Verlag.
Halis, J.R. (1983): Applied Geomorphology.
Holmes,A.(1992): Holmes Principles of Physical Geology, Edited by P. McL. D. Duff. Chapman and Hall.
Lillesand, T.M. and Kiefer, R.W. (1987): Remote Sensing and Image Interpretation, John Wiley.
Sharma, H.S. (1990): Indian Geomorphology, Concept Publishing Co., New Delhi.
Siegal, B.S. and Gillespie, A.R. (1980): Remote Sensing in Geology, John Wiley.
Thornbury, W.D. (1980): Principles of Geomorphology, Wiley Easton Ltd., New York.

SEMESTER - III **COURSE: IV - MINERAL EXPLORATION (2018-19)**

UNIT- I

1.1 Prospecting & Exploration: Definition and characteristic features. Reconnaissance. Preliminary and detailed investigation, surface and subsurface methods.

1.2 Guides to ore search: global, regional and local guides, detailed study of regional physiographic, stratigraphic, lithological, mineralogical and structural guides. Persistence of ore in depth.

1.3 Drilling: Type of drills, Diamond drilling, Drilling records and logs, Duty of geologists during drilling.

1.4 Sampling: General principles, various methods and procedures, Average assays, weighting of samples, salting. Precautions.

UNIT- II

2.1 Calculating grade and tonnage of ore: Average grade, volume, specific gravity, tonnage factor, calculations from data obtained from bore holes, prospecting pits, trenches, ore blocks, geological maps and sections. UNFC classification

2.2 Gravity Method of prospecting: Basic principles of gravimeter. Gravity field surveys. Various types of corrections applied to gravity data.

2.3 Preparation of gravity anomaly maps. And their interpretation in terms of shape, size and depth.

2.4 Magnetic method of prospecting: Magnetic properties. Magnetic anomaly. Magnetometer. Field survey and data reduction. Preparation of magnetic anomaly maps. Aeromagnetic surveys.

UNIT-III

3.1 Seismic prospecting: Fundamentals of seismic wave propagation, Methods of seismic prospecting and interpretation of seismic data.

3.2 Basic principles of resistivity method. Resistivity survey. Application and interpretation of resistivity data.S.P.Method and interpretation of data obtained by S. P. Method.

3.3 Radiometric prospecting and Borehole Logging. Radiometric survey, Application and interpretation of data.

3.4 Borehole logging: Principles of various borehole-logging methods, Interpretation of data.

UNIT- IV

4.1 Geochemical cycle, Forms of primary and secondary dispersion of elements. Secondary dispersion processes and anomalies.

4.2 Factors affecting dispersion patterns. Main types of geochemical surveys.

4.3 Methods of lithogeochemical and pedogeochemical surveys.

4.4 Methods of hydro-geochemical, atmogeochemical and biogeochemical surveys.

UNIT - V

5.1 Case studies of regional exploration for deposits of plutonic associations and vein and replacement types.

5.2 Analytical methods – sample preparation and decomposition. Precision and accuracy.

5.3 Instrumentation and applications of Atomic absorption spectrometer, Emission spectrograph and XRF.

5.4 Statistical treatment of geochemical data.

Books Recommended:

Arogyaswami, R.P.N. (1996): Courses in Mining Geology, Oxford and IBH Publ.

Bagchi,T.C.,Sengupta, D.K.,Rao, S.V.L.N. (1979):Elements of Prospecting and Exploration, Kalyani Publ.

Banerjee , P.K. and Ghosh, S. (1997): Elements of Prospecting for Non-fuel Mineral deposits, Allied Publ.

Chaussier, Jean – Bernard and Morer, J. (1987): Mineral Prospecting Manual. North Oxford Academic.

Dhanraju, R. (2005): Radioactive Minerals, Geol. Soc. India, Bangalore.

Rajendran, S. (2007): Mineral Exploration: Recent Strategies.

Sinha, R.K. and Sharma, N.L. (1976): Mineral economics, Oxford and IBH Publ.

SEMESTER - III **PRACTICAL (2018-19)**

LAB COURSE: I - ORE GEOLOGY AND MINERAL EXPLORATION

1. Megascopic study of metallic and nonmetallic economic minerals. Description and identification, uses and distribution in India.
2. Description and identification of ore minerals in polished section of ores.
3. Study of ore textures and structure under the microscope.
4. Paragenetic study of ore minerals and construction of Paragenetic diagrams.
5. Location of important metallic and non-metallic mineral compels in a map of India.
6. Calculation of ore reserves and assay values.
7. Study and interpretations of Isopach and Isograde maps.
8. Evaluation of simple mining plans.
9. Interpretation of Geophysical and geochemical anomaly maps.
10. Numerical problems based on Geophysical and geochemical data.

LAB COURSE: II

[A] PALEONTOLOGY

1. Study and identification of important invertebrate, vertebrate and plant fossils. Drawing of neat sketches of fossils.
2. Sketching and labeling of representative fossil specimens.
3 Identification and study of important foraminifers.

[B] GEOMORPHOLOGY AND REMOTE SENSING

1. Identification and interpretation of drainage patterns
2. Drawing of labeled diagrams of landforms
3. Determination of stream order, bifurcation ratio, drainage density, stream frequency, infiltration number.
4. Slope studies of landforms.
5. Study of areal photographs and satellite imageries and identification of landforms.

SEMESTER – IV **COURSE: I - MINING AND ENGINEERING GEOLOGY (2018-19)**

UNIT – I

1.1 Definition of mining terms: pitting, trenching, panning, adits, tunnels, and shafts.
1.2 Role of geologist in mining industry. Strata control in different rocks and structures.
1.3 Geological structures of ore deposits and choice of mining methods.
1.4 Subsidence and rock bursts, mine supports, Ventilation and drainage.

UNIT – II

2.1 Open pit mining- geologic and geomorphic conditions, different methods of opencast mining, advantages and limitations.
2.2 Underground mining methods- gophering, shrinkage, stoping, caving and slicing sublevel, over hand, under hand methods.
2.3 Coal mining methods, long wall, board and pillar.
2.4 Engineering properties of rocks and soil. Physical characters of building stones. Metal concrete aggregate.

UNIT - III

3.1 Role of geologist in civil construction projects.
3.2 Geological considerations for evaluation of Dam and reservoir sites. Dam foundation problems. Dam failure.
3.3 Geotechnical evaluation of tunnel alignment and transportation routes. Methods of tunneling.
3.4 Classification of ground for tunneling purposes. Various types of supports.

UNIT - IV

3.1 General principles, economic justification and scope of mineral dressing.
3.2 Properties or rocks and minerals as applied to mineral dressing.
3.3 Previous and secondary breaking, crushing and grinding, liberation by sizes, reduction.
3.4 Principles and methods of screening.
3.5 Principles and methods of classification, classification as a means of concentration.

UNIT- V

4.1 Concentration methods, hand sorting, washing, jigging, tabling heavy fluid.
4.2 Magnetic and electrostatic methods of separation of minerals.
4.3 Floatation methods- Principles and techniques with examples.
4.4 Application of ore microscopy in mineral dressing.
Concentration methods- with flow sheets of common types of mineral and ore dressing practicess in India - Gold, copper, Lead-zinc, coal, beach sand, fluorite, iron, manganese, chromite and limestone.

Books Recommended:

Dobrin, M. B.; Savit, C. H. (1988): Introduction to Geophysical Prospecting, McGraw-Hill.
Keary, P., Brooks, M. and Hill, I. (2002): An introduction to geophysical exploration, (3rd Ed.), Blackwell.
Krynine, D.H. and Judd, W.R. (1998): Principles of Engineering Geology, CBS Publ..
Rider, M. H. (1986): Whittles Publishing, Caithness. The Geological Interpretation of Well Logs, (Rev. Ed).
Schultz, J.R. and Cleaves, A.B. (1951): Geology in Engineering, John Willey and Sons, New York.
Singh, P. (1994): Engineering and General Geology, S.K. Kataria and Sons, Delhi.

SEMESTER - IV **COURSE: II – ENVRIONMENTAL GEOLOGY (2018-19)**

UNIT- I

1.1 Definition, history and scope of Environmental Geology.
1.2 Environment, Ecology, Ecosystems and habitat.
1.3 Nature of its degradation.
1.4 Basic concepts of Environmental Geology.

UNIT- II

2.1 Interaction of man and natural systems.
2.2 Conservation principle, conservation of mineral and fuel resources.
2.3 Conservation of soil and water resources.
2.4 Geological hazards- Lands slides, volcanic activity, Earthquake.

UNIT- III

3.1 Draught and desertification, Measures of mitigation.
3.2 Geological hazards -River flooding, erosion and sedimentation, coastal erosion, cyclones and tsunamis.
3.3 Transgression and Regression of sea. Measures of mitigation.
3.4 Human modifications of nature in surface and subsurface by engineering constructions dams, reservoirs, bridges and buildings.

UNIT - IV

4.1 Changes in surface and subsurface by mining activities.
4.2 Changes in surface and subsurface by mineral based industries.
4.3 Human settlement and contamination of atmosphere, soil, surface water and groundwater by waste disposal and agro-industries.

UNIT- V

5.1 Environmental policies of the Government for air and water pollution. Environmental laws.
5.2 Problems of environment in urban areas, causes and remedies.
5.3 Climate Change and global warming: Causes and Impact (ozone hole).
5.4 Environment impact assessment report and preparation of environment Management plans.

Books Recommended:

Bryant, E. (1985): Natural Hazards, Cambridge Univ. Press.
Keller, E.A.(1978): Environmental Geology, Bell and Howell, USA.
Nagabhushaniah, H.S. (2001): Goundwater in Hydrosphere, CBS Publ.
Perry, C.T. and Taylor, K.G. (2006): Environmental Sedimentology, Blackwell Publ.
Singh, S. (2001): Geomorphology, Pustakalaya Bhawan, Allahabad.
Todd, D.K. (1995): Groundwater Hydrology, John Wiley and Sons.
Valdiya, K.S.(1987): Environmental Geology – Indian Context, Tata McGraw Hill.

SEMESTER - IV **COURSE: III – HYDROGEOLOGY (2018-19)**

UNIT- I

1.1 Scope of hydrogeology and its relation with hydrology, meteorology and their uses in the Hydrogeological investigation.
1.2 Hydrologic cycle. Role of groundwater in the hydrologic cycle.
1.3 Hydrograph, data collection and analysis.
1.4 Water table and piezometric surface. Water table fluctuation. Water table contour maps, interpretation and uses.

UNIT- II

2.1 Water bearing formation - aquifers, aquitard. aquiclude, aquifuse. Aquifer types: perched, unconfined, semi-confined and confined. Isotropic, anisotropic aquifers.
2.2 Porosity, permeability. Ground water movement: Darcy's law and its applications.
2.3 Specific yield and specific retention. Storativity and transmissivity
2.4 Steady and unsteady flow, leaky aquifers. Groundwater flow near aquifer bundaries

UNIT- III

3.1 Bounded aquifers. Image wells.
3.2 Water wells and their types. Construction of wells.
3.3 Well Development and completion.
3.4 Pumping test and Yield of wells.

UNIT-IV

4.1 Geological and Hydrogeological methods of groundwater exploration.
4.2 Geophysical methods – Electrical resistivity method for groundwater exploration
4.3 Application of remote sensing in groundwater exploration.
4.4 Basin wise development of groundwater with special reference to Chhattisgarh region.

UNIT – V

5.1 Groundwater provinces of India.
5.2 Sources of dissolved constituents in groundwater. Groundwater quality standards-drinking, domestic, agriculture and industry. Groundwater pollution.
5.3 Groundwater management. Safe yield, overdraft and spacing of wells.
5.4 Conservation of Groundwater; conjunctive use of water. Artificial recharge.

Books Recommended:

C.F. Tolman (1937): Groundwater, McGraw Hill , New York and London.
D.K. Todd (1995): Groundwater Hydrology, John Wiley and Sons.
F.G. Driscoll (1988): Groundwater and Wells, UOP, Johnson Div.St.Paul. Min. USA.
H.M. Raghunath (1990): Groundwater, Wiley Eastern Ltd.
H.S. Nagabhushaniah (2001): Groundwater in Hydrosphere (Groundwater hydrology), CBS Publ.
K. R. Karanth (1989): Hydrogeology, Tata McGraw Hill Publ.
S.N. Davies and R.J.N. De Wiest (1966): Hydrogeology, John Wiley and Sons, New York

SEMESTER - IV **PRACTICAL (2018-19)**

LAB COURSE – I **150 Marks**

[A] HYDRGEOLOGY

1. Hydrogeological properties of rocks.
2. Interpretation of water table maps.
3. Computation of pumping test data.
4. Interpretation of Hydrogeochemical data and their plotting in different diagrams.
5. Sieve analysis and screen gravel pack design.
6. Plotting of groundwater provinces on an outline map of India.
7. Computation of Resistivity (VES) data.

[B] ENGINEERING GEOLOGY AND MINING GEOLOGY

1. Interpretation of engineering properties of rocks in hands specimens.
2. Determination of compressive, tensile and sheer strength of rocks.
3. Determination of porosity and absorption of building materials.
4. Mechanical analysis of soils and unconsolidated materials.
5. Preparation of core-logs and their Geotechnical interpretation from bore hole data.
6. Plotting the geographical distribution of important dams, tunnels on the outline of India.
7. Terrain studies from satellite imageries, aerial photographs and Toposheet.

SEMESTER - IV **CORE ELECTIVE COURSES (2018-19)**

ME- I ADVANCED HYDROGEOLOGY

UNIT- I

1.1 Hydrologic cycle, ground water in hydrologic cycle
1.2 Hydrograph and hydrographic analysis
1.3 Water balance studies
1.4 Springs (including thermal): Origin and movement of water.

UNIT- II

2.1 Geologic structures favouring groundwater movement. Groundwater reservoir properties.
2.2 Forces and laws of groundwater movement.
2.3 Well hydraulics: confined, unconfined, unsteady and radial flow. Water level fluctuation and its causative factors.
2.4 Water well technology: Well types, drilling methods, construction, designing, development and maintenance of wells.

UNIT- III

3.1 Groundwater in arid and semiarid regions.
3.2 Groundwater in coastal and alluvial regions.
3.3 Groundwater in hard rocks and limestone terrain. Environmental impact on groundwater extraction.
3.4 Ground water recharge: artificial and natural. Factors controlling recharge. Conjunctive and consumptive use of groundwater.

UNIT- IV

4.1 Chemical characterization of groundwater in relation to domestic and industrial uses.
4.2 Chemical characterization of groundwater for irrigation purposes.
4.3 Water pollution: remedial measures and treatment
4.4 Problems of arsenic and fluoride in water.

UNIT-V

5.1 Geological and hydrogeological methods of groundwater exploration.
5.2 Geophysical surface resistivity and seismic methods in groundwater exploration. Geophysical water well logging.
5.3 Application of remote sensing and radiogenic isotopes in hydrogeological studies.
5.4 Basin-wise groundwater management.

LAB COURSE: ME-IL

1 Morphometric analysis of Watershed
2 Interpretation of groundwater features on water table maps
3 Computation of storativity and transmissivity of aquifer from pumping test data
4 Interpretation of subsurface layers from resistivity field survey data
5 Chemical quality assessment of groundwater
6 Use of Software for morphometric analysis,

SEMESTER - IV **(2018-19)**

ME-II PROJECT ORIENTED DISSERTATION

SCRIPT EVALUATION	**100**
SEMINAR	**25**
VIVA VOCE	**25**

MINOR ELECTIVE

GMnE- I FUNDAMENTALS OF GEOLOGY

UNIT- I

1.1 Geology and its perspective. Earth in the Solar System
1.2 Age of the earth.
1.3 Interior of the earth and its manifestation.
1.4 Brief introduction of hydrosphere and atmosphere. Hydrologic cycle.

UNIT-II

2.1 Earthquakes and Volcanoes.
2.2 Continental Drift
2.3 Fundamentals of Plate Tectonics and Plate boundaries
2.4 Distribution of Oceans and Continents. Tectonic divisions of India

UNIT- III

3.1 Definition and classification of minerals, rock forming minerals
3.2 Classification of rocks. Igneous rocks and their types.
3.3 Sedimentary and Metamorphic rocks and their types.
3.4 Deformation in rocks. Folds, Faults and Unconformities

UNIT- IV

4.1 Geomorphic agents, Weathering.
4.2 Salient geomorphic features.
4.3 Types mountains and plains
4.4 Fossils and their applications

UNIT- V

5.1 Industrial uses of Iron, Manganese, Bauxite
5.2 Industrial uses of Copper, Lead and Zinc
5.3 Fossil Fuels: Coal and Petroleum- mode of occurrence and distribution in India
5.4 Conservation of energy and mineral resources.

Books Recommended:

Mukherjee, P. K. (2005). Text Book of Geology, The World Press Pvt. Ltd.
Roy, A. B. (2010). Fundamentals of Geology, Narosa Pub. House Pvt. Ltd.

MINOR ELECTIVE

GMnE- II DISASTER MANAGEMENT

UNIT- I

1.1 Natural Disasters: Introduction
1.2 Causes and impact of Floods, Droughts,
1.3 Cyclone, Landslides,
1.4 Earthquake and Tsunamis

UNIT- II

2.1 Man-made Disasters: introduction
2.2 Causes and impact of Nuclear, Industrial accidents,
2.3 Environmental disasters, fires, rail accidents, road accidents,
2.4 Air accidents and sea accidents

UNIT – III

3.1 Hazard Risk Concept and Elements.
3.2 Risk Analysis and Risk Assessment.
3.3 Resource Analyses and Mobilisation.
3.4 Strategic Developments for Vulnerability Reduction

UNIT- IV

4.1 Disaster Preparedness: Conception and Nature.
4.2 Disaster Management – Prevention, Preparedness and Mitigation.
4.3 Search and rescue operations
4.4 Use and Applications of Emerging Technologies in Disaster Preparedness.

UNIT- V

5.1 Disaster Management Plan
5.2 Disaster Response Plan.
5.3 Communication, Participation, and Activation of Emergency Preparedness Plan.
5.4 Logistics Management.

Books Recommended:

Bell, F.G. (1999): Geological Hazards, Routledge, London.
Bryant, E. (1985): Natural Hazards, Cambridge Univ. Press.
Keller, E.A. (1978): Environmental Geology, Bell and Howell, USA.
Lal, D. S. (2007): Climatology, Sharda Pustak Bhawan, Allahabad.
Patwardhan, A.M. (1999): The Dynamic Earth System, Prentice Hall.
Smith, K. (1992): Environmental Hazards, Routledge, London.
Subramaniam, V. (2001): Textbook in Environmental Science, Narosa International.
Valdiya, K.S. (1987): Environmental Geology – Indian Context, Tata McGraw Hill.

SCHOOL OF STUDIES IN GEOLOGY AND WATER RESOURCE MANAGEMENT

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR, CHHATTISGARH.

2017-2018

P. G. DIPLOMA IN REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM

SCHEME OF EXAMINATION

THEORY

		Max. Marks
Course – I	Principles of Geology and Geomorphology	100
Course – II	Introduction to GIS and Tools for Map Analysis	100
Course – III	Principles of Remote Sensing and Information Extraction from Images	100
	Aggregate Theory (A)	**300**

PRACTICAL

Lab Course – I	Comprise exercises related to Course – I	50
Lab Course – II	Comprises exercises related Courses II & III	100
	Aggregate Practical (B)	**150**

Project Oriented Dissertation

(Related with any one of the following subjects/disciplines: Geology/Geomorphology/Forestry/Agriculture/Town & Country Planning)

Script Evaluation		100
Seminar		25
Viva-voce		25
	Total	**150**.

GRAND TOTAL **600**

SYLLABUS

Course – I Principles of Geology and Geomorphology

Unit- I

1. Earth in the Solar system. Surface features and internal structure of the Earth.
2. Minerals – Definition, Classification, Physical properties and chemical composition.
3. Rocks – Definition, Classification, Mineral composition and texture of important Igneous,
4. Definition, Classification and texture of important sedimentary and metamorphic rocks.

Unit – II

1. Definition and classification of economic Minerals.
2. Mode of occurrence and distribution of Iron, manganese, Copper, Lead –Zinc deposits in India.
3. Mode of occurrence and distribution of fossil fuels in India.
4. Mode of occurrence and distribution of Industrial minerals in India.

Unit- III

1. Rock weathering and soil formation. Important soil types of India.
2. Concept of bedding and deformation in rocks. Elementary idea of attitudes in rocks.
3. Folds – elements and classification. Foliation and Lineation in rocks.
4. Faults and joints _ elements and classification. Unconformities.

Unit –IV

1. Distribution of continents and oceans. Origin of mountains.
2. Earthquakes and Volcanoes, their distribution. Volcanic landforms.
3. Wave erosion and beach processes. Coastal landforms.
4. Erosion and deposition by winds. Aeolian landforms , their characters and distribution in India.

Unit – V

1. Erosion and deposition by rivers. Drainage pattern.
2. Characteristics of fluvial landforms.
3. Glacial landforms, U - shaped valleys, moraines.
4. Karstification and karst landforms. Solution valleys, caves, stalactites and stalagmites.

Course- II Introduction to GIS and Tools for Map Analysis

Unit – I

1. Concept of GIS – Historical background. Uses of GIS.
2. Objectives, elements and applications of GIS.
3. Data source. Concept of space and time in spatial information. Geoinformatics.
4. Fundamentals of computers – generations, components, software and hardware.

Unit – II

1. Major types of software – Programming languages. Computer operating systems.
2. Application software for computers. Sources of GIS and Remote sensing software.
3. GIS data models. Characteristics of spatial data – Raster and Vector models and their advantages and disadvantages.
4. Fundamentals of Internet. Internet GIS.

Unit – III

1. Data input methods – Spatial data input: digitization. Attribute input.
2. Map and its utility. Presenting Geographic information through layers.
3. GIS data formats. GIS data entry. Sources of GIS data error.
4. Features in topographic base map. Base map accuracy standards.

Unit- IV

1. Data display. Digital Elevation Model. Visualizing surfaces with TIN layer.
2. Data quality. Metadata. Data analysis and editing.
3. Topology and topology creation.
4. Global positioning systems – segments, receivers. Applications and limitations.

Unit – V

1. Fundamentals of cartography. Principles of computer cartography.
2. Cartographic models. Digital cartography and GIS. Map symbols.
3. MapInfo Tutorials.
4. GIS Project design and management.

Course – III Principles of Remote sensing and information extraction from Images.

Unit – I

1. Concept of Remote Sensing. Electromagnetic radiation and their properties – Reflection, emission and adsorption of EMR.
2. Interaction of earth surface features with EMR. Effects of Atmosphere on EMR.
3. Physical basis of Remote Sensing. Types of satellites.
4. Basic principles of thermal Remote Sensing.

Unit – II

1. Basic principles of microwave Remote Sensing. Uses and advantages of Radar imagery.
2. Data acquisition. Remote Sensing platforms and sensors.
3. Data products, their characteristics and uses.
4. Data interpretation: Visual and computer aided interpretation techniques. Digital image processing.

Unit – III

1. Fundamentals of Aerial photography.
2. Concept of Photogrammetry. Stereoscopic vision.
3. Height and slope rectification of aerial photographs.
4. Interpretation of aerial photographs.

Unit- IV

Applications of Remote Sensing in:

1. Lithological discrimination.
2. Mineral exploration.
3. Geomorphology.
4. Site selection for Engineering Projects.

Unit –V

Applications of Remote Sensing in:

1. Hydrogeology
2. Land use and land cover.
3. Urban Planning.
4. Forestry.

SCHOOL OF STUDIES IN GEOLOGY & WRM

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

SYLLABUS FOR

POST GRADUATE DIPLOMA IN APPLIED HYDROGEOLOGY

(in collaboration with Rajiv Gandhi National Ground Water Training and Research Institute, CGWB)

The **AIM** of the Course is capacity building & Research within the state of Chhattisgarh.Applications in Hydrogeology for Geoscientists present the most recent scientific developments in the field that are accessible yet rigorous enough for industry professionals and academic researchers alike.

OBJECTIVE OF THE COURSE is to provide an opportunity for individuals to learnthe full scope of hydrogeology.The course addresses the developments in hydrogeology, ground water and hydrology that are underscored with perspectives regarding the challenges that are facing industry professionals, researchers, and academiaand emerge as a *Professional Hydrogeologist*.

1. COURSE STRUCTURE AND DURATION

The course shall comprise of two theory papers, two lab course practical and an independent dissertation. The duration of the course will be of one year duration. The details are as follows:

Theory	
Paper I	Groundwater Occurrence, Movement, Distribution & Hydraulics
Paper II	Groundwater Regime Monitoring and Assessment
Practicals	
Lab Course I	Groundwater Occurrence, Movement, Distribution & Hydraulics
Lab Course II	Groundwater Regime Monitoring and Assessment
Dissertation (Report + Presentation + Viva voce)	

2. SCHEME OF EXAMINATION: The total marks for the course shall be 500, including theory, practical and dissertation.

Theory		**Max Marks**
Paper I	Groundwater Occurrence, Movement, Distribution & Hydraulics	100
Paper II	Groundwater Regime Monitoring and Assessment	100
Practicals		
Lab Course I	Groundwater Occurrence, Movement, Distribution & Hydraulics	50
Lab Course II	Groundwater Regime Monitoring and Assessment	50
Dissertation (Report + Presentation + Viva voce)		200
	Total	**500**

3. RESULT DECLARATION:

The minimum score for passing theory is 50% and practical is 50%. The candidate has to score minimum 50% marks in theory and practical examination separately. The viva-voce will be based on the overall understanding of the subject

4. SYLLABUS

Paper I: Groundwater Occurrence, Movement, Distribution & Hydraulics
Maximum Marks: 100

Unit – I

Occurrence of Ground Water; Hydrological Cycle; Precipitation, Infiltration, Percolation, Runoff, baseflow; Rainfall data Analysis; Origin, Age, Ground Water on earth; Types of water; Vertical Distribution of Water

Unit – II

Ground Water Movement; Types of Aquifer; Aquifer Properties – Permeability, Storage, Storativity, Transmissivity; Equation Governing groundwater flow, groundwater flowdirection, groundwater flowrates, groundwater dispersion

Unit – III

Concept of drainage basin, including watershed and groundwater basin. Aquifer systems and Groundwater Provinces of India; Hydrogeology of Alluvial aquifer, Arid aquifer, Hard rock aquifer/ Basaltic Aquifer, Himalayan aquifer, Coastal and wetland aquifer, Island aquifer.

Unit – IV

Well Hydraulics; Groundwater flow-An Overview; Darcy's law and its applications; Determination of permeability in laboratory and in field; Flow through aquifers; steady, unsteady and radial flow conditions; Effect of partial penetrating wells, well losses, specific capacity; Evaluation of aquifer parameters of confined, semi-confined and unconfined aquifers -Thiem, Thies, Jacob and Walton's methods; Yield characteristics of wells; Pumping tests- methods, data analysis and interpretation.

Unit - V

Role of remote sensing in groundwater exploration; Hydrogeomorphic and lineament mapping; Surface geophysical methods; Types of water wells and methods of construction. Site selection for groundwater exploration, Water well drilling techniques; Design, development, maintenance and revitalization of wells; Sub-surface geophysical methods.

Paper II: GroundwaterRegime Monitoring and Assessment
Maximum Marks: 100

Unit – I

Water level monitoring; Water table and piezometric surface, Springs; Fluctuations of water table/Flow net analysis; Barometric and tidal effects; Representation of water level data -Water table contour; Hydrographs; statistics

Unit – II

Ground Water Quality monitoring; Physical and chemical properties of water; Quality criteria and standards for different uses; Groundwater quality in different provinces in India; Groundwater contamination; natural (geogenic) and anthropogenic contaminants; Inland salinity, Saline water intrusion; governing principles, Use of Radioactive isotopes in hydrogeological studies; Collection of water sample and analysis; Presentation of water quality data - contours, point map, statistics

Unit – III

History of Ground Water Assessment in India; Ground Water Estimation Methodology in Vogue i.e. GEC 2015; Ground Water Balance equation;Various inflow terms and their estimation; Various outflow terms including Base flow and their estimation; Estimation of Dynamic and In-storage Ground Water Resources of Unconfined, Confined and Semi-Confined Aquifers. Estimation of Stage of Ground Water Extraction and Categorization; Use of Tracersin Ground Water Studies; Natural and Artificial Tracers and their Application; Various Techniques used in Ground Water Studies to measure the parameters needed in the Assessment of Ground Water Resources.

Unit - IV

Principles of Groundwater Management — supply side and demand side management, Concept of sustainable development of groundwater resources; Groundwater Issues and Challenges -Over-exploitation of groundwater, ground water issues in coastal areas; issues of ground water in mining areas, waterlogging in canal command areas; urban areas; water quality issues; Conjunctive use of surface and groundwater; Impact of Climate change on groundwater resources; Rainwater harvesting and managed aquifer recharge; Rainwater harvesting concept; Rainwater harvesting Methods; Managed aquifer recharge; Site identification, Source water assessment, Recycle and reuse; Recharge Methods; Induced recharge - aquifer – river interaction.

Unit – V

Groundwater modelling; Analytical models, Mathematical models / Numerical models, Statistical / Stochastic models, Time series analysis, Mathematical models -case studies. Groundwater regulation, Groundwater ownership, constitutional provisions, Issues and challenges in groundwater legislation adoption.Groundwater legislation.

Lab Course I: Groundwater Occurrence, Movement, Distribution & Hydraulics
Maximum Marks: 50

Rainfall data analysis, Runoff and baseflow estimation, Demarcation of watershed from drainage map, Determination of permeability in laboratory, Determination of well losses and aquifer losses and well efficiency using step drawdown test data, Determination of T using Theim solution, Determination of T and S values of confined aquifers usingTheis and Jacob solutions, Determination of T and S values of semi-confined aquifers usingWalton solution, Determination of T and S values of unconfined aquifers using Boulton solution, Determination of specific capacity using Slichter method, Determination of optimum yield using Saleem Romani method, Delineation of hydrogeomorphic units and lineaments using visual interpretation techniques, Application of VES for pinpointing a site for water well.

Lab Course 2: Groundwater Regime Monitoring and Assessment
Maximum Marks: 50

Three point problem, Preparation of water table map, Delineation of ground water flow direction, Preparation of water level maps and preparation of fluctuation maps, Preparation of EC contour maps, point maps of fluoride, Piper trilinear diagram, USsalinity diagram and Wilcox diagram with chemical parameters. Ground water resources estimation of a watershed using GEC 2015 methodology. Exercise on rainwater harvesting/ artificial recharge – estimation of available resource and selecting suitable methods. Preparation of ground water hydrographs.

Dissertation (Report + Presentation + Viva-voce)
Maximum marks: 200

Dissertation is an essential component of the course. Every student has to carry out fieldwork (in continuation or in breaks) during the course. The candidate will be required to submit a field report for evaluation as a part of the examination. The candidate can choose a theme or a combination of themes, dissertation under the guidance of a Supervisor, as mentioned below:

1. Ground Water Data Collection Feasibility studies
2. Water quality data Collection, analysis and interpretation.
3. Well logs -lithological log, drill time log, geophysical logs
4. Pumping test, Infiltration test, Slug test,Discharge Measurement
5. Geophysical surveys
6. Water audit and Impact assessment
7. Socio-economic surveys – Unit draft, Crops yield and ground water usage, micro irrigation, water use efficiency.

The candidate will have to complete his fieldwork related to Project and the Dissertation thesis must be submitted within 30 days after the completion of theory examination.

Recommended Textbooks: Only the basic textbooks are mentioned here. The student is advised to consult Library and e-resources for in-depth knowledge.

1. C.F. Tolman (1937): Groundwater, McGraw Hill , New York and London.
2. D.K. Todd (1995): Groundwater Hydrology, John Wiley and Sons.
3. F.G. Driscoll (1988): Groundwater and Wells, UOP, Johnson Div.St.Paul. Min. USA.
4. H.M. Raghunath (1990): Groundwater, Wiley Eastern Ltd.
5. H.S. Nagabhushaniah (2001): Groundwater in Hydrosphere (Groundwater hydrology), CBS Publ.
6. K. R. Karanth (1989): Hydrogeology, Tata McGraw Hill Publ.
7. S.N. Davies and R.J.N. De Wiest (1966): Hydrogeology, John Wiley and Sons, New York
8. R. Allan Freeze and John A. Cherry (1979): Groundwater, Prentice-Hall, Inc. ISBN 0-13-365312-9

School of Studies in Geology & WRM

Pt. Ravishankar Shukla University, Raipur, C. G.

Syllabus for
M. Phil (Geology) Examination 2017-18

The duration of M. Phil. Course in Geology shall be of One Year. The course consists of Two Theory Papers, One Practical and the dissertation. The following shall be the Scheme of Examination.

Scheme of Examination

S. No.	Theory Paper	Title of Paper	Marks Allocation
1.	I	Research Methodology in Geology	100
2.	II	Advanced Research in Geology	100
		(Any one of the Following Courses) A. Hydrogeology B. Applied Sedimentology C. Igneous and Metamorphic Petrology D. Mineral Deposits E. Mineral Exploration	
3.		Lab Course in Geology	100
		(Based on theory Papers as given and opted above) Practical Exam - 70 Viva-voce - 20 Practical Record - 10	
		Seminar (Based on Theory)	50
4.		Dissertation a. Seminar based on dissertation 50 b. Script evaluation 75 c. Viva-voce examination 25	150
		Grand Total	**500**

Paper I – RESEARCH METHODOLOGY IN GEOLOGY

M. M. - 100

Unit – I

Research methodology – An overview. Scientific hypothesis, Model, Theory and Philosophy of Research methodology in context to Earth Sciences. Facts and Law Formulating Hypothesis. Selection and formulation of research problem. Meaning and need of Research design. Field methods in Geology: Scale, Topographic map, Bearing. Attitudes of the planar and linear features and their standard notations.

Unit – II

Methods of data collection. Primary and Secondary data. Observations and tests.

Precision and accuracy in geological data generation.

Statistical techniques for processing and analysis of data: Probability, Norma distribution, Binomial and Poisson distribution. Sampling – simple random sampling. Systematic/ Grid sampling stratified and cluster sampling. Sampling estimates – Central tendency parameters – mean, median, mode, variance, standard deviation, skewness, kurtosis. Null Hypothesis. Student's t Test, chi square Test. Computer application in Geology. Analysis, interpretation and drawing inferences.

Unit – III

Microscopic techniques. Staining techniques for distinguishing Calcite-Dolomite, K- Feldspar-Plagioclase-Cordierite. Techniques in photomicrography. Application of x-ray diffraction data in determination of composition of Olivine and cordierite. NORM calculation and interpretation of ACF, AKF diagrams.

Unit – IV

Computer Applications: Word processing software. Application of statistical and graphical software – Microsoft Excel and Harward Graphics . Report Writing: Selection of chapters, Methods of citing References.

Paper II – ADVANCED RESEARCH IN GEOLOGY

Course A – HYDROGEOLOGY M. M. – 100

Section A.

1. Aquifers and their types. Determination of aquifer parameters.
2. Laws of ground water flow. Its application and limitations.
3. Well hydraulics – steady, unsteady and radial flow to well. Boundary effect on unsteady well flow.
4. Leaky aquifer. Image wells and hydraulics of open wells.
5. Well Types and method of water well drilling.
6. Design and construction of Dug well and Tube wells.
7. Quality of ground water and its applications.

Section B.

8. Ground water exploration– geological and hydrogeological..
9. Geophysical methods of ground water exploration – resistivity survey and Seismic survey.
10. Application of remote sensing in ground water studies.
11. Ground water development and management, water balance studies.
12. Water logging and artificial recharge.
13. Groundwater pollution.
14. Occurrence and potentials of ground water in various geologic provinces of India.

Course B - APPLIED SEDIMENTOLOGY M.M. - 100

Section A.

1. Factors controlling the formation and deposition of different types of sediments.
2. Cyclic sedimentation, patterns and interpretation.
3. Classification, petrology and petrogenesis of limestone and dolomites.
4. Classification, petrology and paragenesis of detrital sedimentary rocks.
5. Application of grain shape-size analysis of sediments to environment interpretation.
8. Implications of diagenesis of carbonate and clastic sediments acting as reservoir rocks for oil and gas.

Section B.

9. Role of Sedimentological framework in understanding coal gasification and coal bed methane.
10. Mineral deposits associated with clastic sedimentary rocks.
11. Mineral deposits associated with non-clastic sedimentary rocks.
12. Plate tectonics-sedimentation and mineral deposits
13. Regional geology of Archaean rocks of India and related mineral deposits.
14. Regional geology of Precambrian rocks of India and related mineral deposits.

Course C - IGNEOUS AND METAMORPHIC PETROLOGY **M.M. – 100**

Section A.

1. The composition and mineralogy of the mental.
2. The structure, petrology and composition of the Earth crust.
3. Meteorites: classification, petrography, bulk chemical characteristics and origin.
4. Properties, origin and environments of magma generation.
5. Composition and kinetic of magma: viscosity, formation of crystals in liquids, Vesciculation, Causes of boiling and cooling, role of volatiles.
6. Geochemical affinity substitution of trace elements for major elements, partition coefficient.
7. Ophiolite complexes, calc alkaline and tholeiite groups, plutonic and volcanic rocks of subduction zone.

Section B.

8. Plate tectonics: Tectonics magmatism and regional metamorphic belts.
9. Metamorphic structure of continental crust and evolution of the earth.
10. Ocean floor metamorphism and its significance.
11. Kinetic of metamorphic minerals reaction. Concept of Rate theory. Direct experiments, stability field of minerals.
12. Basic principles of isotopes geology and it's application in petrology.
13. Experimental and theoretical study of metamorphic systems.
14. Chemical fractionation and distribution of elements during metamorphism zoning (Thomson Model)

Course D - MINERAL DEPOSITS **M.M. - 100**

Section A.

1. Environment of mineral deposition.
2. Metallogenic processes.
3. Metallogenic opaque and province.
4. Ore texture, structure and mineral Paragenesis.
5. Geo-thermometry and isotopic studies of ore minerals.
6. Mineral deposit associate with plate margins.
7. Mineralogy, geochemistry and genesis of iron and manganese.

Section B.

8. Mineralogy, Geochemistry and genesis of bauxite.
9. Geochemistry and genesis of Pegmatite deposits.
10. Mineralogy, Geochemistry and genesis of Base metal deposits including Au and Ag.
11. Mineralogy, Geochemistry and genesis of Cr and Ni deposits.
12. Mode of Occurrence, distribution and origin of radioactive mineral deposits.
13. Mode of Occurrence, distribution, mineralogy and genesis of recent polymetallic nodules.
14. Distribution, origin of non-metallic mineral deposits: Phosphorites, Beryl, Magnetite, fluorite, Diamond, Asbestos, and Graphite.

Course E- MINERAL EXPLORATION **M.M. - 100**

Section A.

1. Explorations programs – objective of exploration pattern of exploration programs. Economics of exploration programs. Use of mathematical modeling in exploration.
2. Surface and subsurface exploration method, collection and evaluation of existing data reorganization.
3. Exploratory drilling - methods, pattern and sequence, logging of drill hole data, planning of exploration drilling holes.
4. Sampling ore bodies and estimating reserves.
5. Basic characteristics and application of various geo physical surveys and exploration of mineral deposits.
6. Basic characteristic method and application of exploration geochemistry and geo botany to mineral deposits.
7. Application of remote sensing in minerals explorations.

Section B.

8. Statistical analysis and computer application to mineral exploration.
9. Mineral economics and mineral processing as applied to planning, development and management of exploration and mining.
10. Mineral property evaluation. Objective of evaluation and condition of evaluation, method of evaluation.
11. Environmental effect of mineral resources, development, conservation and substitution,
12. Impact of mineral processing and mining activities on the environment, mining hazard, pollution of atmosphere, and pollution due to mineral based industries.
13. Planning and management of land use, industrial solid waste deposit and management, environment guidelines for mineral exploration.
14. Study of selected Indian case histories of exploration of iron, manganese, bauxite, copper, lead – zinc, gold, mica, coal and phosphate deposits.

PRACTICAL EXAMINATION

M.M. - 100

Paper I – RESEARCH METHODOLOGY IN GEOLOGY

A.

1. Interpretation of geological maps.
2. Study of rocks in hand specimen and thin sections and interpretation of genesis of rocks.
3. Location of metamorphic facies on a P-T diagram.
4. Plotting of different rock groups on ACF, AKF & AFM diagram.
7 Problems on:
    1. Determination of background threshold and anomaly.
    2. Anomaly delineation coefficient.
    3. Correlation coefficients.
8. Heavy mineral studies.
9. Study of sedimentary structure in hand specimens and their significance.

Paper II – ADVANCED RESEARCH IN GEOLOGY

Group A – HYDROGEOLOGY

1. Evaluation of morphometric parameters from drainage maps.
2. Problems on formation characteristic evaluation – porosity, Sp. Yield, Sp. Retention.
3. Preparation and analysis of water table contour maps.
4. Numerical problems on formation constant evaluation – transmissivity and storability.
5. Interpretation of ground water occurrence from surface geophysical survey data-Receptivity method.
6. Preparation of watershed maps from the satellite imageries and delineation of ground water potential zones.
7. Interpretation of water quality from chemical analysis data.

Group B – APPLIED SEDIMENTOLOGY

1. Graphic representation of textural data and its interpretation.
2. Study of texture and petrogenesis of sandstone.
3. Study of texture and petrogenesis of limestone.
4. Study of sedimentary structure in hand specimen and their significance.
5. Study and interpretation of mineral deposits associated with sedimentary rocks.

Group C – IGNEOUS AND METAMORPHIC PETROLOGY

1. Study of texture and structure and determination of mineral Paragenesis in igneous and metamorphic rocks.
2. Calculation of volumetric modal percentage of individual mineral present in the rocks.
3. Preparation of different type of diagrams and their interpretation from the given chemical data.
4. Representation of metamorphic rocks in the ACF, AFM, AKF, AFM etc. diagrams and their interpretation.
5. Study of the geographical distribution and significant criteria of important igneous and metamorphic rocks of India.
6. Megascopic and microscopic study of important igneous and metamorphic rocks of India.

Group D – MINERAL DEPOSITS

1. Study of ores (Megascopic and microscopic) and their geographic distribution.
2. Study of geological and economic significance of some of the metallic and non- metallic deposits of India.
   - A Gondwana coal field- Raniganj, Jharia.
   - B Kolar Gold Field
   - C Panna Diamond field
   - D Zawar Pb-zn Deposits
   - E Oil field/ Petroliferous basin of India
   - F Copper Deposits – Mosabani, Khetri, Malanjkhand.
3. Study of the mineral deposits associated with plate Tectonics.
4. Study of geologic, economic significance and geographic distribution of raw materials used in the following mineral based industries: (a) Iron & Steel (b) Cement (c) Aluminum (d) Fertilizers
5. Geology and geographic distribution of radioactive minerals and the location of the processing unite in India.
6. Calculation of grade assay and reserve of mineral deposits.

Group E – MINERAL EXPLORATION

1. Interpretation of subsurface geology from geological data.
2. Calculation of ore reserves from given geological map and data.
3. Calculation of grade and averaging of assay value and demarcation of ore bearing zones
4. Preparation and interpretation of geochemical anomaly and maps.
5. Resistivity survey and interpretation of resistivity data.
6. Preparation and interpretation of gravity and magnetic anomaly maps.
7. Preparation of geological maps from aerial photographs.
8. Preparation of geological maps and lineaments maps from satellite imagery.
9. Mineragraphic studies of ore samples including study of ore texture and structure and determination of mineral Paragenesis.
10. Study of mineral beneficiation flow sheets of common ores (Cu, Pb, Zn, Mn)

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School of Studies in Geology & WRM

Pt. Ravishankar Shukla University, Raipur, C. G.

Syllabus for Ph. D. Course Work in
Geology Examination 2017-18

The Ph. D. Course in Geology shall be of six months. This course shall have Two Papers. Paper- I is theory paper and Paper -II is project course work Each paper is of 100 marks. Theory paper will be of three hours duration. In Paper –II, 40 % marks will be assigned to seminar which will be evaluated by Departmental Research Committee and 60 % marks will be assigned to project work which will be evaluated by external and internal examiners jointly.

Scheme of Examination

Paper	Title of the Paper	Marks allotted
Paper-I	Research Methodology, Quantitative Methods and Computer applications	100 Marks
Paper-II	Review of Literature concerning the topic of research and Seminar/Project Report. (a) Seminar (b) Project work and Viva-voce	100 Marks 40 marks 60 Marks

Paper – I: Research Methodology, Quantitative Methods and Computer applications

Research methodology – An overview. Scientific hypothesis. Theory and philosophy of Research Methodology in context to Earth Sciences. Facts and Laws Formulating Hypothesis. Selection and formulation of research problem. Meaning and need of Research design.

Theory of Sampling / field methods, Parametric Analysis and Quantitative and qualitative methods in Geosciences. Methods of data collection. Primary and Secondary data. Observations and tests.

Precision and accuracy in geological data generation. Statistical techniques for processing and analysis of data: Probability, Normal distribution, Binomial and Poisson distribution. Sampling estimates – central tendency parameters. Null hypothesis – student t test and chi square test.

Computer applications in numerical data processing. Microscopic techniques. Staining techniques for distinguishing Calcite-Dolomite, K- Feldspar-

Plagioclase-Cordierite. Techniques in photomicrography. . NORM calculation and interpretation of ACF, AKF diagrams.
Hydrogeology, Theory and Methods.

Paper - II Review of Literature concerning the topic of research and Seminar/Project Report.

Literature Review/Project/Assignment work on any current topic of demand in the stream decided by the Supervisor(s)and or DRC. Presentation of report and work.

(a) Seminar presentation
(b) Project work and Viva-voce

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एम.ए.पूर्व इतिहास (M.A. Previous History)
प्रथम एवं द्वितीय सेमेस्टर (First & Second Semester)
सत्र 2017–18 (Session 2017-18)

(जुलाई 2017 से प्रारंभ)

टीप :– तीन अनिवार्य प्रश्न पत्रों के अतिरिक्त परीक्षार्थियों को कोई एक वैकल्पिक प्रश्न पत्र का चयन करना होगा। प्रत्येक प्रश्न पत्र 100–100 अंकों का होगा। 100 अंकों में 80 अंक सैद्धांतिक एवं 20 अंक आंतरिक मूल्यांकन के होंगे। सभी प्रश्न पत्रों के 5–5 क्रेडिट हैं।

प्रथम सेमेस्टर (First semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	
प्रथम I	इतिहास पद्धति **(अनिवार्य)** Historiography (Compulsory)	0370–I	100	80	20
द्वितीय II	आधुनिक विश्व 1800–1920 ई. **(अनिवार्य)** Modern world 1800-1920 A.D.(Compulsory)	0371–I	100	80	20
तृतीय III	प्राचीन एवं मध्यकालीन छत्तीसगढ़ **(अनिवार्य)** Ancient and Medieval Chhattisgarh (Compulsory)	0372–I	100	80	20
चतुर्थ IV	ग्रेट ब्रिटेन का इतिहास 1815–1885 ई. **(वैकल्पिक–अ)** History of Great Britain 1815-1885A.D. (Optional-A)	0373–I	100	80	20
चतुर्थ IV	भारतीय इतिहास में नारी– प्राचीन एवं मध्यकालीन **(वैकल्पिक–ब)** Women in Indian History in Ancient &Medieval Period (Optional-B)	0377–I	100	80	20

द्वितीय सेमेस्टर (Second semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक मूल्यांकन
पंचम V	इतिहास लेखन **(अनिवार्य)** Historigraphy (Compulsory)	0370–II	100	80	20
षष्ठम VI	समकालीन विश्व 1920–2000 ई. **(अनिवार्य)** Contemporary world 1920-2000 A.D. (Compulsory)	0371–II	100	80	20
सप्तम VII	आधुनिक छत्तीसगढ़ **(अनिवार्य)** Modern Chhattisgarh (Compulsory)	0372–II	100	80	20
अष्टम VIII	आधुनिक इंग्लैण्ड 1885–1956 ई. **(वैकल्पिक–अ)** Modern England 1885-1956A.D. (Optional-A)	0373–II	100	80	20
अष्टम VIII	आधुनिक भारत में नारी **(वैकल्पिक–ब)** Women in Modern India (Optional-B)	0377–II	100	80	20

टीप –उपरोक्त वैकल्पिक प्रश्न पत्रों **अ एवं ब** में से कोई एक का चयन करना होगा।

सत्र 2017–18 (जुलाई 2017 से प्रारंभ)

एम.ए.पूर्व इतिहास, प्रथम सेमेस्टर (M.A.Previous History, 1st Semester)

प्रथम–प्रश्न पत्र (अनिवार्य) (First Paper- Compulsory) इतिहास पद्धति (Historiography)

(पेपर कोड–0370–I) (Paper Code - 0370 - I)

इकाई – 1

1. इतिहास का अर्थ एवं परिभाषा
2. इतिहास का स्वरूप
3. इतिहास विज्ञान एवं कला के रूप में
4. इतिहास के प्रकार–सामाजिक,आर्थिक,राजनीतिक,क्षेत्रीय

इकाई – 2

5. इतिहास का अन्य सभी सामाजिक विज्ञान विषयों के साथ संबंध–
   भूगोल,राजनीति शास्त्र, अर्थशास्त्र,समाजशास्त्र,
6. इतिहास का साहित्य के साथ संबंध
7. इतिहास में तथ्य
8. तथ्यों की व्याख्या

इकाई – 3

9. इतिहास में उपकरण–काल,स्थान,घटना,मानव
10. इतिहास में कारण एवं नियतिवाद
11. इतिहास में वस्तुनिष्ठता
12. इतिहास में पूर्वाग्रह

इकाई – 4

13. इतिहास का चक्रवादी सिद्धांत
14. इतिहास का समाज शास्त्रीय सिद्धांत
15. इतिहास का आदर्शवादी सिद्धांत
16. इतिहास का तुलनात्मक सिद्धांत

इकाई – 5

17. इतिहास का आलोचनात्मक सिद्धांत
18. इतिहास का भौतिकवादी सिद्धांत
19. इतिहास का सापेक्षवादी सिद्धांत
20. इतिहासवाद

टीपः– इस प्रश्न पत्र में **इकाई 1.4** में सामाजिक,आर्थिक,राजनीतिक,क्षेत्रीय,
इकाई 2.5 में भूगोल,राजनीति शास्त्र, अर्थशास्त्र,समाजशास्त्र,तथा
इकाई 3.9 मे काल,स्थान,घटना,मानव को निर्णयानुसार जोड़ा गया है ।

संदर्भ ग्रंथ :

(1) झारखण्ड चौबे – इतिहास दर्शन

(2) के.एल.खुराना एवं आर.के.बंसल – इतिहास लेखन, धारणाएं तथा पद्धतियां

(3) परमानन्द सिंह – इतिहास दर्शन

(4) प्रो.राधेशरण – इतिहास पद्धति, इतिहास लेखन

(5) गोविन्द चन्द्रपांडे – इतिहास स्वरूप एवं सिद्धांत

(6) ब्रजेश कुमार श्रीवास्तव – इतिहास लेखन : अवधारणा, विधाएं एवं साधन

(7) E.H.Car - What is History

(8) R.G. Collingwood - The Idea of History

(9) बुद्ध प्रकाश – इतिहास दर्शन

(10) बुद्ध प्रकाश – इतिहास दर्शन उद्देश्य एवं विधि

(11) मानिक लाल गुप्ता – इतिहास–स्वरूप, अवधारणाएं एवं उपयोगिता

(12) रामकुमार बेहार, ऋषिराज पांडेय – इतिहास पद्धति एवं इतिहास लेखन

(13) कौलेश्वर राय – इतिहास दर्शन

(14) Erich Kahler - The Meaning of History

(15) H.S. Commager - History purpose and Methods

(16) सत्यनारायण दुबे शरतेन्दु – इतिहास दर्शन (चिंतन) एवं लेखन

सत्र 2017–18 (जुलाई 2017से प्रारंभ)

एम.ए.पूर्व इतिहास, प्रथम सेमेस्टर (M.A.Previous History, 1st Semester,)
द्वितीय–प्रश्न पत्र (अनिवार्य) (Second- Paper,Compulsory)
आधुनिक विश्व 1800–1920 ई. (Modern World 1800-1920 A.D.)
(पेपर कोड–0371–I) (Paper Code - 0371 - I)

इकाई – 1

1. विश्व में पूंजीवाद के विकास की अवधारणा
2. साम्राज्यवाद का विकास–इंग्लैंड और फ्रांस में
3. साम्राज्यवाद का विकास–जर्मनी और जापान में
4. इंग्लैंड में उदारवाद का विकास

इकाई – 2

5. बिस्मार्क की आंतरिक एवं विदेश नीति
6. कैसर विलियम द्वितीय की विश्व राजनीति
7. 1900–1910 तक अंतर्राष्ट्रीय संधियां
8. 1912 तक पूर्वी समस्या–बर्लिन कांग्रेस

इकाई – 3

9 .युवा तुर्क आंदोलन
10. प्रथम एवं द्वितीय बाल्कन युद्ध एवं प्रभाव
11. प्रथम विश्वयुद्ध कारण एवं घटनाएं
12. प्रथम विश्वयुद्ध परिणाम

इकाई – 4

13. पेरिस की शांति सम्मेलन एवं वर्साय की संधि
14. विश्व में समाजवाद का विकास
15. 1917 की रूसी क्रांति
16. बोल्शेविक क्रांति एवं लेनिन की आर्थिक नीति

इकाई – 5

17. राष्ट्रसंघ संगठन
18. राष्ट्रसंघ की उपलब्धियां एवं असफलताएं
19. प्रथम विश्वयुद्ध के पश्चात् विश्व आर्थिक मंदी का उदय
20. न्यूडील

टीपः– इस प्रश्न पत्र में **इकाई 1.1** में विकास की अवधारणा, **इकाई 2.8** में बर्लिन ,**इकाई 3.9** मे युवा तुर्क आंदोलन , **3.11** में घटनाएं ,**3.12** में प्रथम विश्वयुद्ध परिणाम एवं **4.16** में आर्थिक नीति को निर्णयानुसार जोड़ा गया है तथा पूर्व कें **इकाई 5.19** –इटली में फासीवाद एवं **5.20** मुसोलिनी की गृह व विदेश नीति को विलोपित किया गया है ।

संदर्भ ग्रंथ :

(1) दीनानाथ वर्मा – आधुनिक विश्व का इतिहास

(2) के.एल.खुराना एवं शर्मा – विश्व का इतिहास

(3) बिनाके – सुदूरपूर्व का इतिहास

(4) H.G.Wells - World History

(5) Moon & Parker - Imperialism & world politieces

(6) मथुरालाल शर्मा – आधुनिक यूरोप

(7) कालूराम शर्मा – आधुनिक विश्व का इतिहास

(8) केटेलबी – आधुनिक यूरोप (1815 से 1919)

(9) देवेन्द्र सिंह चौहान – आधुनिक यूरोप (1815 से 1919)

(10) सत्यकेतु विद्यालंकार – एशिया का इतिहास

(11) जार्ज बर्नाद्सकी – रूस का इतिहास

(12) B.V. Rao - History of Modern world

(13) D.N.Ghosh - The History of Europe

(14) B.R.Gokhale - Modern Europe

(15) डॉ.मथुरालाल शर्मा – आधुनिक विश्व

(16) विपिन बिहारी सिन्हा – आधुनिक विश्व

(17) दीनानाथ वर्मा एवं शिवकुमार सिंह – विश्व इतिहास का सर्वेक्षण

(18) जैन एवं माथुर – आधुनिक विश्व

(19) डॉ.एस.आर. वर्मा – आधुनिक विश्व का इतिहास

(20) मानिक लाल गुप्ता – विश्व का इतिहास

(21) इंदिरा अर्जुन देव – समकालीन विश्व का इतिहास (1890–2008)

(22) बी.एन. लुणिया – आधुनिक पाश्चात्य इतिहास की प्रमुख धाराएं (भाग–2)

(23) कौलेश्वर राय – आधुनिक एशिया (1839–1949)

(24) कौलेश्वर राय – आधुनिक यूरोप (1789–1945)

सत्र 2017–18 जुलाई 2017से प्रारंभ

एम.ए.पूर्व इतिहास, प्रथम सेमेस्टर (M.A. Previous History,1st Semester)

तृतीय–प्रश्न पत्र,(अनिवार्य) (Third Paper- Compulsory)

प्राचीन एवं मध्यकालीन छत्तीसगढ़ (Ancient & Medieval Chhattisgarh)

(पेपर कोड–0372–I) (Paper Code - 0372 - I)

इकाई – 1

1. छत्तीसगढ़ का परिचय एवं भौगोलिक स्थिति
2. छत्तीसगढ़ का नामकरण
3. छत्तीसगढ़ का जनजीवन
4. प्राचीन छत्तीसगढ़–मौर्य वंश के पूर्व तक

इकाई – 2

5. छत्तीसगढ़ में मौर्यकालीन एवं गुप्तकालीन छत्तीसगढ़
6. छत्तीसगढ़ में सातवाहनों का प्रभाव
7. क्षेत्रीय राजवंश–नलवंश, राजर्षितुल्य कुल वंश, शरभपुरीय वंश
8. पाण्डु वंश, छिन्दकनाग वंश, फणिनाग वंश

इकाई – 3

9. छत्तीसगढ़ में कल्चुरियों का आगमन
10. छत्तीसगढ़ में कल्चुरि वंश रत्नदेव से मोहन सिंह तक
11. कल्चुरि कालीन शासन व्यवस्था
12. कल्चुरि कालीन आर्थिक दशा

इकाई – 4

13. कल्चुरि कालीन सामाजिक एवं सांस्कृतिक दशा
14. कल्चुरि स्थापत्य
15. छत्तीसगढ़ में मराठा शासन – बिंबाजी एवं उनका प्रशासन
16. छत्तीसगढ़ में मराठों की सूबा शासन व्यवस्था

इकाई – 5

17. रघुजी तृतीय
18. मराठा कालीन छत्तीसगढ़ की आर्थिक दशा
19. मराठा कालीन छत्तीसगढ़ की सामाजिक एवं सांस्कृतिक दशा
20. ब्रिटिश नियंत्रण काल

संदर्भ ग्रंथ :

(1) प्यारेलाल गुप्त – प्राचीन छत्तीसगढ़

(2) पी.एल. मिश्र – दक्षिण कोशल का प्राचीन इतिहास

(3) पी.एल. मिश्र – मराठाकालीन छत्तीसगढ़

(4) भगवान सिंह वर्मा – छत्तीसगढ़ का इतिहास

(5) राम कुमार बेहार – छत्तीसगढ़ का इतिहास

(6) एल.एस. निगम – दक्षिण कोशल का इतिहास

(7) मदनलाल गुप्ता – छत्तीसगढ़ दिग्दर्शन भाग 1, भाग 2

(8) जे.आर. वार्ल्यानी एवं वासुदेव साहसी – छत्तीसगढ़ का राजनीतिक एवं सांस्कृतिक इतिहास

(9) सुरेश चंद्र शुक्ल – छत्तीसगढ़ का समग्र अध्ययन

(10) ऋषिराज पांडेय – छत्तीसगढ़ (दक्षिण कोशल के कल्चुरि)

(11) व्ही.व्ही. मिराशी – कल्चुरि नरेश और उनका काल

(12) शांता शुक्ला – छत्तीसगढ़ की सामाजिक एवं आर्थिक स्थिति

सत्र 2017–18 (जुलाई 2017से प्रारंभ)
एम.ए.पूर्व इतिहास, प्रथम सेमेस्टर (M.A. Previous History, 1st Semester)
चतुर्थ–प्रश्न पत्र (वैकल्पिक–अ) (Fourth Paper, Optional - A)
ग्रेट ब्रिटेन का इतिहास (1815से 1885 ई) (History of Great Britain 1815-1885A.D.)
(पेपर कोड–0373–I) (Paper Code - 0373 - I)

इकाई – 1

1. 1815 से 1822 तक आंतरिक समस्याएं
2. 1822 से 1830 तक इंग्लैंड की आंतरिक स्थिति
3. कैसलरे की विदेश नीति
4. कैनिंग की विदेश नीति

इकाई – 2

5. ब्रिटेन में उदारवाद का उदय
6. ब्रिटेन में उदारवाद के विकास का कारण
7. 1832 का सुधार अधिनियम
8. 1830 से 1841 तक अन्य सुधार

इकाई – 3

9. चार्टिस्ट आंदोलन
10. ग्रेट ब्रिटेन की विदेश नीति (1830–1841)
11. सर राबर्ट पील
12. लार्ड जॉन रसेल

इकाई – 4

13. लार्ड पामर्स्टन
14. 1867 का सुधार अधिनियम
15. बेंजामिन डिजरैली – विदेश नीति
16. नवीन टोरीवाद

इकाई – 5

17. ग्रेट ब्रिटेन और मुक्त व्यापार
18. ग्रेट ब्रिटेन और पूर्वी समस्या (1828–1878)
19. ब्रिटिश साम्राज्यवाद (1880 तक)
20. 1884 तथा 1885 के संसदीय सुधार

संदर्भ ग्रंथ :

(1) एल.पी. शर्मा – इंग्लैंड का इतिहास

(2) विद्याधर महाजन – इंग्लैंड का इतिहास

(3) J.A.R.Marriott - Modern England

(4) G.M.Trevelyan - Social History of England

(5) Ramsay Muir - History of England

(6) बिपीन बिहारी सिन्हा – आधुनिक ग्रेट ब्रिटेन

(7) मेरियट – आधुनिक इंग्लैंड का इतिहास

(8) रामकिशोर पाण्डेय – आधुनिक इंग्लैंड का इतिहास

(9) Maitland - Constitutional History of Engla

सत्र 2017–18 (जुलाई 2017से प्रारंभ)

एम.ए.पूर्व इतिहास ,प्रथम सेमेस्टर (M.A. Previous History ,1st Semester)

चतुर्थ–प्रश्न पत्र (वैकल्पिक– ब) (Fourth Paper ,Optional - B)

भारतीय इतिहास में नारी–प्राचीन एवं मध्यकालीन

(Women in Indian History - Ancient & Medieval Period)

(पेपर कोड–0377–I) (Paper Code - 0377 - I)

इकाई – 1

1. नारी अध्ययन की विचार धारा– उदारवादी, मार्क्सवादी, मनोवैज्ञानिक
2. नारी अध्ययन संबंधी स्रोत–ऐतिहासिक स्त्रोत
3. नारी अध्ययन की स्रोत गैर अभिलेखागारीय
4. नारी अध्ययन का महत्व एवं उपयोगिता

इकाई – 2

5. वैदिक साहित्य एवं महाकाव्य में नारी चित्रण
6. मौर्य एवं मौर्योत्तर काल में नारी की स्थिति
7. गुप्त एवं गुप्तोत्तर काल में नारी की स्थिति
8. राजपूत काल में नारी की स्थिति

इकाई – 3

9. बौद्ध धर्म में महिलाओं की स्थिति
10. जैन धर्म में महिलाओं की स्थिति
11. इस्लाम में महिलाओं की स्थिति
12. सिक्ख धर्म में महिलाओं की स्थिति

इकाई – 4

13. प्राचीन भारत में महिला शिक्षा
14. मध्यकालीन भारत में महिला शिक्षा
15. प्राचीन भारत में महिलाओं की वैधानिक एवं राजनैतिक स्थिति
16. मध्यकालीन भारत में महिलाओं की वैधानिक एवं राजनैतिक स्थिति

इकाई – 5

17. प्राचीन कालीन महत्वपूर्ण महिलाएं –गार्गी,मैत्रयी,
18. मध्यकालीन महत्वपूर्ण महिलाएं –रजिया,गुलबदन,नूरजहां
19. भक्ति आंदोलन और महिलाएं
20. मध्यकालीन मराठा राजनीति एवं महिलाएं

टीपः– इस प्रश्न पत्र में **इकाई 4.15** में राजनैतिक स्थिति ,**इकाई 4.16** में राजनैतिक स्थिति , **इकाई 5.17** मे प्राचीन कालीन महत्वपूर्ण महिलाएं –गार्गी,मैत्रयी, **5.18 में** मध्यकालीन महत्वपूर्ण महिलाएं –रजिया,गुलबदन,नूरजहां को निर्णयानुसार जोड़ा गया है तथा पूर्व कें **इकाई 1.1**–नारी अध्ययन की विचारधारा समाजवादी ,**5.17 प्राचीन** कालीन दक्षिण भारत मे महिलाओं की दशा को विलोपित किया गया है ।

संदर्भ ग्रंथ :

(1) कमलेश्वर प्रसाद – भारत का इतिहास खंड 1, 2, 3

(2) सुगम आनंद – भारतीय इतिहास में नारी

(3) के.सी.श्रीवास्तव – प्राचीन भारत का इतिहास तथा संस्कृति

(4) सुरेश चंद्र शुक्ला – भारतीय इतिहास में नारी

(5) रामधारी सिंह दिनकर – संस्कृति के चार अध्याय

(6) पुरी, दास, चोपड़ा – भारत का सामाजिक, आर्थिक, सांस्कृतिक इतिहास (भाग 1 एवं 2)

(7) प्रताप सिंह – आधुनिक भारत का सामाजिक, आर्थिक इतिहास

(8) राम शरण शर्मा – प्राचीन भारत

(9) सुधा गोस्वामी – भारत की चर्चित महिलाएं

(10) डॉ.एम.के. गिरि – द रोल एंड स्टेट्स ऑफ वीमन इन सिक्खिज्म

(11) राजपाल – वीमेन इन अरली मिडिवल नार्थ इंडिया

सत्र 2017–18 (जनवरी 2018से प्रारंभ)

एम.ए.पूर्व इतिहास,द्वितीय सेमेस्टर (M.A. Previous History, 2nd Semester)

पंचम–प्रश्न पत्र,अनिवार्य (Five th- Paper, Compulsory) **इतिहास लेखन** (Historiography)

(पेपर कोड–0370–II) (Paper Code - 0370 - II)

इकाई – 1

1. यूनानी एवं रोमन इतिहास लेखन
2. चीनी इतिहास लेखन
3. मध्यकालीन यूरोपीय इतिहास लेखन
4. प्रबुद्धतावादी इतिहास लेखन

इकाई – 2

5. अरबी तथा परशियन (फारसी) इतिहास लेखन
6. प्राचीन भारत में इतिहास लेखन की परम्परा
7. मध्यकालीन भारतीय इतिहास लेखन–सल्तनत काल
8. मध्यकालीन भारतीय इतिहास लेखन–मुगल कालीन

इकाई – 3

9. भारतीय इतिहास की साम्राज्यवादी व्याख्या
10. भारतीय इतिहास की राष्ट्रवादी व्याख्या
11. भारतीय इतिहास की मार्क्सवादी व्याख्या
12. भारतीय इतिहास की सवालटर्न अथवा जनवादी व्याख्या

इकाई – 4

13. भारतीय इतिहास की विषय वस्तु–आर्थिक इतिहास
14. भारतीय इतिहास की विषय वस्तु–सामाजिक–सांस्कृतिक इतिहास
15. जातीय एवं जनजातीय इतिहास
16. क्षेत्रीय इतिहास लेखन

इकाई – 5

17. भारतीय इतिहास की विषय वस्तु–कृषक एवं श्रमिक
18. भारतीय इतिहास की विषय वस्तु–विज्ञान एवं प्रौद्योगिकी
19. भारतीय इतिहास की विषय वस्तु–नारी
20. जनसंचार के माध्यम मे इतिहास की प्रस्तुति

- **टीप**:– इस प्रश्न पत्र में **इकाई 5.20** जनसंचार के माध्यम मे इतिहास की प्रस्तुति को भारतीय इतिहास लेखन में वामपंथी, दक्षिण पंथी वाद–विवाद के स्थान पर रखा गया है ।

संदर्भ ग्रंथ :

(1) गोविन्द चन्द्र पांडे – इतिहास स्वरूप एवं सिद्धांत

(2) के.एल.खुराना, आर.के.बंसल – इतिहास–लेखन, धारणाएं तथा पद्धतियां

(3) प्रो. राधेशरण – इतिहास पद्धतियां इतिहास लेखन

(4) कौलेश्वर राय – इतिहास दर्शन

(5) कंवर बहादुर कौशिक – इतिहास दर्शन एवं भारतीय–इतिहास लेखन

(6) Gyanendra Pandey – Subaltern Studies

(7) ई. श्रीधरन – इतिहास लेख एक पाठ्य पुस्तक 500 ई.पू. से 2000 तक

(8) S.P.Sen - History & Historiography in Modern India

(9) Ranjit Guha - Subaltern Studies (All Volumes)

(10) बी.के. श्रीवास्तव – इतिहास के सिद्धांत स्वरूप एवं इतिहास लेखन

(11) हेरम्ब चतुर्वेदी – मध्यकालीन इतिहासकार

(12) R.C.Majumdar - Historiography of Modern India

(13) बी. शेख अली – हिस्ट्री इट्स थ्योरी एंड मेथड

(14) ए.आर. देसाई – Peasant strugales in India

(15) D.N. Dhangra - Peasant strugales in India

सत्र 2017–18 (जनवरी 2018से प्रारंभ)

एम.ए.पूर्व इतिहास, द्वितीय सेमेस्टर (M.A. Previous History, 2nd Semester)

षष्ठम–प्रश्न पत्र (अनिवार्य) (Sixth Paper, Compulsory)

समकालीन विश्व 1920–2000ई.(Contemporary World 1920-2000 A.D.)

(पेपर कोड–0371–II) (Paper Code - 0371 - II)

इकाई – 1

1. इटली में फासीवाद–उदय के कारण
2. मुसोलिनी –गृह एवं विदेश नीति
3. जर्मनी में नाजीवाद का उदय–कारण
4. हिटलर की गृह नीति

इकाई – 2

5. हिटलर की विदेश नीति
6. जापान में सैन्यवाद
7. द्वितीय विश्व युद्ध – कारण एवं परिणाम
8. संयुक्त राष्ट्रसंघ – उद्देश्य एवं संगठन

इकाई – 3

9. संयुक्त राष्ट्रसंघ – उपलब्धियां एवं योगदान
10. निशस्त्रीकरण की समस्याएं
11. चीन में राष्ट्रवाद एवं साम्यवाद का संघर्ष
12. चीन में साम्यवादी सरकार का अभ्युदय

इकाई – 4

13. हिन्द चीन एवं इंडोनेशिया में राष्ट्रीय आंदोलन
14. शीत युद्ध –स्वरूप, अंतर्राष्ट्रीय संधियां एवं तनाव
15. साम्यवादी रूस का विघटन – कारण
16. एक ध्रुवीय विश्व

इकाई – 5

17. गुटनिरपेक्ष आंदोलन एवं भारत, पंचशील
18. अरब राष्ट्रवाद
19. आधुनिक तुर्की
20. अंतर्राष्ट्रीय समस्या – फिलीस्तीन, कोरिया एवं वियतनाम

टीपः– इस प्रश्न पत्र में **इकाई 1.1** इटली में फासीवाद–उदय के कारण, **इकाई 1.2** मुसोलिनी –गृह एवं विदेश नीति तथा **इकाई 3.11** चीन में राष्ट्रवाद एवं साम्यवाद का संघर्ष, को जोड़ा गया है ।पूर्व के **इकाई** 3.11 चीन में गृह युद्व एवं राष्ट्रवादी सरकार की स्थापना को विलोपित किया गया है।

संदर्भ ग्रंथ :

(1) दीनानाथ वर्मा – आधुनिक विश्व का इतिहास

(2) सत्यकेतु विद्यालंकार – एशिया का इतिहास

(3) के.एल.खुराना एवं शर्मा – विश्व का इतिहास

(4) देवेन्द्र सिंह चौहान – समकालीन यूरोप

(5) S.P. Nanda - History of Modern World

(6) सुरेश चंद्र एवं शिवकुमार – आधुनिक विश्व का इतिहास

(7) कालू राम शर्मा – आधुनिक विश्व

(8) ई.एच.कार – दो विश्व युद्ध के बीच

(9) जैन एवं माथुर – विश्व का इतिहास

(10) D.G.E. Hall - Soul Eorl Asia

(11) B.V.E. Rao - History of World

(12) Leyender - The Mieldle East

(13) A.C.Ray - Contemporary World since 1919

(14) P.K. Chhatterjee - Modern World

(15) D.C.Bhattacharya - International relation in the 20th century

(16) अजय चंद्र बनर्जी – माडर्न वर्ल्ड

(17) अर्जुन देव, इंदिरा अर्जुन देव – समकालीन विश्व का इतिहास (1890–2008)

(18) बी.एन.लुणिया – आधुनिक पाश्चात्य इतिहास की प्रमुख धाराएं (भाग–2)

(19) कौलेश्वर राय – आधुनिक यूरोप (1789–1945)

सत्र 2017–18 (जनवरी 2018से प्रारंभ)

एम.ए.पूर्व इतिहास, द्वितीय सेमेस्टर (M.A. Previous History, 2nd Semester)
सप्तम–प्रश्न पत्र (अनिवार्य) (Seventh Paper ,Compulsory)
आधुनिक छत्तीसगढ़ (Modern Chhattisgarh)
(पेपर कोड–0372–II) (Paper Code - 0372 - II)

इकाई – 1

1. ब्रिटिश सत्ता की स्थापना
2. ब्रिटिश कालीन प्रशासनिक व्यवस्था
3. ब्रिटिश कालीन छत्तीसगढ़ की सामाजिक, सांस्कृतिक दशा
4. छत्तीसगढ़ के रियासतों के प्रति ब्रिटिश नीति

इकाई – 2

5. 1857 का विप्लव – छत्तीसगढ़ में
6. जमींदारी विद्रोह – वीरनारायण सिंह
7. बस्तर में आदिवासी विद्रोह – 1876 एवं 1910
8. छत्तीसगढ़ में राष्ट्रीय आंदोलन 1920 तक

इकाई – 3

9. छत्तीसगढ़ में असहयोग आंदोलन
10. छत्तीसगढ़ में सविनय अवज्ञा आंदोलन
11. छत्तीसगढ़ में जंगल सत्याग्रह
12. छत्तीसगढ़ में व्यक्तिगत सत्याग्रह

इकाई – 4

13. छत्तीसगढ़ में भारत छोड़ो आंदोलन
14. छत्तीसगढ़ में किसान आंदोलन
15. छत्तीसगढ़ में श्रमिक आंदोलन
16. छत्तीसगढ़ में रियासतों का विलीनीकरण

इकाई – 5

17. छत्तीसगढ़ में धार्मिक आस्थाएँ, शैव, वैष्णव, शाक्त, जैन एवं बौद्ध धर्म
18. छत्तीसगढ़ में कबीर एवं सतनाम पंथ
19. छत्तीसगढ़ की लोक संस्कृति
20. छत्तीसगढ़ राज्य निर्माण की पृष्ठभूमि

संदर्भ ग्रंथ :

(1) किशोर अग्रवाल – बीसवीं शताब्दी का छत्तीसगढ़

(2) किशोर अग्रवाल – स्वातंत्र्योत्तर छत्तीसगढ़

(3) अरविंद शर्मा – छत्तीसगढ़ का इतिहास

(4) तृषा शर्मा – छत्तीसगढ़ इतिहास, संस्कृति एवं परंपरा

(5) अशोक शुक्ला – छत्तीसगढ़ का राजनीतिक इतिहास

(6) भगवान सिंह वर्मा – छत्तीसगढ़ का इतिहास

(7) सुरेश चंद्र – छत्तीसगढ़ का समग्र इतिहास

(8) हीरालाल शुक्ला – छत्तीसगढ़ का इतिहास

(9) दिनेश कुमार राठौर – कांकेर का इतिहास

(10) ऋषिराज पांडेय – सारंगढ़ रियासत

(11) देवेश शर्मा – मध्यप्रांत में छत्तीसगढ़

(12) रश्मि चौबे – राष्ट्रीय चेतना के विकास में छत्तीसगढ़ के साहित्यकारों का योगदान ''पंडित सुंदरलाल शर्मा के विशेष में''

(13) सुरेश चंद्र शुक्ला, एवं अर्चना शुक्ला – छत्तीसगढ़ की रियासतों का विलीनीकरण

(14) शैलेन्द्र सिंग – भारत के आदिवासी क्षेत्रों के सामन्तीय रियासतों एवं जमींदारियों में जनजागृति

(15) राधेश्याम पटेल – कबीर पंथ और छत्तीसगढ़ का सामाजिक विकास

(16) रीता पांडे – बिलासपुर जिले की भूराजस्व व्यवस्था 1861–1947

सत्र 2017–18 (जनवरी 2018से प्रारंभ)

एम.ए.पूर्व इतिहास, द्वितीय सेमेस्टर (M.A.Previous History, 2nd Semester)

अष्टम–प्रश्न पत्र (वैकल्पिक– अ) (Eightth-Paper ,Optional - A)

आधुनिक इंग्लैंड (1885 से 1956 ई.तक) (Modern England 1885 – 1956A.D.)

(पेपर कोड–0373–II) (Paper Code - 0373 - II)

इकाई – 1

1. ग्लैडस्टन – आयरिश नीति
2. ग्लैडस्टन – गृह नीति
3. डिजरैली – विदेश नीति
4. सेलिसबरी – गृह नीति

इकाई – 2

5. सेलिसबरी – विदेश नीति
6. चेम्बरलेन का साम्राज्यवाद
7. 1911 का सुधार अधिनियम
8. इंग्लैंड की गृह नीति (1902–1914)

इकाई – 3

9. इंग्लैंड की विदेश नीति (1902–1914)
10. इंग्लैंड और पूर्वी समस्या (1878–1914)
11. प्रथम विश्व युद्ध में इंग्लैंड की भूमिका
12. दो विश्व युद्धों के बीच इंग्लैंड

इकाई – 4

13. विश्व आर्थिक मंदी और इंग्लैंड
14. अफ्रीका के विभाजन में इंग्लैंड की भूमिका
15. ग्रेट ब्रिटेन की गृह नीति (1919–1939)
16. ग्रेट ब्रिटेन की विदेश नीति (1919–1935)

इकाई – 5

17. चेम्बरलेन की तुष्टीकरण की नीति (1936–1939)
18. द्वितीय विश्व युद्ध में इंग्लैंड की भूमिका
19. द्वितीय विश्व युद्ध के पश्चात् इंग्लैंड की स्थिति
20. इंग्लैंड और शीत युद्ध

टीप:– इस प्रश्न पत्र में **इकाई 1.3** डिजरैली – विदेश नीति को निर्णयानुसार जोड़ा गया है।

संदर्भ ग्रंथ :

(1) एल.पी.शर्मा – इंग्लैंड का इतिहास

(2) विद्याधर महाजन – इंग्लैंड का इतिहास

(3) J.A.R. Marriott - Modern England

(4) G.M. Trevelyan - Social History of England

(5) अरूण कुमार मित्तल – इंग्लैंड का इतिहास

(6) रमेश चंद्र सिन्हा – इंग्लैंड का इतिहास

(7) Ramsay Muir - History of England

सत्र 2017–18 (जनवरी 2018से प्रारंभ)

एम.ए.पूर्व इतिहास, द्वितीय सेमेस्टर (M.A.Previous History, 2nd Semester)
अष्टम–प्रश्न पत्र (वैकल्पिक–ब) (Eighth Paper,Optional - B)

आधुनिक भारत में नारी (Women in Modern India)

(पेपर कोड–0377–II) (Paper Code - 0377 - II)

इकाई – 1

1. औपनिवेशिक काल में नारी शिक्षा
2. पुनर्जागरण आंदोलन और महिलाएं
3. उन्नीसवीं शताब्दी के नारी संगठन
4. बीसवीं शताब्दी के नारी संगठन

इकाई – 2

5. भारतीय स्वतंत्रता आंदोलन और महिलाएं, 1857 की क्रांति
6. भारतीय स्वतंत्रता आंदोलन और महिलाएं, गांधीवादी आंदोलन
7. भारतीय स्वतंत्रता आंदोलन और महिलाएं, क्रांतिकारी आंदोलन
8. भारतीय स्वतंत्रता आंदोलन और महिलाए, आजाद हिंद फौज

इकाई – 3

9. स्वतंत्रता के पश्चात् राजनीति और महिलाएं – पंचायत
10. स्वतंत्रता के पश्चात् राजनीति और महिलाएं – विधानसभा से संसद तक
11. मताधिकार और महिलाएं
12. पंचवर्षीय योजनाएं और महिलाएं

इकाई – 4

13. भारतीय संविधान में महिलाओं की स्थिति
14. स्वतंत्रोत्तर भारत में महिलाओं की वैधानिक स्थिति
15. जनजातीय समाज में महिलाओं की स्थिति
16. महिलाओं के प्रति हिंसा एवं अपराध

इकाई – 5

17. महिलाएं – कला एवं साहित्य के क्षेत्र में
18. मानवाधिकार एवं महिलाएं
19. स्वतंत्रोत्तर भारत में महिला शिक्षा
20. काम काजी महिलाएं – स्वावलंबन एवं सशक्तिकरण

संदर्भ ग्रंथ :

(1) कमलेश्वर प्रसाद – भारत का इतिहास खंड 1, 2, 3

(2) सुगम आनंद – भारतीय इतिहास में नारी

(3) विपिन चंद्र – आजादी के बाद का भारत

(4) पुरी, दास, चोपड़ा – भारत का सामाजिक, आर्थिक, सांस्कृतिक इतिहास (खंड तीन)

(5) प्रताप सिंह – आधुनिक भारत का सामाजिक, आर्थिक इतिहास

(6) आनंद मूर्ति – भारतीय इतिहास में नारी

(7) गोपा जोशी – भारत में स्त्री असमानता

(8) नीतू केंग – इंडियन वीमेन एक्टीविस्ट

(9) सी.एन.मंगल, यशोदा भट्ट – बीयांड द थ्रेस होल्ड–इंडियन वीमेन ऑन द मूव

(10) सुधा गोस्वामी – भारत की चर्चित महिलाएं

(11) कौरोलिय एम बायर्ली और कारेन रास – महिलायें और संचार माध्यम

(12) साधना आर्य,नवोदिता मेनन आदि (संपादक) – नारीवादी राजनीति संघर्ष एवं मुद्दे

(13) यशोदा भट्ट – वीमेन इन इंडिया इन फिफ्टी इयर्स ऑफ इंडिपेंडेंस

(14) वृंदा करात – भारतीय नारी संघर्ष और मुक्ति

(15) सीमा पाल – भारतीय संस्कृति एवं ब्रिटिश उपनिवेशवाद

एम.ए.अंतिम, इतिहास (M.A. Final, History)
तृतीय एवं चतुर्थ सेमेस्टर (Third &Fourth Semester)
सत्र–2018–19 (Session 2018-19)
(जुलाई 2018 से प्रारंभ)

टीप :– परीक्षार्थियों को निम्नलिखित खण्ड **ब एवं स में से किसी एक खण्ड** का चयन कर उसके दोनों प्रश्न पत्रों को हल करना होगा तथा दिये गए चार वैकल्पिक प्रश्न पत्रों में से **कोई दो वैकल्पिक प्रश्न पत्रों** का चयन करना होगा। सभी प्रश्न पत्रों में 100–100 अंक होंगे। 100 अंकों में 80 अंक सैद्धांतिक एवं 20 अंक आंतरिक मूल्यांकन के होंगे। सभी प्रश्न पत्रों के 5–5 क्रेडिट है।

तृतीय सेमेस्टर (Third Semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक मूल्यांकन
प्रथम I	**खण्ड ब : मध्यकालीन भारत** **Setion B : Medieval India** सल्तनत कालीन भारतीय राजनय एवं अर्थव्यवस्था (1200 से 1526 ई. तक) Indian polity and economy in sultanate period (1200-1526 A.D.)	0380–I	100	80	20
द्वितीय II	सल्तनत कालीन समाज एवं संस्कृति (1200 से 1526 ई.) Society and culture in Sultanate period (1200-1526 A.D.)	0381–I	100	80	20
प्रथम I	**खण्ड स : आधुनिक भारत** **Setion C : Modern India** आधुनिक भारत का राजनीतिक, प्रशासनिक इतिहास (1757 ई. से 1857 ई. तक) Political and Administrative History of Modern India(1757 A.D. to 1857 A.D.)	0382–I	100	80	20
द्वितीय II	आधुनिक भारत का आर्थिक, सामाजिक, एवं सांस्कृतिक इतिहास (1757 ई. से 1857 ई. तक) Economical,Social and Cultural History of Modern India (1757 - 1857 A.D.)	0383–I	100	80	20

वैकल्पिक प्रश्न पत्र (Optional Paper)					
वैक. प्रथम Op. - I	भारतीय राष्ट्रीय आंदोलन का इतिहास (1857 से 1922 ई. तक) History of Indian National Movement (1857 to 1922 A.D.)	0384–I	100	80	20
वैक. द्वितीय Op. - II	भारत का सांस्कृतिक इतिहास (प्रारंभ से 1526 ई. तक) Cultural History of India (Begining to 1526 A.D.)	0385–I	100	80	20
वैक. तृतीय Op. - III	भारतीय संविधान और शासन व्यवस्था (Indian Constitution and Administrative System)	0386–I A	100	80	20
वैक. चतुर्थ Op. - IV	पर्यटन सिद्धांत Tourism Theory	0387–I	100	80	20

चतुर्थ सेमेस्टर (Forth Semester)

प्रश्न पत्र	प्रश्न पत्र का नाम	कोड संख्या	पूर्णांक	सैद्धांतिक	आंतरिक मूल्यांकन
प्रथम I	**खण्ड ब : मध्यकालीन भारत** **Setion B : Medieval India** मुगलकालीन भारतीय राजनय एवं अर्थव्यवस्था (1526 से 1750 ई. तक) Indian Politiy and Economy in Mughal Period (1526-1750 A.D.)	0380–II	100	80	20
द्वितीय II	मुगलकालीन समाज एवं संस्कृति (1526 से 1750 ई.) Society and Culture in Mughal Period (1526-1750 A.D.)	0381–II	100	80	20
प्रथम I	**खण्ड स : आधुनिक भारत** **Setion C : Modern India** आधुनिक भारत का राजनीतिक एवं प्रशासनिक इतिहास (1858 ई. से 1964 तक) (Political and Administrative History of Modern India (1858 - 1964 A.D.)	0382–II	100	80	20
द्वितीय II	आधुनिक भारत का आर्थिक, सामाजिक एवं सांस्कृतिक इतिहास (1858 ई. से 1964 ई. तक) Economical, Social,and Cultural History of Modern India (1858 A.D. to 1964 A.D.)	0383–II	100	80	20

वैकल्पिक प्रश्न पत्र (Optional Paper)					
वैक. प्रथम Op. - I	भारतीय राष्ट्रीय आंदोलन का इतिहास (1922 से 1947 ई. तक) History of Indian Indian National Movement (1922 - 1947 A.D.)	0384–II	100	80	20
वैक. द्वितीय Op. - II	भारत का सांस्कृतिक इतिहास (1526 ई. से 1950 ई. तक) Cultural History of India (1526 - 1950 A.D.)	0385–II	100	80	20
वैक. तृतीय Op. - III	भारत की केन्द्रीय तथा प्रांतीय शासन व्यवस्था Central and Provincial Administrative System of India	0386–II A	100	80	20
वैक. चतुर्थ Op. - IV	पर्यटन सिद्धांत एवं व्यवहार–इतिहास के संदर्भ में Tourism Theory and Principles In Reference of History	0387–II	100	80	20

सत्र 2018–19(जुलाई 2018 से प्रारंभ)

एम.ए.अंतिम इतिहास ,तृतीय सेमेस्टर (M.A. Final.History ,Third Semester)

(खण्ड–ब) मध्यकालीन भारत (Section –B, Medieval India)**प्रथम–प्रश्न पत्र** (Paper - I)

सल्तनत कालीन भारतीय राजनय एवं अर्थव्यवस्था (1200 से 1526 ई.)

Indian Polity and Economy in Sultanate Period (1200-1526 A.D.)

(पेपर कोड–0380–I) (Paper Code-0380-I)

इकाई – 1

1. सल्तनत कालीन इतिहास के स्रोत
2. दिल्ली सल्तनत की स्थापना एवं प्रसार
3. सल्तनत कालीन इतिहास लेखन – विभिन्न विचारधाराएं
4. सल्तनत कालीन राज्य का स्वरूप एवं सिद्धांत

इकाई – 2

5. सल्तनकालीन केन्द्रीय प्रशासन
6. सल्तनत कालीन प्रांतीय व्यवस्था–इक्ता
7. अलाउद्दीन खिलजी की आर्थिक नीति–बाजार नियंत्रण
8. अलाउद्दीन खिलजी की विजयें–उत्तर भारत, दक्षिण भारत

इकाई – 3

9. मुहम्मद बिन तुगलक की योजनाएं
10. फिरोजशाह तुगलक का प्रशासन
11. सल्तनतकालीन क्षेत्रीय राज्य – उत्तर भारत
12. सल्तनतकालीन क्षेत्रीय राज्य – दक्षिण भारत

इकाई – 4

13. सल्तनतकालीन भूराजस्व व्यवस्था
14. सल्तनतकालीन शिल्प व उद्योग
15. सल्तनतकालीन आंतरिक व्यापार
16. सल्तनतकालीन विदेशी व्यापार

इकाई – 5

17. तैमूर का आक्रमण एवं प्रभाव
18. सल्तनत काल में नगरों का उदय
19. सल्तनत कालीन मुद्राएं एवं बैंकिंग
20. सल्तनत कालीन – कृषि एवं उद्योग

संदर्भ ग्रंथ :

(1) हरिशचंद्र वर्मा – मध्यकालीन भारत भाग – 1

(2) ए.एल. श्रीवास्तव – सल्तनतकालीन भारत

(3) विपिन बिहारी सिन्हा – मध्यकालीन भारत

(4) बी.एन. लूणिया – पूर्व मध्यकालीन भारत

(5) इरफान हबीब – सल्तनतकालीन भारत

(6) एल.पी. शर्मा – मध्यकालीन भारत

(7) हेरम्ब चतुर्वेदी – मध्यकालीन इतिहासकार

(8) सतीश चंद्र – मध्यकालीन भारत–राजनीति, समाज और संस्कृति–आठवीं से सत्रहवीं सदीं तक

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)

एम.ए.अंतिम इतिहास, तृतीय सेमेस्टर (M.A. Final. History, Third Semester)

(खण्ड–ब) मध्यकालीन भारत (Section –B, Medieval India) **द्वितीय–प्रश्न पत्र** (Paper - II)

सल्तनत कालीन समाज एवं संस्कृति (1200 से 1526 ई. तक)

Society and Culture in Sultanate Period (1200-1526 A.D.)

(पेपर कोड–0381–I) (Paper Code-0381-I)

इकाई – 1

1. सल्तनत कालीन समाज – संरचना एवं परिवर्तन
2. सल्तनत कालीन नगरीय समाज – नये सामाजिक वर्गों का उदय
3. सल्तनत कालीन हिन्दू समाज
4. सल्तनत कालीन मुस्लिम समाज

इकाई – 2

5. भक्ति आंदोलन – उदय के लिए उत्तरदायी तत्व
6. सगुण भक्ति की विशेषताएं
7. कृष्ण भक्ति शाखा
8. राम भक्ति शाखा

इकाई – 3

9. निर्गुण भक्ति सम्प्रदाय – कबीर और नानक
10. भक्ति आंदोलन की क्षेत्रीय विशेषताएं
11. भक्ति आंदोलन की भारतीय समाज एवं संस्कृति पर प्रभाव
12. भक्ति आंदोलन का साहित्य पर प्रभाव

इकाई – 4

13. सूफीवाद
14. प्रमुख सूफी सिलसिलें और उनकी विशेषताएं
15. इण्डो–इस्लामिक संस्कृति का उदय एवं विकास
16. सल्तनत कालीन विज्ञान एवं तकनीकी

इकाई – 5

17. सल्तनत कालीन स्थापत्य कला
18. सल्तनत कालीन क्षेत्रीय स्थापत्य कला
19. सल्तनत काल में साहित्य का विकास
20. सल्तनत काल में चित्रकला एवं संगीत कला

संदर्भ ग्रंथ :

(1) बी.के. पंजाबी – मध्यकालीन भारतीय इतिहास

(2) हरिशचंद्र वर्मा – मध्यकालीन भारत भाग–1

(3) रामधारी सिंह दिनकर – संस्कृति के चार अध्याय

(4) बी.एन. लूणिया – पूर्व मध्यकालीन भारत

(5) विपिन बिहारी सिन्हा – मध्यकालीन भारत

(6) प्रताप सिंह – मध्यकालीन संस्कृति

(7) राजबली सिंह – सूफीवाद

(8) एल.पी. शर्मा – मध्यकालीन भारत

(9) ए.एल. श्रीवास्तव – मध्यकालीन संस्कृति

(10) पुरी, दास, चोपड़ा – भारत का सामाजिक, आर्थिक एवं सांस्कृतिक इतिहास (भाग–2)

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)

एम.ए.अंतिम इतिहास, तृतीय सेमेस्टर (M.A. Final, History ,Third Semester)

(खण्ड–स) आधुनिक भारत (Section –C, Modern India) **प्रथम–प्रश्न पत्र** (Paper - I)

आधुनिक भारत का राजनीतिक एवं प्रशासनिक इतिहास (1757 ई. से 1857 ई. तक)

Political and Administrative History of Modern India(1757 -1857A.D.)

(पेपर कोड–0382–I) (Paper Code-0382-I)

इकाई – 1

1. आधुनिक भारतीय इतिहास के स्रोत
2. आधुनिक भारतीय इतिहास लेखन की विचारधाराएं–साम्राज्यवादी, राष्ट्रवादी
3. आधुनिक भारतीय इतिहास लेखन की विचारधाराएं–मार्क्सवादी, जनवादी
4. पूर्व औपनिवेशिक भारत की राजनीतिक व्यवस्था

इकाई – 2

5. भारत में यूरोपियों का आगमन
6. कर्नाटक में आंग्ल–फ्रांसीसी प्रतिष्पर्द्धा
7. बंगाल में अंग्रेजी शक्ति का उदय
8. ब्रिटिश साम्राज्य का विस्तार–नीतियां तथा कार्यक्रम

इकाई – 3

9. आंग्ल – मैसूर संबंध
10. आंग्ल – मराठा संबंध
11. आंग्ल–अफगान संबंध
12. आंग्ल – सिक्ख संबंध

इकाई – 4

13. आंग्ल – अवध संबंध
14. भारत की औपनिवेशिक संरचना–प्रशासनिक स्वरूप
15. संवैधानिक विकास – 1773–1784
16. संवैधानिक विकास – 1784–1854

इकाई – 5

17. कंपनी एवं रियासतों के संबंध
18. कंपनी प्रशासन के अंतर्गत पुलिस, लोकसेवा एवं न्याय व्यवस्था
19. उपनिवेशवाद का प्रतिरोध–जनजातीय व कृषक आंदोलन
20. 1857 की क्रांति–विचारधाराएं, कारण, स्वरूप एवं महत्व

संदर्भ ग्रंथ :

(1) एल.पी. शर्मा – आधुनिक भारत

(2) रजनीपाम दत्त – इंडिया टुडे

(3) प्रताप सिंह – आधुनिक भारत का इतिहास

(4) एम.एस. जैन – आधुनिक भारत

(5) सुमित सरकार – आधुनिक भारत का इतिहास

(6) बी.एल. ग्रोवर एवं यशपाल – आधुनिक भारत का इतिहास

(7) एग्नेस ठाकुर – भारत का इतिहास 1757–1857

(8) वीरकेश्वर प्रसाद सिंह – भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास

(9) एस.आर. शर्मा – मेकिंग आफ मार्डन इंडिया

(10) बी.बी. मिश्र – सेंट्रल एडमिनिस्ट्रेशन आफ ईस्ट इंडिया कंपनी

(11) शेखर बंधोपाध्याय – प्लासी से विभाजन तक

(12) विपिन चंद्रा – आधुनिक भारत का इतिहास

(13) वी.डी. महाजन – मार्डन इंडियन हिस्ट्री फ्राम 1707 टू प्रजेन्ट डे

(14) के.सी. चौधरी – हिस्ट्री आफ मार्डन इंडिया

(15) कौलेश्वर राय – आधुनिक भारत 1757–1950

(16) सीमा पाल – भारतीय संस्कृति एवं ब्रिटिश उपनिवेशवाद

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)

एम.ए.अंतिम इतिहास, तृतीय सेमेस्टर (M.A. Final History, Third Semester)

(खण्ड–स) आधुनिक भारत (Section –C, Modern India) **द्वितीय–प्रश्न पत्र** (Paper - II)

आधुनिक भारत का आर्थिक, सामाजिक एवं सांस्कृतिक इतिहास (1757 ई.से 1857ई. तक)

(Economical, Social and Cultural History of Modern India 1757 -1857 A.D.)

(पेपर कोड–0383–I) (Paper Code-0383-I)

इकाई – 1

1. पूर्व औपनिवेशिक भारत की आर्थिक व्यवस्था
2. यूरोपीय वाणिज्यवाद का उदय
3. अंग्रेजों की व्यापारिक, वाणिज्यिक नीति
4. कृषि का वाणिज्यीकरण

इकाई – 2

5. ग्रामीण अर्थव्यवस्था – कृषि की स्थिति एवं समस्याएं
6. नवीन भूराजस्व व्यवस्था – स्थाई बंदोबस्त
7. नवीन भूराजस्व व्यवस्था – रैयतवाड़ी, महालवाड़ी
8. अकाल एवं अकाल नीति

इकाई – 3

9. शहरी अर्थव्यवस्था – हस्तशिल्प, उद्योगों की स्थिति
10. औद्योगीकरण 1757–1857
11. आंतरिक बाजार और शहरी केन्द्र, विदेशी व्यापार
12. धन का निष्कासन

इकाई – 4

13. पूर्व औपनिवेशिक भारत की सामाजिक एवं सांस्कृतिक व्यवस्था
14. भारतीय पुनर्जागरण
15. समन्वयवादी समाज सुधार आंदोलन–बंगाल एवं महाराष्ट्र के संदर्भ में
16. सामाजिक सुधार शासन द्वारा किये गए सुधार कार्य

इकाई – 5

17. प्रतिक्रियावाद – बहावी आंदोलन
18. नवीन सामाजिक वर्गों का उदय
19. शिक्षा का विकास
20. भारतीय प्रेस (1857 तक)

टीपः– इस प्रश्न पत्र में निर्णयानुसार **इकाई 2.8** अकाल एवं अकाल नीति को ग्रामीण ऋण ग्रस्तता के स्थान पर रखा गया है।

संदर्भ ग्रंथ :

(1) एल.पी. शर्मा – आधुनिक भारत

(2) ए.आर. देसाई – आधुनिक राष्ट्रवाद की सामाजिक पृष्ठभूमि

(3) रजनी पामदत्त – इंडिया टुडे

(4) ग्रोवर एवं यशपाल – आधुनिक भारत का इतिहास एवं नवीन मूल्यांकन (1707–1969)

(5) एस.आर. शर्मा – मेकिंग आफ मार्डन इंडिया

(6) प्रताप सिंह – आधुनिक भारत–1, खंड–3

(7) एम.एस. जैन – आधुनिक भारत का इतिहास

(8) एस.पी. नायर – सोशल एंड इकॉनामिक हिस्ट्री आफ मॉडर्न इंडिया

(9) S.P. Nanda - Economic and Social History of Modern India

(10) V.A. Narain - Social History of Modern India

(11) एग्नेस ठाकुर – भारत का आर्थिक इतिहास (1757–1950)

(12) पुरी, दास, चोपड़ा –भारत का सामाजिक आर्थिक एवं सांस्कृतिक इतिहास

(13) अरूण भट्टाचार्य – हिस्ट्री आफ माडर्न इंडिया (1757–1947)

(14) नीलकंठ शास्त्री – एडवांस हिस्ट्री ऑफ इंडिया

(15) आर.सी. मजुमदार एवं एच.सी. राय – ऐन एडवांश हिस्ट्री ऑफ इंडिया

(16) कौलेश्वर राय – आधुनिक भारत 1757–195

(17) सीमा पाल – भारतीय संस्कृति एवं ब्रिटिश उपनिवेशवाद

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)
एम.ए.अंतिम इतिहास, तृतीय सेमेस्टर (M.A.Final History, Third Semester)
खण्ड–स, प्रश्न पत्र (वैकल्पिक–01) (Section- C,Paper - Optional - 01)
भारतीय राष्ट्रीय आंदोलन का इतिहास (1857ई. से 1922ई. तक)
History of National Movement (1857 - 1922 A.D.)
(पेपर कोड–0384–I) (Paper Code-0384-I)

इकाई – 1

1. 1857 के विप्लव के कारण
2. 1857 के विप्लव का स्वरूप एवं परिणाम
3. भारत में राष्ट्रवाद की वैचारिक पृष्ठभूमि
4. कांग्रेस की स्थापना के पूर्व राजनीतिक संगठन

इकाई – 2

5. भारतीय राष्ट्रीय कांग्रेस की स्थापना – अवधारणाएं एवं उद्देश्य
6. कांग्रेस का नरमपंथी युग –विचारधारा एवं कार्यक्रम
7. कांग्रेस में उग्रवाद का उदय – विचारधारा एवं कार्यक्रम
8. नरमपंथी – उग्रवाद संघर्ष

इकाई – 3

9. बंग–भंग एवं स्वदेशी आंदोलन
10. साम्प्रदायिक राजनीति का उदय, मुस्लिम लीग
11. लखनऊ समझौता
12. होमरूल आंदोलन

इकाई – 4

13. गांधीजी का भारतीय राजनीति में प्रवेश एवं उनके नेतृत्व में प्रारंभिक आंदोलन
14. रोलेक्ट एक्ट
15. जलियावाला बाग हत्याकांड और उसका प्रभाव
16. खिलाफत आंदोलन

इकाई – 5

17. 1919 के अधिनियम
18. क्रांतिकारी आंदोलन–प्रथम चरण–महाराष्ट्र, बंगाल, पंजाब एवं अन्य क्षेत्र
19. असहयोग आंदोलन
20. असहयोग आंदोलन का भारतीय राजनीति पर प्रभाव

टीपः– इस प्रश्न पत्र में निर्णयानुसार **इकाई 4.16** खिलाफत आंदोलन को हंण्टर कमीशन रिपोर्ट के स्थान पर रखा गया है।

संदर्भ ग्रंथ :

(1) ताराचंद – भारतीय स्वाधीनता आंदोलन का इतिहास भाग 1 व 2

(2) सुमित सरकार – आधुनिक भारत

(3) पं.सुंदरलाल शर्मा – भारत में अंग्रेजी राज

(4) डॉ. आभा सक्सेना – इंडियन नेशनल मूवमेंट एंड द लिबरलस

(5) ए.आर. देसाई – भारतीय राष्ट्रवाद की सामाजिक पृष्ठभूमि

(6) शर्मा एवं शर्मा – भारतीय राष्ट्रीय आंदोलन एवं राजनैतिक विकास

(7) कौलेश्वर राय – फ्रीडम स्ट्रगल

(8) विपिन चन्द्र – भारतीय स्वतंत्रता संग्राम का इतिहास

(9) बीरकेश्वर प्रसाद सिंह – भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास

(10) रामलखन शुक्ला – आधुनिक भारत का इतिहास

(11) विनोद कुमार सक्सेना – द पार्टीशन ऑफ बंगाल

(12) के.पी. बहादुर – हिस्ट्री ऑफ फ्रीडम मूवमेंट इन इंडिया

(13) योगेन्द्र श्रीवास्तव – हिस्ट्री ऑफ फ्रीडम मूवमेंट 1857–1947

(14) यशपाल एवं ग्रोवर – आधुनिक भारत का इतिहास

(15) कौलेश्वर राय – आधुनिक भारत 1757–1950

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)
एम.ए.अंतिम इतिहास, तृतीय सेमेस्टर (M.A. Final. History, Third Semester)
खण्ड–स,प्रश्न पत्र (वैकल्पिक–02) (Section- C,Paper - Optional - 02)
भारत का सांस्कृतिक इतिहास (प्रारंभ से 1526 ई. तक)
Cultural History of India (Begining to 1526 A.D.)
(पेपर कोड–0385–I) (Paper Code-0385-I)

इकाई – 1

1. हड़प्पा कालीन सामाजिक एवं आर्थिक जीवन
2. हड़प्पा कालीन कला एवं स्थापत्य कला
3. आर्यों का मूल निवास संबंधी अवधारणाएं
4. आर्यों का भारत में प्रसार

इकाई – 2

5. ऋग्वेद कालीन समाज एवं संस्कृति
6. उत्तरवैदिक कालीन समाज एवं संस्कृति
7. वेद, उपनिषद, सूत्र, स्मृतिग्रंथ
8. महाकाव्य युगीन संस्कृति

इकाई – 3

9. महाजनपद कालीन समाज एवं संस्कृति
10. जैन धर्म, बौद्ध धर्म
11. मौर्यकालीन समाज एवं संस्कृति
12. भारतीय संस्कृति में अशोक का योगदान

इकाई – 4

13. गुप्तकालीन समाज एवं धर्म
14. गुप्तकालीन कला विज्ञान एवं साहित्य
15. राजपूत कालीन समाज
16. राजपूत कालीन कला एवं स्थापत्य

इकाई – 5

17. सल्तनत कालीन समाज
18. सल्तनतकालीन संस्कृति की विशेषताएं
19. भक्ति आंदोलन
20. सूफी आंदोलन

संदर्भ ग्रंथ :

(1) रामशरण शर्मा – प्राचीन भारत

(2) विमल चन्द्र पाण्डेय – प्राचीन भारत का राजनीतिक, सांस्कृतिक इतिहास

(3) रोमिला थापर – अशोक तथा मौर्य साम्राज्य का पतन

(4) के.एन. शास्त्री – दक्षिण भारत का इतिहास

(5) ए.एल. बाशम – अद्‌भुत भारत

(6) भारद्वाज – मध्यकालीन भारतीय संस्कृति

(7) जयनारायण पांडे – सिंधु सभ्यता

(8) के.सी. श्रीवास्तव – प्राचीन भारत का इतिहास तथा संस्कृति

(9) शिवशंकर शर्मा – भारतीय संस्कृति

(10) नीरज श्रीवास्तव – मध्यकालीन भारत–प्रशासन, समाज एवं संस्कृति

(11) रामशरण शर्मा – प्रारंभिक भारत का परिचय

(12) कृष्ण मोहन श्रीमाली – धर्म, समाज एवं संस्कृति

(13) रमेन्द्र नाथ नंदी – प्राचीन भारत में धर्म के सामाजिक आधार

(14) राधाकुमुद मुखर्जी – हिन्दू सभ्यता

(15) बी.एन. लूणिया – प्राचीन भारतीय संस्कृति

(16) राजबली – सूफीवाद

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)

एम.ए.अंतिम, इतिहास तृतीय सेमेस्टर (M.A.Final- History ,Third Semester)

खण्ड–स, प्रश्न पत्र (वैकपिक 3) (Section- C,Paper optional- 3)

भारतीय संविधान और शासन व्यवस्था

(Indian Constitution and Administrative System)

इकाई –1

1.भारत की संविधान सभा का गठन
2.भारत का संविधान सभा की विभिन्न समितियॉ
3.भारतीय संविधान की प्रस्तावना
4.भारतीय संविधान की प्रमुख विशेषताएँ

ईकाई –**2**

5. भारतीय संविधान के स्रोत
6. मौलिक अधिकार एवं सवैधानिक उपचार
7. नीति निद्रेशक तत्व
8. मौलिक कर्तव्य

इकाई–3

9. राष्ट्रपति – निर्वाचन,शक्तियॉ एवं कर्तव्य
10.उपराष्ट्रपति निर्वाचन शक्तियॉ एवं कर्तव्य
11.प्रधानमंत्री एवं मंत्रिपरिषद तथा उनके कार्य
12.संसद का गठन – राज्य सभा एवं लोकसभा

इकाई–4

13.संविधान संशोधन प्रक्रिया एवं प्रमुख संशोधन
14.आपातकालीन उपबंध
15.महान्यायवादी
16.नियंत्रक एवं महालेखा परीक्षक

इकाई–5

17.सर्वोच्च न्यायालय
18.संघलोक सेवा आयोग, निर्वाचन आयोग
19 योजना आयोग एवं राष्ट्रीय विकास परिषद
20.वित्त आयोग

अनुशंषित पुस्तकें :–

- डी.डी. बसु – भारत का संविधान एक परिचय
- हिर मोहन जैन – भारतीय शासन और राजनीति
- सुशीला कौशिक – भारतीय शासन और राजनीति
- R.C.Agrawal – Indian Political System
- A.G.Noorani - Constitutional Questions in India
- A.S.Narang –Indian Goverment and Politics
- G.Austin - The Indian Constitution
- M.V.Paylee – An Introduction to the constitution of India
- सुभाष कश्यप – हमारा संविधान

सत्र 2018–19 (जुलाई 2018 से प्रारंभ)

एम.ए.अंतिम, इतिहास, तृतीय सेमेस्टर (M.A.Final History, Third Semester**)**

खण्ड–स, प्रश्न पत्र (वैकल्पिक–04) (Section- C, Paper - Optional -04)

पर्यटन सिद्धान्त (Tourism Theory) **(पेपर कोड–0387–I)** (Paper Code-0387-I)

इकाई – 1

1. पर्यटन का अर्थ एवं परिभाषा
2. पर्यटन की अवधारणा
3. पर्यटन का उद्देश्य एवं महत्व
4. पर्यटन के सिद्धान्त एवं व्यवहार

इकाई – 2

5. पर्यटन संगठन
6. भारतीय पर्यटन संगठन केन्द्रीय
7. प्रान्तीय पर्यटन विभाग
8. छत्तीसगढ़ पर्यटन विकास की योजनाएं

इकाई – 3

9. ट्रैवल एजेंसी – गठन
10. ट्रैवल एजेंसी – कार्य
11. पर्यटन एवं यातायात
12. टिकट एवं आरक्षण कार्य

इकाई – 4

13 पर्यटन विकास में संचार साधनो का योगदान

14. पर्यटन एवं आवास तथा होटल उद्योग, मुद्रा विनिमय
15. अंतर्राष्ट्रीय पर्यटन – पासपोर्ट, वीसा विदेशी संबंधी नियम
16. अंतर्राष्ट्रीय पर्यटन सुविधाएं एवं समस्याएं

इकाई – 5

17. पर्यटन एवं हस्तशिल्प उद्योग
18. पर्यटन एवं कला
19. पर्यटन एवं लोक संस्कृति
20. पर्यटन एवं मेले त्यौहार

संदर्भ ग्रंथ :

(1) जगमोहन नेगी – पर्यटन एवं यात्रा के सिद्धांत
(2) जगमोहन नगी – पर्यटन एवं मार्केटिंग तथा विकास
(3) के.के. दीक्षित – पर्यटन के विविध आयाम
(4) ताज राव – पर्यटन विकास के विविध आयाम
(5) ताज राव – पर्यटन का प्रभाव एवं प्रबंधन
(6) ए.के. भाटिया – टूरिज्म डेवलेपमेंट प्रिंसिपल एंड प्रैक्टिसेज
(7) राम आचार्य – टूरिज्म इन इंडिया

टीपः– इस प्रश्न पत्र में निर्णयानुसार **इकाई 2.8** छत्तीसगढ़ पर्यटन विकास की योजनाए तथा **इकाई 4.13** पर्यटन विकास में संचार साधनो का योगदान को जोड़ा गया है।

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)

एम.ए.अंतिम, इतिहास चतुर्थ सेमेस्टर (M.A. Final. History ,Fourth Semester)

(खंड– ब, मध्यकालीन भारत) (Section - B , Medieval India) **पंचम प्रश्न पत्र** (Paper – V)

मुगलकालीन भारतीय राजनय एवं अर्थव्यवस्था (1526 से 1750 ई. तक)

Indian Politiy and Economy in Mughal Period (1526-1750 A.D.)

(पेपर कोड–0380–II) (Paper Code-0380-II)

इकाई – 1

1. मुगलकालीन इतिहास के स्रोत
2. मुगलकालीन इतिहास लेखन – विभिन्न विचारधाराएं
3. मुगलकालीन राजनय – दैवीय अधिकार का सिद्धांत
4. मुगल शासकों की राजत्व नीति

इकाई – 2

5. मुगलकालीन केन्द्रीय प्रशासन
6. मुगलकालीन प्रांतीय प्रशासन विशेषताएं
7. मनसब एवं जागीर
8. शेरशाह का प्रशासन

इकाई – 3

9. मुगलकालीन दरबारी राजनीति एवं संघर्ष
10. मराठा इतिहास के स्रोत
11. मराठा राज्य की स्थापना एवं विकास
12. शिवाजी का प्रशासन

इकाई – 4

13. मुगलकालीन कृषि अर्थव्यवस्था एवं भू–राजस्व
14. मुगलकाल में शिल्प उद्योग
15. मुगलकालीन आंतरिक व्यापार
16. मुगलकालीन विदेशी व्यापार

इकाई – 5

17. मुगलकाल में नगरों का उदय–नगरीय प्रशासन
18. मुगलकालीन मुद्रा एवं बैकिंग
19. नए व्यापारिक वर्गों का उदय
20. मुगल काल में कृषि एवं उद्योग में तकनीकी परिवर्तन

संदर्भ ग्रंथ :

1. हरिशचन्द्र वर्मा – मध्यकालीन भारत – भाग 2
2. सर जदुनाथ सरकार – शिवाजी एंड हिज टाईम्स
3. ए.एल. श्रीवास्तव – मुगलकालीन भारत
4. बी.एन. लुनिया – मुगल साम्राज्य का उत्कर्ष
5. बी.के. पंजाबी – मध्यकालीन भारत का इतिहास
6. हेरम्ब चतुर्वेदी – मुगलकालीन इतिहासकार
7. हेरम्ब चतुर्वेदी – मुगलकालीन राजनय एवं अर्थव्यवस्था
8. पी.पी. सिन्हा – मध्यकालीन भारत

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)

एम.ए.अंतिम इतिहास, चतुर्थ सेमेस्टर (M.A. Final. History ,Fourth Semester)

(खंड– ब ,मध्यकालीन भारत) (Section – B,Medieval India) **षष्ठम प्रश्न पत्र** (Paper – VI)

मुगलकालीन भारतीय समाज एवं संस्कृति (1526 से 1750 ई. तक)

Society and Culture in Mughal Period (1526-1750 A.D.)

(पेपर कोड–0381–II**)** (Paper Code-0381-II)

इकाई – 1

1. मुगलकालीन हिन्दू समाज
2. मुगलकालीन मुस्लिम समाज
3. मुगलकालीन समाज में शासक वर्ग की भूमिका
4. मुगलकाल में स्त्रियों की दशा

इकाई – 2

5. मुगलकालीन स्थापत्यकला
6. मुगलकालीन क्षेत्रीय स्थापत्य कला
7. मुगलकालीन चित्रकला
8. क्षेत्रीय चित्रकला का विकास

इकाई – 3

9. फारसी भाषा एवं साहित्य का विकास
10. हिन्दी साहित्य का विकास
11. संस्कृत साहित्य का विकास
12. उर्दू भाषा एवं साहित्य का विकास

इकाई – 4

13. मुगलकाल में समन्वयवादी संस्कृति का विकास
14. मुगलकाल में संस्कृति के विकास में अकबर का योगदान
15. समन्वयवादी संस्कृति का विघटन और औरंगजेब
16. मुगलकाल में नृत्य एवं संगीतकला का विकास

इकाई – 5

17. मुगलकाल में धार्मिक आंदोलन
18. सामंती व्यवस्था का समाज पर प्रभाव
19. मराठा संस्कृति की विशेषताएं
20. मुगलकाल में ईसाई धर्म का आगमन

संदर्भ ग्रंथ :

1. आर्शीवादी लाल श्रीवास्तव – मध्यकालीन भारत
2. हरिशचन्द्र वर्मा – मध्यकालीन भारत – 2
3. बी.एन. लुनिया – मुगल साम्राज्य का उत्कर्ष
4. ए.एल. श्रीवास्तव – मध्यकालीन संस्कृति
5. दिनेश चन्द्र भारद्वाज – मध्यकालीन संस्कृति
6. पुरीदास एवं चोपड़ा – भारत का सामाजिक, सांस्कृतिक एवं आर्थिक इतिहास भाग – 2
7. एल.पी. शर्मा – मध्यकालीन भारत

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)

एम.ए.अंतिम इतिहास, चतुर्थ सेमेस्टर (M.A. Final. History, Fourth Semester)

(खंड–स, आधुनिक भारत) (Section – C, Modern India) **पंचम प्रश्न पत्र** (Paper – V)

आधुनिक भारत का राजनीतिक एवं प्रशासनिक इतिहास (1858 से 1964 ई. तक)

Political and Administrative History of Modern India (1858 -1964 A.D.)

(पेपर कोड–0382–II) (Paper Code-0382-II)

इकाई – 1

1. प्रशासनिक परिवर्तन – संवैधानिक सुधारों के संदर्भ में (1858–1892)
2. प्रशासनिक परिवर्तन – संवैधानिक सुधारों के संदर्भ में (1909–1919)
3. प्रशासनिक परिवर्तन – संवैधानिक सुधारों के संदर्भ में (1935–1947)
4. भारतीय गणतंत्र का संविधान

इकाई – 2

5. प्रशासनिक ढांचा – स्थानीय स्वाशासन के संदर्भ में
6. प्रशासनिक ढांचा – लोकसेवा के संदर्भ में
7. प्रशासनिक ढांचा – न्याय व्यवस्था के संदर्भ में
8. प्रशासनिक ढांचा – पुलिस प्रशासन के संदर्भ में

इकाई – 3

9. पड़ोसी राज्यों से संबंध – अफगानिस्तान एवं फारस के संदर्भ में
10. पड़ोसी राज्यों से संबंध – नेपाल एवं बर्मा के संदर्भ में
11. देशी रियासतों के साथ संबंध – नीतिगत विस्तार
12. रियासतों का भारतीय संघ में विलीनीकरण

इकाई – 4

13. भारतीय राष्ट्रवाद का उदय – अवधारणाएं एवं गतिविधियां
14. 1919 तक संगठित राष्ट्रवाद की प्रवृत्तियां
15. कृषक, श्रमिक एवं क्रांतिकारी आंदोलन
16. गांधीवादी आंदोलन – विचारधारा, स्वरूप एवं कार्यक्रम

इकाई – 5

17. साम्प्रदायिकता का उदय एवं विकास – मुस्लिम लीग की स्थापना तक
18. साम्प्रदायिकता का विकास – भारत विभाजन तक
19. स्वाधीनता की प्राप्ति
20. भारत की विदेश नीति – गुटनिरपेक्षता

संदर्भ ग्रंथ :

1. एल.पी.शर्मा – आधुनिक भारत
2. रजनी पाम दत्त – इंडिया टुडे
3. प्रताप सिंह – आधुनिक भारत का इतिहास
4. एम.एस. जैन – आधुनिक भारत
5. सुमित सरकार – आधुनिक भारत का इतिहास
6. बी.एल.ग्रोवर एवं यशपाल – आधुनिक भारत का इतिहास
7. एग्नेस ठाकुर – भारत का इतिहास 1757–1857
8. वीरकेश्वर प्रसाद सिंह – भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास
9. एस.आर. शर्मा – मेकिंग ऑफ मॉर्डन इंडिया
10. बी.बी. मिश्र – सेंट्रल एडमिनिस्ट्रेशन ऑफ ईस्ट इंडिया कंपनी
11. शेखर बंधोपाध्याय – प्लासी से विभाजन तक
12. विपन चन्द्र – आधुनिक भारत का इतिहास
13. बी.डी. महाजन – मार्डन इंडियन हिस्ट्री 1707 टू प्रजेन्ट डे
14. के.सी. चौधरी – हिस्ट्री ऑफ माडर्न इंडिया
15. कौलेश्वर राय – आधुनिक भारत 1757–1950

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)

एम.ए.अंतिम ,इतिहास चतुर्थ सेमेस्टर (M.A. Final.History, IV- Sem.)

(खंड–स,आधुनिक भारत) (Section–C,Modern India)**षष्ठम प्रश्न पत्र** (Paper – VI)

आधुनिक भारत का आर्थिक,सामाजिक एवं सांस्कृतिक इतिहास (1858 से 1964 ई.तक)

Economical, Social and Cultural History of Modern India (1858 A.D. to 1964 A.D.)

(पेपर कोड–0383–II) (Paper Code-0383-II)

इकाई – 1

1. ग्रामीण अर्थव्यवस्था – कृषि की स्थिति
2. ऋण ग्रस्तता एवं बेरोजगारी
3. शहरी अर्थव्यवस्था – औद्योगिकीकरण का विकास 1858–1947
4. वृहद पैमाने के उद्योग

इकाई – 2

5. औद्योगिक श्रम, श्रम संघों का विकास व श्रमिक आंदोलन
6. जनसंख्या
7. रेल्वे का विकास एवं भारतीय अर्थव्यवस्था
8. रेलपथ के सामाजिक, आर्थिक प्रभाव

इकाई – 3

9. भूमि सुधार – 1964 तक
10. नियोजित अर्थव्यवस्था–पंचवर्षीय योजनाएं
11. योजनाओं के आर्थिक परिणाम
12. आधुनिक उद्योगों की वृद्वि

इकाई – 4

13. आर्य समाज, प्रार्थना समाज
14. थियोसोफिकल सोसाइटी, रामकृष्ण मिशन
15. अलीगढ़ आंदोलन
16. निम्न जातीय आंदोलन, सिक्ख सुधार आंदोलन

इकाई – 5

17. ब्रिटिश शासन काल में नारी उत्थान के प्रयास
18. आधुनिक शिक्षा का विकास
19. समाचार पत्रों का विकास
20. स्वास्थ्य एवं विज्ञान – तकनीकी विकास

संदर्भ ग्रंथ :

1. बी.एल.ग्रोवर एवं यशपाल – आधुनिक भारत का इतिहास एक नवीन मूल्यांकन (1707–1969)
2. एल.पी.शर्मा – आधुनिक भारत
3. एस.आर.शर्मा – मेकिंग ऑफ मार्डन इंडिया
4. ए.आर.देसाई – भारतीय राष्ट्रवाद की सामाजिक पृष्ठभूमि
5. आर.सी. दत्त – इकोनामिक हिस्ट्री ऑफ इंडिया
6. विपिन चंद्र – भारतीय स्वतंत्रता संग्राम का इतिहास 1857–1947
7. विपिन चंद्र – आजादी के बाद भारत (1947–2000)
8. सुमित सरकार – आधुनिक भारत
9. एम.ए. जैन – आधुनिक भारत का इतिहास
10. प्रताप सिंह – आधुनिक भारत का सामाजिक आर्थिक इतिहास
11. प्रताप सिंह – आधुनिक भारत, 3 खंड
12. एग्नेस ठाकुर – भारत का आर्थिक इतिहास 1757–1950
13. पुरी दास ठाकुर – भारत का सामाजिक, आर्थिक एवं सांस्कृतिक इतिहास
14. अरूण भट्टाचार्य – हिस्ट्री ऑफ मार्डन इंडिया

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)
एम.ए.अंतिम इतिहास ,चतुर्थ सेमेस्टर (M.A. Final.History, Fourth Semester **)**

खण्ड –स, प्रश्न पत्र (वैकल्पिक –01) (Section – C, Paper- Optional - 01**)**

भारतीय राष्ट्रीय आंदोलन का इतिहास (1922 से 1947 ई. तक)

History of Indian National Movement (1922 to 1947 A.D.)

(पेपर कोड–0384–II**)** (Paper Code-0384-II)

इकाई – 1

1. स्वराज्य दल
2. साइमन कमीशन का विरोध एवं नेहरू रिपोर्ट
3. सविनय अवज्ञा के समय भारत की राजनीतिक स्थिति
4. सविनय अवज्ञा आंदोलन

इकाई – 2

5. गोलमेज सम्मेलन
6. पूना समझौता एवं श्वेत पत्र
7. प्रांतीय स्वायत्ता का क्रियान्वयन
8. राजनीतिक गतिरोध 1940–45

इकाई – 3

9. क्रांतिकारी आंदोलन द्वितीय चरण
10. भारतीय राजनीति में वामपंथी विचारधारा
11. कृषक एवं जनजातीय आंदोलन
12. श्रमिक आंदोलन

इकाई – 4

13. व्यक्तिगत सत्याग्रह
14. क्रिप्स मिशन
15. भारत छोड़ो आंदोलन
16. भारतीय राजनीति में गांधीजी का योगदान

इकाई – 5

17. भारत विभाजन की योजनाएं
18. केबिनेट मिशन एवं अंतरिम सरकार
19. सुभाष चंद्र बोस एवं आजाद हिन्द फौज
20. सांप्रदायिक राजनीति का विकास एवं भारत विभाजन

संदर्भ ग्रंथ :

1. बी.एल. ग्रोवर – आधुनिक भारत का नवीन मूल्यांकन
2. कौलेश्वर राय – आधुनिक भारत
3. सुमित सरकार – आधुनिक भारत
4. बिरकेश्वर प्रसाद सिंह – भारतीय राष्ट्रीय आंदोलन एवं संवैधानिक विकास
5. पुखराज जैन – भारत का स्वतंत्रता संग्राम एवं राजनैतिक विकास
6. डी.सी. गुप्ता – भारत का राष्ट्रीय आंदोलन
7. विपन श्रीवास्तव – भारतीय स्वतंत्रता संग्राम का इतिहास
8. योगेन्द्रा चंद्रा – हिस्ट्री ऑफ फ्रीडम मूवमेंट इन इंडिया
9. यशपाल एवं ग्रोवर – आधुनिक भारत
10. रामलखन शुक्ल – आधुनिक भारत का इतिहास

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)
एम.ए.अंतिम इतिहास चतुर्थ सेमेस्टर (M.A. Final.History, IV Sem.)
खण्ड–स,प्रश्न पत्र (वैकल्पिक–02) (Section –C,Paper Optional -02)
भारत का सांस्कृतिक इतिहास (1526 से 1950 ई. तक)
Cultural History of India (1526 A.D. to 1950 A.D.)
(पेपर कोड–0385–II) (Paper Code-0385-II)

इकाई – 1

1. भारतीय संस्कृति में अकबर का योगदान
2. मुगलकालीन समाज
3. मुगलकालीन स्थापत्य
4. मुगलकालीन चित्रकला

इकाई – 2

5. मुगलकालीन संगीतकला
6. मुगलकालीन साहित्य
7. दक्षिण भारतीय सांस्कृतिक जीवन
8. दक्षिण भारत की कला एवं स्थापत्यकला

इकाई – 3

9. यूरोपियों के आगमन का आर्थिक प्रभाव
10. भारतीय संस्कृति पर पाश्चात्य प्रभाव
11. भारतीय संस्कृति में ईसाई मिशनरियों का योगदान
12. यूरोपीय प्राच्यवादियों का भारतीय संस्कृति में योगदान

इकाई – 4

13. राजा राममोहन राय एवं ब्रम्ह समाज
14. आर्य समाज तथा थियोसोफिकल सोसाइटी
15. रामकृष्ण मिशन एवं विवेकानंद
16. मुस्लिम समाज सुधार आंदोलन

इकाई – 5

17. ब्रिटिश भारत में नारी की स्थिति – सामाजिक कुरीतियां
18. ब्रिटिश भारत में नारी सुधार के प्रयास
19. कंपनी शासन काल में शिक्षा का विकास 1857 तक
20. ब्रिटिश शासन काल में शिक्षा का विकास 1858 से 1947

टीपः–' इस प्रश्न पत्र में निर्णयानुसार **इकाई 2.6**. मुगलकालीन साहित्य को जोड़ा गया है।

संदर्भ ग्रंथ :

1. ए.एल. श्रीवास्तव – सल्तनतकालीन भारत
2. हरिशचन्द्र वर्मा – मध्यकालीन भारत – भाग – 1 एवं 2
3. राजबली पांडे – सूफीज्म
4. पं. सुन्दर लाल शर्मा – भारत में अंग्रेजी राज
5. डाडवेल – कैम्ब्रिज हिस्ट्री ऑफ इंडिया
6. रोमिला थापर – आधुनिक भारत का इतिहास
7. बी.एन. लुणिया – मुगल साम्राज्य का उत्कर्ष
8. शिवशंकर शर्मा – भारतीय संस्कृति
9. बी.एन. लुणिया – भारतीय संस्कृति
10. पुरी, दास, चोपड़ा – भारत का सामाजिक, आर्थिक सांस्कृतिक इतिहास, खंड 2, 3।

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)
एम.ए.अंतिम इतिहास, चतुर्थ सेमेस्टर (M.A. Final.History, Fourth Semester)
खण्ड–स,प्रश्न पत्र (वैकल्पिक –03)(Section –C, Paper- Optional -03)
भारत की केन्द्रीय तथा प्रांतीय शासन व्यवस्था
Central and Provincial Administrative System of India
(पेपर कोड–0386–II A) (Paper Code-0386-II A)

इकाई– 1

1. लोकपाल
2. भाषाएं एवं राजभाषा आयोग
3. राष्ट्रीय अनुसूचित जाति एवं जनजाति आयोग
4. सूचना आयोग एवं सूचना का अधिकार

इकाई–2

5. राज्यपाल – नियुक्ति ,शर्ते एवं शक्तियां
6. मुख्यमंत्री एवं मंत्रिपरिषद तथा उनके कार्य
7. विधान परिषद एवं विधान सभा
8. संघ राज्य क्षेत्र

इकाई–3

9. उच्च न्यायालय
10. अधीनस्थ न्यायालय
11. महाधिवक्ता
12. राज्य लोक सेवा आयोग

इकाई–4

13. नौकर शाही का विकास
14. पंचायती राज संस्थाएं
15. नगरीय स्वायत्त शासन व्यवस्था
16. शासन में दबाव समूह

इकाई –5

17. राज्य के मुख्य सचिव एवं उनकी प्रशासन में भूमिका
18. राज्य में कानून व्यवस्था एवं पुलिस प्रशासन
19. संभाग एवं संभागायुक्त, उनके कार्य तथा शक्तियां
20. जिला एवं जिला दंडाधिकारी, उनके कार्य तथा शाक्तियां

अनुशंषित पुस्तकें :–

- डी.डी. बसु – भारत का संविधान एक परिचय
- हिर मोहन जैन – भारतीय शासन और राजनीति
- सुशीला कौशिक – भारतीय शासन और राजनीति
- R.C.Agrawal – Indian Political System
- A.G.Noorani - Constitutional Questions in India
- A.S.Narang –Indian Goverment and politics
- G.Austin - The Indian Constitution
- M.V.Paylee – An Introduction to the constitution of India.
- सुभाष कश्यप – हमारा संविधान

सत्र 2018–19 (जनवरी 2019 से प्रारंभ)

एम.ए.अंतिम इतिहास, चतुर्थ सेमेस्टर (M.A. Final.History, Fourth- Semester)

खण्ड–स,प्रश्न पत्र (वैकल्पिक–04) (Section–C,Paper Optional -04)

पर्यटन सिद्धान्त एवं व्यवहार इतिहास के संदर्भ में

Tourism Theory and Principles In Reference of History

(पेपर कोड–0387–II) (Paper Code-0387-II)

इकाई – 1

1. पर्यटन का इतिहास से संबंध
2. पर्यटन का संस्कृति से संबंध
3. पर्यटन विकास के कारक
4. पर्यटन और पर्यावरण

इकाई – 2

5. पर्यटन उद्योग एवं विपणन
6. विश्व के प्रसिद्व प्राचीन धरोहर–मिश्र के पिरामिड ,चीन की दीवार
7. विश्व के प्रमुख धार्मिक पर्यटन केन्द्र–अंकोरवाट,बोरोबुदर ,जेरूसलम,मक्का मदीना
8. विश्व के प्राचीन शिक्षा केन्द्र–तक्षशिला ,नालंदा,एथेन्स

इकाई – 3

9. पर्यटन में राष्ट्रीय उद्यानों का महत्व
10. भारत में प्रमुख राष्ट्रीय उद्यान
11. उत्तर भारत के धार्मिक पर्यटन स्थल –केदारनाथ,अमृतसर,बोधगया,माउंटआबू
12. दक्षिण भारत के धार्मिक पर्यटन स्थल –तिरूपति,मदुरै,,रामेश्वरम,कांचीपुरम

इकाई – 4

13. उत्तर भारत के प्रमुख ऐतिहासिक पर्यटन स्थल
14. दक्षिण भारत के प्रमुख ऐतिहासिक पर्यटन स्थल
15. पूर्वी भारत के प्रमुख ऐतिहासिक पर्यटन स्थल
16. पश्चिमी भारत के प्रमुख ऐतिहासिक पर्यटन स्थल

इकाई – 5

17. छत्तीसगढ़ के प्रमुख ऐतिहासिक पर्यटन स्थल
18. छत्तीसगढ़ के प्रमुख धार्मिक पर्यटन स्थल
19. छत्तीसगढ़ के प्रमुख प्राकृतिक पर्यटन स्थल
20. छत्तीसगढ़ में पर्यटन की सुविधाएं एवं समस्याएं

टीप:– इस प्रश्न पत्र के **इकाई 2.6** विश्व के प्रसिद्व प्राचीन धरोहर–मिश्र के पिरामिड, चीन की दीवार **इकाई 2.7** विश्व के प्रमुख धार्मिक पर्यटन केन्द्र–अंकोरवाट ,बोरोबुदर ,जेरूसलम,मक्का मदीना
इकाई 2.8 विश्व के प्राचीन शिक्षा केन्द्र–तक्षशिला ,नालंदा,एथेन्स
इकाई 3.11 उत्तर भारत के धार्मिक पर्यटन स्थल –केदारनाथ,अमृतसर,बोधगया,माउंटआबू
इकाई 3.12 दक्षिण भारत के धार्मिक पर्यटन स्थल –तिरूपति, मदुरै,,रामेश्वरम, कांचीपुरम
को निर्णयानुसार जोड़ा गया है।

संदर्भ ग्रंथ :

1. जगमोहन नेगी – राष्ट्रीय संस्कृति, संपदा, सांस्कृतिक पर्यटन एवं पर्यावरण
2. रामआचार्य – टूरिज्म एंड कल्चरल हेरीटेज ऑफ इंडिया
3. ताज रावत – पर्यटन का प्रभाव एवं प्रबंधन
4. शिवाकांत बाजपेयी – सिरपुर – पुरातत्व एवं पर्यटन
5. पर्यटन विभाग – भारत शासन एवं छत्तीसगढ़ शासन द्वारा प्रकाशित सामग्री

पाठ्यक्रम
एम.फिल इतिहास
सत्र – 2017–18

प्रश्न पत्र Paper	प्रश्न पत्र का नाम Name of Paper	अंकों का विभाजन Allotment of Marks
प्रथम I	शोध प्रविधि Research Methodology	100
द्वितीय II	इतिहास दर्शन तथा लेखन Philosophy of History and Historiography	100
तृतीय III	भारतीय इतिहास के स्रोत Sources of Indian History	100
योग (Total)		**300**
चतुर्थ IV	सेमिनार Seminar (Best out of two)	50
पंचम V	लघु शोध प्रबंध लेखन Dissertation (i) (Seminar based on dissertation) - (50) (ii) Dissertation (Script) - (200) including Viva-Voce	250
योग (Total)		300
सकल योग (Grand Total)		600

पाठ्यक्रम
एम.फिल इतिहास
प्रथम–प्रश्न पत्र – शोध प्रविधि
सत्र 2017–18

इकाई – 1

1. शोध का अर्थ, उद्देश्य एवं महत्व
2. शोध प्रारूप (Synopsis) निर्माण के चरण, शोध विषय का चयन, संबंधित साहित्य का पुनरावलोकन
3. परिकल्पना निर्माण – परिकल्पना का अर्थ उद्देश्य एवं प्रकार
4. शोध विधि का चयन – अध्यायीकरण, संदर्भ ग्रंथ सूची

इकाई – 2

5. अवलोकन – अर्थ, महत्व, प्रकार
6. ऐतिहासिक स्थल अवलोकन – शिलालेख, स्मारक
7. ऐतिहासिक दस्तावेज अवलोकन – पांडुलिपि, प्रकाशित सामग्री
8. ऐतिहासिक दस्तावेज अवलोकन – शासकीय, अशासकीय सामग्री

इकाई – 3

9. समाजशास्त्रीय अवलोकन – अर्थ, उद्देश्य एवं महत्व उपकरण
10. समाजशास्त्रीय अवलोकन – समूह अवलोकन, बाह्य एवं आंतरिक अवलोकन
11. निदर्शन सैम्पल – प्रकार एवं तकनीक
12. प्रश्नावली – प्रश्नों का निर्माण, प्रकार एवं सत्यापन

इकाई – 4

13. साक्षात्कार – उद्देश्य, उपकरण, महत्व
14. साक्षात्कार – वर्गीकरण, तकनीक, समस्याएं
15. सांख्यिकी विश्लेषण का महत्व एवं सीमाएं और कम्प्युटर का प्रयोग
16. स्रोतों का प्रतिपरीक्षण तथा व्याख्या

इकाई – 5

17. निष्कर्ष की प्राप्ति एवं परिकल्पना परीक्षण
18. शोध प्रबंध लेखन – प्रविधि, समस्याएं
19. उद्धरण, पाद टिप्पणियां, संदर्भ ग्रंथ सूची
20. शोध पत्र लेखन, प्रतिवेदन लेखन, पुस्तक समीक्षा लेखन

संदर्भ ग्रंथ :

1. पारसनाथ राय – अनुसंधान परिचय
2. एम.आर. बाजपेयी – सामाजिक अनुसंधान तथा सर्वेक्षण
3. सुनील गोयल एवं संगीता – सामाजिक अनुसंधान के मूल तत्व
4. रविन्द्रनाथ मुखर्जी – सामाजिक शोध स सांख्यिकी
5. धर्मवीर महाजन एवं कमलेश महाजन – सामाजिक अनुसंधान की पद्धतियां
6. कौलेश्वर राय – इतिहास दर्शन
7. के.एल. खुराना एवं आर.के बंसल – इतिहास लेखन धारणाएं एवं पद्धति
8. सुरेन्द्र शर्मा – रिसर्च मेथोडोलॉजी
9. डॉ. आभापाल एवं डिश्वरनाथ खुटे – सामाजिक विज्ञान की शोध प्रविधियां
10. Satish K. Bajaj - Research Methodology in History

* * *

पाठ्यक्रम
एम.फिल इतिहास
द्वितीय–प्रश्न पत्र – इतिहास दर्शन तथा लेखन
सत्र 2017–18

इकाई – 1

1. इतिहास का अर्थ तथा स्वरूप
2. इतिहास का उद्देश्य तथा महत्व
3. इतिहास के उपकरण
4. इतिहास और तथ्य

इकाई – 2

5. मिश्र की सभ्यता – समाज एवं संस्कृति
6. यूनानी सभ्यता – समाज एवं संस्कृति
7. रोम की सभ्यता – समाज एवं संस्कृति
8. चीन की सभ्यता – समाज एवं संस्कृति

इकाई – 3

9. प्राचीन यूनानी एवं रोमन इतिहास लेखन
10. मध्यकालीन यूरोप में इतिहास लेखन – ईसाईयत का प्रभाव
11. पुनर्जागरण कालीन यूरोप में इतिहास लेखन मानववाद
12. प्रबुद्धतावादी, रोमान्तकवादी इतिहास लेखन

इकाई – 4

13. आधुनिक काल में यूरोप में इतिहास लेखन इतिहासवाद
14. एनालेस विचारधारा एवं लेखन
15. उत्तर आधुनिकतावादी इतिहास लेखन
16. उत्तर आधुनिकतावादी की आलोचना

इकाई – 5

17. आधुनिक भारत में इतिहास लेखन – जनवादी इतिहास लेखन
18. आधुनिक भारत में इतिहास लेखन – दक्षिण पंथी इतिहास लेखन
19. राष्ट्रवाद और राष्ट्रीय आंदोलन पर इतिहास लेखन
20. सम्प्रदायवाद पर इतिहास लेखन

संदर्भ ग्रंथ :

1. एस.एल. नागोरी – विश्व की प्राचीन सभ्यताएं
2. ई. श्रीधरन – इतिहास लेख एक पाठ्य पुस्तक 500 ई.पू. से 2000 तक
3. E. Sreedharan - A Text Book of Historiography
4. E.H. Car - What is History
5. Satish K. Bajaj - Research Trends In Historiography
6. प्रो. राधेशरण – इतिहास और इतिहास लेखन
7. अरविंद मोहन – इतिहास कथा
8. कौलेश्वर राय – इतिहास दर्शन
9. ब्रजेश कुमार श्रीवास्तव – इतिहास लेखन अवधारणा विधाएं एवं साधन
10. झारखण्डे चौबे – इतिहास दर्शन
11. बुद्ध प्रकाश – इतिहास चक्र
12. परमानंद सिंह – इतिहास दर्शन
13. एस.के. माथुर एवं डी.सी. त्रिपाठी – इतिहास लेखन की अवधारणा एवं आधुनिक विचारधाराएं
14. मानिक लाल गुप्त – इतिहास लेखन, धारणाएं एवं पद्धतियां

* * *

पाठ्यक्रम
एम.फिल इतिहास
तृतीय–प्रश्न पत्र – भारतीय इतिहास के स्रोत
सत्र 2017–18

इकाई – 1 प्राचीन भारतीय इतिहास के स्रोत

1. पुरातात्विक स्रोत – अभिलेख, सिक्के
2. पुरातात्विक स्रोत – स्मारक, मृदभांड
3. साहित्यिक स्रोत –धर्म साहित्य – वेद, पुराण, ब्राम्हण ग्रंथ, बौद्ध एवं जैन साहित्य
4. साहित्यिक स्रोत – यात्रा वृत्तांत, ऐतिहासिक स्रोत कौटिल्य, कल्हण

इकाई – 2 मध्यकालीन भारतीय इतिहास के स्रोत एवं विशेषताएं

5. दिल्ली सल्तनत दरबारी इतिहासकार – मिन्हाज उस सिराज, जियाउद्दीन बरनी
6. मुगल काल दरबारी इतिहासकार एवं विशेषताएं – अबुल फजल, अब्दुल हमीद लाहौरी
7. मध्यकाल के अन्य इतिहासकार एवं विशेषताएं – इब्नबतूता, अमीर खुसरो
8. मध्यकालीन शासक इतिहासकार – बाबर, जहांगीर

इकाई – 3 आधुनिक भारत के इतिहास के स्रोत

9. शासकीय दस्तावेज अभिलेखागारीय सामग्री – राष्ट्रीय आंदोलन संबंधी प्रपत्र एआईसीसी पेपर्स
10. अशासकीय सामग्री – पत्र, डायरियां
11. समाचार पत्र
12. आत्मकथा एवं जीवनियां, महात्मा गांधी की आत्मकथा

इकाई – 4 छत्तीसगढ़ के इतिहास जानने के स्रोत

13. पुरातात्विक स्रोत – अभिलेख सिक्के, स्मारक
14. लिखित ऐतिहासिक स्रोत – शासकीय दस्तावेज
15. लिखित ऐतिहासिक स्रोत – पांडुलिपि एवं अशासकीय स्रोत
16. लोक साहित्य एवं लोककला, लोकनृत्य, लोकगीत, लोककथा

इकाई – 5 अभिलेखागार

17. अभिलेखागार अर्थ एवं परिभाषा
18. भारत में अभिलेखागार का उद्भव एवं विकास
19. अभिलेखागार की कार्यशैली
20. अभिलेखागार का महत्व

संदर्भ ग्रंथ :

1. निहारिका – प्राचीन भारत पुरातत्व अभिलेख एवं मुद्राएं
2. रणजीत सिंह सैनी – अभिलेख मंजूषा
3. संतोष कुमार वाजपेयी – अभिलेखा शास्त्र एवं मुद्राशास्त्र के मूल तत्व
4. श्याम शर्मा – प्राचीन भारत, वास्तुकला एवं मूर्तिकला
5. राधाकुमुद मुकर्जी – भारत की संस्कृति एवं कला
6. रतन लाल मिश्र – समारकों का इतिहास एवं स्थापत्य कला
7. ओम प्रकाश पांडेय – वैदिक साहित्य एवं संस्कृति का स्वरूप
8. डॉ. राधेशरण – प्राचीन भारत का राजनैतिक सांस्कृतिक इतिहास
9. हबीब एवं निजामी – दिल्ली सल्तनत
10. हेरम्ब चतुर्वेदी – मध्यकालीन इतिहासकार
11. कल्हण – राजतरंगिणी
12. कौटिल्य – अर्थशास्त्र
13. कृष्णदेव उपाध्याय – लोक साहित्य की भूमिका
14. डॉ. शकुन्तला वर्मा – छत्तीसगढ़ लोक जीवन और लोक साहित्य का अध्ययन
15. वर्मा भगवान सिंह – छत्तीसगढ़ का इतिहास प्रारंभ से 1947
16. विपिन चंद्र – आधुनिक भारत
17. यशपाल, ग्रोवर – आधुनिक भारत का इतिहास

* * *

SCHOOL OF STUDIES IN HISTORY

Pt. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

COURSE WORK FOR Ph. D. IN HISTORY

Effective from 2011

Session - 2017-18

S.N.	PAPERS	MARKS
1	Methodological aspect of Research in History	100
2	Practical a. Review of related (Maks - 20) b. Seminar : (Marks - 20) c. Project Report/Dissertation (External - 40) & (Internal - 20)	100
TOTAL MARKS		**200**

Paper - I

Methodological Aspects of Research in History

M.M. - 100

UNIT - I

1. Research - Meaning, aims and importance
2. Stages of synopsis preparation-selection of topic, Review of related Literature.
3. Hypothesis formation-meaning, aims, kind.
4. Selection of Research methodology, chapterization, Bibliography.

UNIT - II

5. Observation-meaning, importance, kind
6. Historical field observation-inscriptions, monuments,
7. Historical Documents Observation-Primary source-Manuscripts, Published matters (Government and Non Government), Letters.
8. Historical documents observation-Secondary source books, Research papers, News papers

UNIT - III

9. Sociological observation-meaning, aims, importance.
10. Sociological observation-equipments, process, kinds.
11. Sample-kinds, technique.
12. Questionnaire-preparation of questions, kinds, verification

UNIT - IV

13. Interview-meaning, aims, importance, equipments.
14. Interview-classification, technique, problems
15. Statistical tools and analysis.
16. Computer application-Data entry and commands for .....

UNIT - V

17. Cross examination of sources and Interpretation.
18. Stoges of thesis writing- Test of Hypothesis, corelasion.
19. Quotations, Footnotes, References, Bibliography.
20. Writing of Research Paper, Project Report and Book Review.

Paper - II (Practical) **M.M.- 100**

Part I : Review of Related Literature **(M-20)**

The candidate shall review minimum 20 research articles of a broad research area from referred journals of the discipline. After reviewing the research articles the candidate shall submit a summary chronologically developing the arguments to the Department within two months from the beginning of the Course. One the basis of the review of literature the candidate shall prepare a synopsis including.

i. Research
ii. Review of Literature
iii. Gaps in earlier Studies
iv. Statement of Problem.
v. Objectives
vi. Hypotheses
vii. Methodology
viii. Plan of the Study

Part - II - Seminar **(Marks - 20)**

The candidate shall present a seminar on the synopsis. On the basis of the suggestions made in the seminar, the candidate shall prepare a project report/dissertation. Final examination will be conducted with the help of an external examiner in the presence of the internal examiner.

PT. RAVISHANKAR SHUKLA UNIVERSITY RAIPUR, CHHATTISGARH

FACULTY OF LAW(ORDINANCE No. 179)

ORDINANCE, SCHEME OF EXAM AND SYLLABUS

OF

B.A.LL.B.

(FIVE YEAR INTEGRATED DEGREE COURSE)

SEMESTER SYSTEM EXAMINATION

2017-18

PUBLISHED
BY

SCHOOL OF P.G. STUDIES AND RESEARCH IN LAW

FOR

REGISTRAR

PT. RAVISHANKAR SHUKLA UNIVERSITY RAIPUR, CHHATTISGARH

Pt. Ravishankar Shukla University Raipur, Chhattisgarh

Revised ordinance No.179
B.A.LL.B. FIVE YEARS INTEGRATED DEGREE COURSE
(Semester System)

1. The whole period of this integrated B.A.LL.B course divided into five academic years/ classes known as B.A.LL.B Semester first, second, third, fourth, fifth, sixth, seventh, eight, ninth and tenth semesters respectively. Every year /class is divided into Two Semesters WINTER and SUMMER Semesters. The examination of winter semester of all the classes will be called as WINTER TERM EXAMINATION and the other one would be known as SUMMER TERM EXAMINATION. In other words the course is extended into TEN SEMESTERS. The winter semesters are known as ODD semesters (I, III, V, VII , IX) while the summer semesters are known as EVEN semesters (II, IV, VI, VIII , X).

2. The details syllabus/ course of studies for each semester/ academic year and marking scheme for examination, etc. for this course shall be framed and approved by the Board of Studies and Law faculty duly constituted in accordance with the provision of the University Statute and Act. The syllabus forming bodies can amend/ modify the syllabus if needed in the light of BCI norms, time to time.

3. The semester academic schedule shall be framed by the University authorities according to the guidelines of BCI, and may be changed if needed.

The general schedule * will be as follows for this course—

S.No.	ACTIVITY	ODD SEMESTERS I, III, V, VII, IX	EVEN SEMESTER II, IV, VI, VIII, X
		DATE	DATE
1	Admission Process	June 16 – July 15	- - - - - - -
2	Commencement of the classes	July 16	January 1
3	Meeting of Examination Committed 1	August 1-4	January 15-30
4	Name of the Practical Examination (External)	September 1-10	February 20-28

	should be informed to Head of S.O.S		
5	Completion of Theory course	November-1	April-1
6	Practical Examination	November 1-10	April 1-10
7	Preparation leave	November11-15	April 11-15
8	Theory Examinations	November16-30	April 16-30
9	Declaration of Result/ Semester Break	(Winter Term Exam.)December 1-31	(Summer Term Exam.) May 1-June 15

* This is a general schedule; the activities may be fluctuated in avoidable circumstances.

1. Respective sections (Examination and Confidential) the university will act accordingly.
2. The Practical examination date will be confident by HOD/ Principal as the case may be.

4. An applicant who has passed & successfully completed Senior secondary school certificate course in 10+2 system or equivalent (such as 11+1, 'A' level in senior school leaving certificate) course recognized by the university or passed Higher Secondary School Examination of Chhattisgarh Board of Higher Secondary Examination, Raipur with at least 45% of the total marks in case of General category and 40% of the total marks in the case of SC and ST in any stream and also fulfilled the other institutional and State Government criteria shall be eligible for a admission in B.A.LL.B First Semester. The procedure for this admission shall be announced by the University administration every year.

5. Subject to the condition stipulated by a University on this behalf and the high degree of professional commitment required the maximum age for seeking admission in this course is limited to twenty years in case of General category of applicant and twenty two years in case of applicants for SC/ST and Other Backwards communities on the 1st day of July every year.

6. If any applicant who fulfill the requirements of clause 4 and 5 and other processes relating to admission and he/she has got admitted in First semester and has prosecuted regular course of prescribed study for that semester session in the University School of Law or in an affiliated College to the University shall be eligible to appear at the B.A.LL.B First semester WINTER TERM EXAMINAITON.

7. (i) There will be a full examination at the end of each semester consisting of theory paper and practical examination.
(ii) A candidate who fails to secure minimum pass mark in any subject may improve the same at the next semester examination (ATKT)

(iii) There will be no supplementary examination

(iv) Standard of passing:

a. Minimum 36% marks in individual paper.
b. There shall be 48% marks in aggregate in each semester examination.
c. A candidate who has secured minimum passing marks in all the papers but could not obtain 48% marks, such candidate shall be given option to select two papers of the concern semester to makeup to the short fall of the 48% aggregate of each semester.

(v) A Candidate who has been admitted B.A.L.L.B. 1st Semester will be promoted in higher semester in accordance with following sub rules.

a. A candidate shall not be admitted in the fifth or higher Semester Classes unless he/she has fully passed/cleared in first and second semester examination(passed in individual paper and 48% aggregate), likewise candidate shall not be admitted to seventh or higher semester clear unless he/she fully passed/cleared the first four semester examination(passed in individual paper and 48% aggregate and similarly candidate shall not be admitted in the 9th or higher semester classes unless he/she fully passed/cleared the first six semester examination(passed in individual paper and 48% aggregate).
b. For the promotion to the higher semester the sequence shall be adhered to.

c. No Candidate will be awarded degree of B.A.L.L.B. unless he/she passed all the 10th semester examination. If any previous semester, paper remains as backlog to be cleared by him/her the result will be withheld till he/she passed the backlog.

A successful candidate shall be awarded division on the basis of marks obtained by him/her in all ten semester examination taken together. Those who secure 60% or more shall be placed in 1st division. All other successful candidates shall be placed in 2nd division.

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8. (a) No Candidate shall be permitted to appear for any of the B.A.LL.B. Semester examination unless he has attended at least 75% of the total number of lectures, Practical works and Seminars held during the Semester Session. The Vice Chancellor may condone 15% of attendance on the recommendation of Head of S.O.S /Principal in genuine cases.

(b) Every student of the College/University Teaching Department Seeking admission to the semester examination shall submit through the principal or Head of the Department as the case may be, application on prescribed form together with necessary fees. The student shall be permitted to appear in the examination if he fulfills other condition of ordinance/statutes of University relating to the examination.

9. In order to declare successful at any of the B.A.LL.B. Semester Examination every Candidate will have to obtain at least 36% marks in individual papers and at least 48% marks in aggregate.

   A successful candidate shall be assigned division on the basis of the marks obtained by him/her in all the ten semester examinations taken together. Those who secure 60% marks or more shall be placed in the FIRST DIVISION. All other successful Candidate shall be placed in the SECOND DIVISION.

10. The provision of revaluation will not be available; however a student may apply for re-totaling.

11. The conditions / stipulations of above ordinance will be subject to rules and regulations made or modified by the Bar Council of India in respect of Rules of Legal Education as framed and amended from time to time.

12. The provisions of Ordinances 5 and 6 shall be applicable only to the extent that they are not inconsistent with the provision of this Ordinance.

13. The Executive Council shall publish the results of the examination as soon as possible for it.

14. After passing all the Five Year semester examinations, the candidate shall be eligible for the degree of B.A. LL.B. Five Year Integrated Degree Course, if permitted by the executive council.

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

FIRST SEMESTER
(July to December)

S.No	Papers	Max. Marks
1	English-I	100
2	Sociology	100
3	History	100
4	Legal History of India (1600-1887)	100
Total Marks		**400**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

SECOND SEMESTER
(Jan to June)

S.No	Papers	Max. Marks
1	English-II	100
2	Economics	100
3	Political Science-I	100
4	Constitutional History of India (1858-1950)	100
Total Marks		**400**

B.A LL.B (SEMESTER SYSTEM) (2017-18)

THIRD SEMESTER

(July to December)

S. No	Papers	Max. Marks
1	Political Science – II(Major)	100
2	History – II (Minor)	100
3	Economics – II (Minor)	100
4	Contract-I (General Principal of Contract)and Specific Relief	100
Total Marks		**400**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

FOURTH SEMESTER

(Jan to June)

S. No	Papers	Max Marks
1	Political Science – III (Major)	100
2	Sociology – II (Minor)	100
3	Political Science – IV (Major)	100
4	Contract - II (Specific Contract) Sale of Goods and Partnership Act	100
Total Marks		**400**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

FIFTH SEMESTER

(July to December)

S.No	Papers	Max. Marks
1	Jurisprudence and Legal Theory	100
2	Law of Torts including Motor Vehicle Act and Consumer Protection Laws	100
3	Law of Crimes –I (I.P.C.)	100
4	Law of Crimes –II (Criminal Procedure Code , Juvenile Justice Act & Probation of Offenders Act)	100
Total Marks		**400**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

SIXTH SEMESTER

(Jan to June)

S.No	Papers	Max. Marks
1	Law of Evidence	100
2	Constitutional law -I	100
3	Constitutional law -II	100
4	Environmental law including Wild Life Protection and Animal Welfare	100
Total Marks		**400**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)
SEVENTH SEMESTER
(July to December)

S.No	Papers	Max. Marks
1	Family Law-I Hindu law	100
2	Family Law-II Muslim law	100
3	Administrative Law & Right to Information Act	100
4 5	Law of Equity and Indian Trust Act,1882 (Practicals) : Professional Ethics and Professional Accounting System.	100
Total Marks		**500**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)
EIGHTH SEMESTER
(Jan to June)

S.No	Papers	Max. Marks
1	Labour and Industrial Law-I	100
2	Labour and Industrial Law-II	100
3	Human Rights and Public International Law	100
4	Insurance Law	100
5	(Practicals) : Alternative Disputes Resolution	100
Total Marks		**500**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

NINTH SEMESTER

(July to December)

S.No	Papers	Max. Marks
1	C.G. Land Revenue Code and Other local laws	100
2	Intellectual Property Law	100
3	Company Law	100
4 5	Law of Taxation (Practical): Moot Court exercised and Internship	100
Total Marks		**500**

B.A.LL.B. (SEMESTER SYSTEM) - Session (2017-18)

TENTH SEMESTER

(Jan to June)

S.No	Papers	Max. Marks
1	Transfer of Property Act and Easement Act	100
2	Civil Procedure Code and Limitation Act	100
3	Interpretation of Statutes and Principles of Legislation	100
4	Criminology and Penology	100
5	(Practical): Drafting, Pleading and Conveyancing	100
Total Marks		**500**

SYLLABUS FOR B.A.LL.B SEMESTER-I

PAPER-I-

ENGLISH-I-GENERAL ENGLISH

UNIT-I GRAMMER AND USAGES :

(a) Tense Sequence - Tense & Concord.

(b) Noun modifier (determiners propositional phrases and clauses).

(c) Active and Passive.

(d) Basic language skill - The ability to fill up blanks correct errors, choose correct form out of alternative choice, Join clauses.

UNIT-II SENTENCES AND ITS BASIC TRANSFORMATION :

(a) Basic transformation - Passive, Negatives, questions, conditional

(b) Reported Speeches Including Part of speeches

(c) Question tags and short responses.

UNIT-III VOCABULARY (COMMUNICATIONS SKILLS) :

(a) English legal terms relevant the subject/paper

(b) Use of legal terms and idiomatic expression.

(c) Use of language as a tool to express communicative functions, such as seeking and imparting information-expressing attitudes - intellectual and emotional , persuasion and discussion.

(d) Common error in English.

UNIT-IV COMPREHENSION SKILL :

(a) Reading comprehension (Principles and Practice) of unseen passage

(b) Listening comprehension

UNIT-V COMPOSITION SKILL :

(a) Paragraph writing

(b) Formal correspondence

(c) Note taking

(d) Translation from regional language into English and vice-versa.

RECOMMENDED READING MATERIAL

1. F.T. WOOD - REMEDIAL ENGLISH GRAMMER FOR FOREIGN STUDENT (MAC-MILLAN)(1975).
2. ISTIAQUE ABIDI - LAW AND LANGUAGE - (UNIVERSITY PUBLISHER-ALIGARH)(1978)
3. COLLINS -LEGAL DICTIONARY (UNIVERSAL BOOK STALL, 3 ANSARI ROAD), NEW DELHI.
4. W.STANNARD ALLEN -LIVING ENGLISH STRUCTURE (OXFORD)
5. M.K. GANDHI - THE LAW AND THE LAWERS (NAVJIVAN PUBLISHERS AHMADABAD)
6. DENNING -DUE PROCESS OF LAW (BUTTER WORTH LONDON)
7. M.C. CHAGLA - ROSES IN DECEMBER (BHARTIYA VIDYA BHAWAN, BOMBAY)
8. VIDHI SAHITYA PRAKASHAN- MINISTRY OF LAW NEW DELHI-HINDI-ENGLISH GLOSSORY
9. SUNITA SHARMA - A TEXT BOOK OF ENGLISH GRAMMER COMPOSITION AND TRANSLATION (VIKAS)
10. GARNER BRYAN - A DICTIONARY OF MODERN LEGAL USAGES (OUPANSARI ROAD DARIYAGANJ, NEW DELHI)
11. SCHEDULED MATERIAL DRAWN FROM RENOUNED JUDGEMENT.
12. BHASHARAN & HORSBURGH - STRANGTHEN YOUR ENGLISH (OUP - 1973)
13. B.K. DAS AND DAVID - A REMEDIAL COURSE IN ENGLISH FOR COLLEGES (BOOK I & II)
14. M.L. TIKKOO & SUBRAMANIAM - USAGES AND COMPOSITION (LONGMAN)
15. PROF. V.S. ELIZABETH - GENERAL ENGLISH
16. R.K. JAIN - PROFESSION IN ENGLISH

PAPER - II

SOCIOLOGY

UNIT-I

(a) Sociology as a science and its concepts- its meaning definition and Origin and importance.

(b) Basic concepts in Sociology - Society community group associations, value and norms.

(c) Major concepts social structure and organization.

(d) Social Institutions Marriage, Family kinship and economic, institution, Power and Political Institutions, Religious Institutions.

UNIT-II

(a) The Human personality - Society and Heredity interrelation. Durkhim;s Theory of Suicide.

(b) Socialization - concept, stages, agencies and Theories, Development of self and personality, Social stratification backward classes, Marx's concept of class struggle.

UNIT-III

(a) Anomic Deviance and Social Structure.

(b) Social Control - Concepts forms and agencies Formal and informal social order and stability, control.

UNIT-IV

(a) Social Process - Association and disassociate social process, its concepts and classification, Durkhim's Theory of Social Solidarity.

(b) Social Change, Concepts and Characteristics and Trend, Factors of social changes - Cultural Technological and Economic.

(c) Cultural Change, Trend in Indian Cultural values & development.

UNIT-V

(a) Law and Society - Social factors and legal system.

(b) Sociology of Law and Legal profession.

RECOMMENDED READING MATERIAL :

1. PELER WESSELEY - INTRODUCTION SOCIOLOGY (HERMOND-WORTH PENGUINE BOOK 1971)
2. N.K. BOSE - THE STRUCTURE OF HINDU SOCIETY (ORIENT LONGMAN-1975)
3. ROMESH THAPPER (ED)-TRIBE, CASTE, RELIGION AND INDIA (MACMILLAN) 1977.
4. MACIVER & PASE - SOCIETY.
5. DAVID GMUNDEL MAUM- SOCIETY IN INDIA (BOMBAY POPULAR PRAKASHAN, 1972).
6. ANDRI BETEILLI - THE BACKWARD CLASSES IN NEW SOCIAL ORDER (OUP 1984)
7. ANDRI BETEILLE - INEQUALITY AND SOCIAL CHANGE (OUP 1972).
8. P. GISKORT - FUNDAMENTAL OF SOCIOLOGY.
9. T.M. BOTOMER - SOCIOLOGY (GEORGE ALLEN & UNWIN BOMBAY)
10. KUSSRGSLY DAVIS - HUMAN SOCIETY
11. JOHNSON W. - SOCIOLOGY
12. M.N. SHRIBUVASAB - SOCIAL CHANGES IN MODERN INDIA
13. K.M. KAPADDIA - MARRIAGE AND FAMILY IN INDIA.
14. T.K.OOMEN & C.N. VENUGOPAL - SOCIOLOGY FOR LAW STUENT (EASTERN BOOK COMPANY, LUCKNOW)
15. INKELES ALEX - WHAT IS SOCIOLOGY ? (PRENTICE-HALL OF INDIA)
16. JAYARAM N. - INTRODUCTORY SOCIOLOGY (MAC MILLAN MADRAS)
17. HARRY M. JOHNSON -SOCIOLOGY A SYSTEMATIC INTRODUCTION BHARTIYA SAMAJ.
18. INDRA DEVA - BHARTIYA SAMAJ.
19. MADAN C.R. - SOCIAL PROBLEM IN INDIA.

PAPER - III
HISTORY

UNIT – I
History of India – Up to 320 B.C.

Vedic Age- A brief introduction of the social, political, legal and religious infrastructure in Vedic times
The organization of Central Government in ancient India
The village republics, *mahajanspadas*
The ancient law givers- *Manu, Vrihaspati, Yaghyavalakya, Katyayana*
The *Varnashram* system
Position of women in ancient India

UNIT- II
320 B.C. to 648 A.D.
The sources, the administrator system of the Mourays, Guptas, & Harshvardhanas with special reference to-
The Central Government
Provincial administration
Local administration
Economy, revenue, agriculture, military organization, feudal system, law and justice, social infrastructure- Caste system, position of women education

UNIT – III

648 A.D. to 1206 A.D.
Historical Sources
A brief political history of the work Indian Rajput dynasties
The partiharas, chahmanas, polas, senas. Chaulukyas (Solanky)
Paramars and Kalchuris of chedi with special reference to their- administration system, central, provincial, village
Economic system: agriculture, revenue
Lw and justice
Military organization
Caste system: position of women, education

UNIT- IV
648 A.D. to 1206 A.D.
-The South Indian Dynasties,sources

A brief political history of the Chalukayas
The Cholas and the Rashtrakutas with special reference to their- administrative system central, provincial, local

UNIT-V
648 A.D to 1206 A.D.
Economy: agriculture, revenue, trade and commerce
Law and justice
Military organization
Social system: caste system, position of women

Books Recommended

1. History of India – elliot & Downson
2. Ancient India- V.D. Mahajan
3. Ancient India- R.C. Majumdar
4. History of India L.P. Sharma
5. Comprehensive history of India – Henry Bemeridge
6. Private & Government in Ancient India A.S. Altelkar
7. Background of Indian criminal law – T.K. Banarjee
8. The political legal and military history – H.S. Bhatia
9. Evlution of Indian culture – B.N. Luniya
10. Indian history – L. Prasad

PAPER- IV

LEGAL HISTORY (1600-1857)

Unit 1st

(a) Administration of justice in presidency towns - Surat, Bombay, Madras and Calcutta.
(b) Provisions of Charter of 1687 and Charter of 1726, Merits and Defects of the Charter.
(c) Distinction between the Madras Charter 1687 and the Charter of 1726
(d) Provisions of Charter of 1753, critical estimate of the working of the Mayer Courts from 1726 to 1753.

Unit 2

(a) Inauguration of Adalat system in Bengal , Grant of "Diwani" dual government of Bengal
(b) Warren Hasting's judicial plan of 1772, 1774 & 1780.
(c) Judicial measures of Cornwallis 1787, 1790, 1793, progress of Adalat system under john shore to William Bentick.
(d) Regulating Act 1773, its provisions powers and functions, merits and defects of the Act.

Unit 3

(a) Provisions of Charter of 1774 Supreme Courts of Calcutta its composition, powers and functions, Critical estimate of the provisions of judicial charters of 1774.
(b) Some landmark cases and its effects on judicial system including Raja Nand Kumar case, Patna case and kassijurah case
(c) Changes under Settlement Act of 1781 and Pitts India Acts 1784.
(d) Establishment of Madras and Bombay presidency.

Unit 4

(a) Development of criminal law, Hindu law and Muslim law in (1600 to 1853)
(b) Racial Discrimination
(c) Charter Act 1813,1833 and 1853
(d) Law Commission & Codification

Unit 5

(a) Privy Council- jurisdiction, Reorganization, Sui Generis body, Appeals History from India.
(b) Development of legal profession in (1600-1853)
(c) Development of Law Reporting In India, Growth of justice. Equality and good conscience
(d) Influence of English law in India

Recommended Reading Material:

1. Herbert Cowell – The History and constitution of court and legislative Authorities in India (1936) (6th End. Published by S.C Bagchi , Calcutta)
2. A.B Keith – A constitutional History of India – 1600 – 1935) (central book Deptt. Allahabad)
3. M.P. Jain - Out lines of Indian Legal History. (Tripathi) (1998)
4. M.V.PAYLEE - Constitutional History of India-(1600-1950)(Asia-Bombay-1967)
5. V.D.KULSHRESTRA – Land mark in Indian Legal History(Eastern Book Co.Lucknow)
6. M.RAMAJOIS WAJONS – Legal & Constitutional Theory of India (1984)(2 roles)
7. Dr.N.V. Paranjare-Indian legal &Constitution History 6th edition (Central Law Agency)

SYLLABUS FOR B.A.LL.B SEMESTER-II

S.No	Papers	Max. Marks
1	English-II	100
2	Economics	100
3	Political Science-I	100
4	Constitutional History of India (1858-1950)	100
Total Marks		**400**

PAPER - I

ENGLISH – II

UNIT-I VOCABULARY :

(a) Foreign words and Phrases (Important Latin & English affixes)

(b) Certain set expression and phrases

(c) One word substitution

(d) Words often confused and misused

(e) Consulting a dictionary - synonyms and antonyms

UNIT-II COMPREHENSION SKILLS :

(a) Common Logical fallacies

(b) Use of legal terms and idiomatic expression.

(c) Comprehension of legal texts.

UNIT-III COMPOSITION SKILLS :

(a) Use of cohesive devices.

(b) Passage and answer to its question

(c) Writing of a precise of the passages

UNIT-IV ESSAY & TRANSLATION :

(a) Essay writing on current topic

(b) Varieties of sentence structure and verb patterns.

(c) Translation from English to Hindi and Hindi to English.

(d) Fill up the blanks by using appropriate word and phrases.

UNIT-V SPEECH TRAINING (PHONETICS THEORY & PRACTICE)

(a) Reading aloud (Knowledge of proper pauses)

(b) Key sounds their discrimination and accent.

(c) Consulting pronouncing dictionary.

(d) Rapid Reading and debating exercise.

RECOMMENDED RADING MATERIAL :

1. Ishtiaque Ibidi, - Law and English (University Publication Aligarh, 1978)

2. Legal Glossary - Government of India Ministry of law publication, New Delhi.
3. Legal Essay - Pioneer publication, Agra.
4. Maurice H. Wassen - Words Confused and Misused (A.H. Wheelar co., Allahabad).
5. Denial Jones - The Pronunciation of English (Universal Book Stall 6, Ansari Road, New Delhi-2).
6. Denial Jones - English Pronouncing Dictionary (Cambridge University Press)
7. Latin for Lawyers - Sweet & Maxwell - Universal Law Publishing Co. (P) Ltd. New Delhi.
8. Bansal & Harrison - Spoken English for India (O.U.P.)
9. Gimson - An Introduction to English Pronunciation (O.U.P.)
10. Black Legal Dictionary - West Publishing Co.
11. Collins - Legal Dictionary - West Publishing Co.
12. R.P. Sinha -How to Translate in to English (Bharat Bavan Patna)
13. Selected Materials drawn from renowned Judgments.

PAPER- II

ECONOMICS – I (MINOR)

Micro Economics

UNIT – I

Introduction:

Definition & Scope of Economics
Inductive and deductive methods of study of Economics
Basic Concepts: Utility, Demand, Supply
Law of demand

UNIT- II

Consumer Behaviour

Law of diminishing marginal utility, law of equit- marginal utility, consumer's surplus, - (classical approach only)
Elasticity of demand and its measurement and factors affecting elasticity of demand
Price elasticity, cross and income elasticity

UNIT- III

Production

Factors of production and their characteristic
Concept of cost and revenue curves
Law of returns

UNIT- IV

Product Pricing

Market and its classification
Price determination under defect competition
Price determination under monopoly
Price determination under monopolistic competition

UNIT – V

Factor Pricing

Rent – Ricardian theory and modern theory of rent
Wages – marginal productivity and modern theory of wages
Interest – net and gross interest liquidity preference theory of keynes
Profit – net and gross profit, theories of profit – schumpeteric's clark's knight's

Books Recommended

P.N. Chouhan	Micro Economics
M.L. Seth	Micro Economics
M.L Sinha	Micro Economics
K.K Deweth	Micro Economics

PAPER - III

POLITICAL SCIENCE – I (Major)

UNIT-I Nature origin and development of the state, Distinction between the state, society and Government. Nature and Nationality, Essential Element of the state, Classical theory of the State - Social contract theory of Hobbs, lock and -Russou and its comparison with modern (Marx, Weber, Emile, Durkhim) approaches to the notion of Political obligation, Bentham's Utilitarianism and view of Hegal and T.H. Green.

UNIT-II Main current of Western and Indian political thought. Medieval political thought (Natural Law and Natural rights) Liberalism, Socialism, and Marxism Classical Hindu and Islamic conception of State.

UNIT-III Definition of Sovereignty. Its characteristics, Political ------ and Legal sovereignty, Law and Morality, Law and state Pluralistic criticism of the theory of Sovereignty, Totalitarian State.

UNIT-IV Classification of constitution and state Unitary and Federal, Parliamentary and Presidential characteristics, Organization of Government-Executive. Legislature and Judiciary. Theory of Separation of power, Parliamentary Supremacy Legal Supremacy and Independence of Judiciary.

UNIT-V Conception of representation, Public Opinion and Participation, Political thought of Mahatma Gandhi. The Philosophy of Non-Violence, Gandhi's view on Economic and Religions.

RECOMMENDED READING MATERIAL :

1. IQBAL NARAIN - PRINCIPLES OF POLITICAL THOUGHT.
2. AASHIRVADAM E. - POLITICAL THEORIES
3. R.C. AGRAWAL - POLITICAL THOERY.
4. G.N. SINGH - FUNDAMENTAL OF POLITICAL SCIENCE AND ORGANISATION (KITAB MAHAL ALLAHABAD).

5. G.H. SABINE - A HJITORY OF POLITICAL THEORY (OXFORD-1973)
6. GANBA - INTRODUCTION OF POLITICAL THEORY
7. B.R. PUROHIT - RAJNITI SHASTRA KE MOOL SIDDANT (RAJAMDI GROWTH ACADAMY JAIPUR)
8. C.F. STRONG - MODERN POLITICAL CONSTITUTION.
9. S.P. VERMA - MODERN POLITICAL THEORY (VIKAS)
10. G. SAWER - MODERN FEDERALISM (C.A. WATT LONDON-1969)
11. GEORGE LICH TOCLM-A SHORT STORY OF SOCIALISM.

PAPER - IV

CONSTITUTIONAL HISTORY OF INDIA (1858-1950)

Unit I

(a) The Government of India Act 1858, Main provisions, merits & Demerits of the Act.
(b) The Indian Council Act 1861 circumstances, main provisions, merits & Demerits.
(c) Government of India Act, 1870.
(d) The Indian Councils Act, 1892, provisions, merits & demerits and its main contribution in the Act.

Unit II

(a) The Indian Council Act 1909 (Minto – Morley Reforms), Provisions, effect & defect of the Act
(b) World War First and its effect in Constitutional Development in India
(c) The Government of India Act, 1919, The Montague Declaration, failure of the Montfort Reforms.
(d) The working & failure of Dyarchy System.

Unit III

(a) The Simon Commission and development Up to 1935 Act.
(b) Nehru Report 1928, Rejection of Nehru Report and Fourteen Points Report by Muslim League.
(c) The National Movement and Communal Award of Poona Pact.
(d) Lord Irwin's Proclamation 1929.

Unit IV

(a) The Government of India Act 1935- Main Provisions. Effect of the federal System in India. Merits & Demerits of the Act.
(b) Constitutional Development 1937 to 1947. Two nation theory and Pakistan.
(c) The August Offer 1940, Cripps Mission 1942, Wavell Plan 1945, Simla Conference, Round TSable Conference.
(d) Cabinet Mission 1946, Mountbatten Plan 1947, The Indian Independence Act 1947

Unit V

(a) The Indian High Court Act 1861, Letters Patent establishing High courts, Indian High Court Act 1865 and 1911.
(b) The Federal Court of India 1935-foundation, functions & powers, Abolition of Federal Court.
(c) The Supreme Court of India-origin, Jurisdiction and Powers.
(d) Origin and Development of the Writ System in India.

Recommended Reading Material:

1. Herbert Cowell – The History and constitution of court and legislative Authorities in
2. India (1936) (6th End. Published by S.C Bagchi , Calcutta)
3. A.B Keith – A constitutional History of India – 1600 – 1935) (central book Deppt. Allahabad)
4. M.P. Jain - Out lines of Indian Legal History. (Tripathi) (1998)
5. M.V.PAYLEE - Constitutional History of India-(1600-1950) (Asia-Bombay-1967)
6. V.D.KULSHRESTRA – Land mark in Indian Legal History(Eastern Book Co Lucknow)

SYLLABUS FOR B.A.LL.B SEMESTER-III

S.No	Papers	Max. Marks
1	Political Science – II(Major)	100
2	History – II (Minor)	100
3	Economics – II (Minor)	100
4	Contract-I (General Principles of Contract and specific Relief)	100
Total Marks		**400**

SYLLABUS FOR B.A.LL.B SEMESTER-IV

S.No	Papers	Max Marks
1	Political Science – III (Major)	100
2	Sociology – II (Minor)	100
3	Political Science – IV (Major)	100
4	Contract - II (Specific Contract) Sale of Goods and Partnership Act	100
Total Marks		**400**

PAPER – I

POLITICAL SCIENCE – II (Major)
INTERNATIONAL RELATIONS AND OGRANISATION

UNIT-I Nature and scope of international relations and foreign policy. Approaches to the study of international relations (a) historical approach (b) Philosophical approach (c) System approach - Balance of power approach, Equilibrium approach, Bipolar approach (d) Policy science approach - Behavioral approach (e) Hon. J. Morgenthaus Theory of Realism.

UNIT-II Emergence of nation state system - Feudalism : Colonialism, Imperialism and nationalism in Asia, Marxsist, Anarchist and welfare, Characters of modem state system, cold war, New world order.

UNIT-III International Organization - Development of International League of Nations, Origin, Membership, Aims Organization of the league of Nations functions & causes of its failure & its evaluation.

UNIT-IV The United Nations organization (UNO) - Genesis and development, basic principles, membership, Principal organs of the U.N.O. - General Assembly Security Council, Economic and Social Council, Trusteeship Council, International court of Justice and secretariat. Subsidiary organs of United nation U.N. Social Development committee, Human Rights Commissions, International Commodity Trade Commission, Specialized and

functional agencies, ILO, IMF, WHO, UNESCO, UNICEF, United Nations and settlements of International Disputes, Evaluation of the U.N.O.

UNIT-V Regionalism in international relations Emergence of regional organization and the development of regional groups NAN, ASIAN, SAARC, NATO Regionalism and the U.N.O.

Recommended Reading Material :

1. D.N. Verma - International Relations
2. M.G. Gupta - International Politics Science 1919.
3. K.K. Mishra - International Politics
4. B.S. Murthy - International Relations and Organization (EBC Lucknow)
5. K.P. Mishra - The Concept of nonalignment and its implication and Recent Trends.
6. Hans Morgenthau - Politics among nations - The struggle for power and place (New York knopp. 1955)
7. Quincy Wrigth - Study of International Relations, (New York - appleton Century croft) (1955)
8. D.W. Bowelt - International institution, London Mac Millan (1914)
9. S.P. Verma - Modern Political Theory (Vikas 1981)
10. G. Sawer - Modern Federalism, London - C.A. Watts 1969.
11. G.H. Sabine - A History of political Theory (Oxford)

PAPER-II
HISTORY-II (MINOR)

UNIT- I

History of India A.D. 1206-1526

The advent of Islam in India sources, the Delhi Sultnat- Iltutmish, Balban, AluddinKhiljee, Mohd.Tughluq, Firoz Tughluq

UNIT – II

The concept of Islamic State- the theory of kingship, control, provincial and local administration, administration of law and justice, military organization, economy under the sultnate - revenue, agriculture, society, position of women, education

UNIT- III

The Mughal Empire 1526-1740 Sources- A brief political history from Barber to Aurangjab with special reference to the administration of Shershah, Akbar and Auranjab

The emergence of the Maratha power – Shivaji and his administration

UNIT – IV

The administration under the Mughlas, Nature of State, theory of kingship, control, provincial and local self Government- revenue administration, agriculture, military administration, manasabdari system, law of justice

UNIT- V

Impact of Islam on Indian society, poverty and economy
Bhakti and Sufi Movements

Books Recommended

11. History of India – elliot & Downson
12. Ancient India- V.D. Mahajan
13. Ancient India- R.C. Majumdar
14. History of India L.P. Sharma
15. Comprehensive history of India – Henry Bemeridge
16. Private & Government in Ancient India A.S. Altelkar
17. Background of Indian criminal law – T.K. Banarjee
18. The political legal and military history – H.S. Bhatia
19. Evlution of Indian culture – B.N. Luniya
20. Indian history – L. Prasad

PAPER—III
ECONOMICS

UNIT – I

Basic features and structure of Indian Economy
Demographic features and population policy of India
National income estimation and its trends in India

UNIT – II

Basic feature of Indian agriculture
Emerging trends in agricultural production and Green Revolution
Problems of agricultural marketing in India
Agricultural credit: sources and problems

UNIT – III

Latest Industrial policy
Cottage and small- scale industries and their problems
Globalization and Indian industry
Role of public, private and joint sector in India

UNIT- IV

Objectives and strategy of planning in India
Analysis of current five year plan
India regional variations in economic development in India
Central State financial relations- role of finance commission and recommendation of latest Finance commission in India

UNIT – V

Poverty- concepts and trends in India
Unemployment- causes and types unemployment
Various Govt. measures for the eradications of poverty and unemployment
Problems and rising prices and its impact of Indian economy

Books Recommended

Mishra & Puri	Indian economy
P.K. Dhar	Indian economy
Dutta and Findrem	Indian economy
P.S. Gongane	Indian economy

PAPER—IV
CONTRACT - I
(General Principles of contract & Specific Relief)

This paper is divided in to two parts - Part one and Part Two : Part I is related with General Principles of Contract. It covers section 1 to 75 of Indian Contract Act. While Part-II is related with Indian Specific Act. Three units covers the course of Part-I while other two units are related with Specific Relief.

PART - I - CONTRACT

UNIT-I NATURE OF CONTRACT, COMMUNICATION ACCEPTANCE AND REVOCATION OF PROPOSAL (sec. 1 to sec. 9)

(a) General History and Nature of Contract, Distinction between Torts and Contract, agreements and contracts, Essentials of contract & consideration.

b) Interpretation clause communication of proposals. Its various means and its completion.

c) Acceptance - Its certainty and absoluteness manner of Acceptance, Acceptance by performing conditions and General offers.

d) Revocation of proposal and acceptance - Revocation of offer, How it is made ? Revocation on sale by auction, Revocation before acceptance of bid and Revocation in standing orders.

UNIT-II AGREEMENT AND CONTRACT - VOID VOIDABLE AND CONTINGENT (Section 9 to 36)

(a) Agreement and contract - Which agreements are contract ? Competency to perform contract : factors which affects the legality of contracts - minority unsoundness etc.

b) Lack of free consent, coercion, undue influences, fraud and misrepresentation and their effect on contract.

c) Effect of mistake of law and mistake of fact on contract. How an unlawful consideration and object made a contract and agreement illegal and void?

d) Contingent contract - What are they ? its effect on the legality of contract.

UNIT-III PERFORMANCE OF CONTRACT QUASI CONTRACT & BREACH OF CONTRACT (sec. 37-75)

a) Performance of Contract - Which and by whom contract must be Performed ? Performance if time, place and manner is mentioned in contract. Performance of reciprocal promises.

b) Effect of failure in performance - when agreement was impossible to do or when act after words impossible and unlawful. Doctrine of frustration and its effects : contract which need not be perform and effect of novation --- and alteration of contract.

c) Quasi contract - certain relation resembling those created by contract (68 to 72)

d) Consequences of breach of contract - Compensation for loss or damages caused by breach of contract, compensation for failure to discharge obligation resembling those created by contract. Compensation for breach of contract where penalty stipulated and position of partly rightfully rescinding contract.

PART - II - SPECIFIC RELIEF

UNIT-IV SPECIFIC RELIEF ACT AND ITS APPLICABILITY (Section 1 to 24)

a) Specific Relief Act and its applicability - Definition, Recovering possession of property; immovable and movable (Sec. 1 to 8)

b) Specific performance of contract - Contract which can be specifically enforced and contract which can not be specifically enforced. (Sec. 9 to 14)

c) Person for or against whom contract may be specifically enforced. (Sec 15-19)

d) Discretion and Powers of the courts in decreeing specific performance awarding compensation and granting relief, liquidation of damages and Bar of suit for compensation for breach after dismissal of suit for specific performance. (Sec. 20-24).

UNIT-V ENFORCEMENT OF AWARDS RATIFICATION, CANCILLATION, DECREE AND INJUNCTIONS (Sec. 25 to 42)

a) Enforcement of awards and Direction to execute settlement and Rescission of contract.

b) Rectification and cancellation of Instrument.

c) Declaratory Degree - Discretion of court as to declaration of status or right and effect of declaration.

d) Injunctions - Temporary & perpetual and mandatory. Refusal of injunction Damages in lieu of or in addition to injunction, and injunction to perform negative agreement.

Book Recommended :

1. Ansons Law of Contract (1998) Universal, Delhi.
2. Pollock and Mulla - Indian Contract and specific Relief Acts. 1999, Universal
   650/-
3. Sarkar on Specific Relief Act. - Wadhwa, Nagpur.
4. Avtar Singh - Law of Contract, EBC, Lucknow.
5. Avtar Singh - Law of Contract and Specific Relief EBC, Lucknow.
6. Benerjees - Law of Specific Relief, Universa
7. Anand & Ayer Law of Specific Relief, Universal
8. Bangia R.K. - Law of Contract and Specific Relief 595/-
9. G.H. Treital - Law of Contract, Sweet & Maxwell 1997.

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SYLLABUS FOR B.A.LL.B SEMESTER-IV

S.No	Papers	Max Marks
1	Political Science – III (Major)	100
2	Sociology – II (Minor)	100
3	Political Science – IV (Major)	100
4	Contract - II (Specific Contract) Sale of Goods and Partnership Act	100
Total Marks		**400**

PAPER – I
POLITICAL SCIENCE-III (MAJOR)
(Comparative Government and Politics)

Unit – I

British Constitution- (a) Introduction to the British Constitution, Sources of the Constitution, Salient features.
(b) Prime Minister, Crown, Parliament.

Unit – II

Constitution of America - (a) Historical background of the Constitution, Making of the Constitution, Nature and Salient features of American Constitution,
(b) President, Congress, Judiciary.

Unit – III

Swiss Constitution- (a) Historical background of the Constitution, Salient features,
(b) Federal assembly, Federal council, Direct democracy.

Unit- IV

Constitution of Japan –(a) Historical background , The Nature and characteristics of the Japanese, The Rights and duties of the People.
(b) The Emperor, Legislature (The Diet), Judiciary.

Unit - V

Comparative study- federal system of America and Switzerland, House of Lords and Senate, power and functions of President of America and the Prime Minister of U.K.

Suggested Readings

D.D. Basu	Constitution of India
Dr. S.C. Singh	विभिन्न संविधान
Dr. Pukhraj Jain	विभिन्न संविधान
Dr. V.P.Singh	World Famous Constitution in Hindi
M.V.Pylee	Select Constitution of the World.
D.D.Basu	Comparative Federalism.

PAPER – I1

SOCIOLOGY – II (MINOR)

SOCIOLOGY OF INDIA

UNIT-1 (a). View about Indian society.
(b).The Classical Views : Verna, Ashram Karma and dharma.
(c).Field views : M.N. Shrinivas And S.C. Dubey
(d).Significance and ineterface of classical and field views

UNIT-2 (a). The structure and Composition of Indian society.
(b). structure : villages, Towns, Cities And Rural – Urban.
(c). Linkage composition : Tribes, Dalits, Women And Minorities.

UNIT-3 (a).Basic Institutions of Indian society.
(b).Caste system, kinship, family, family marriage class, changing dimensions.

UNIT-4 (a) Familial Problems .
(b) Dowry, domestic violence, divorce, intra- intergenerational conflict problem of elderly.

UNIT-5 (a) Social problems.
(b) Casteism, Regionalism, Communalism, Corruption, Youth unrest.

RECOMMENDED READING MATERIAL :

1. PELER WESSELEY - INTRODUCTION SOCIOLOGY (HERMOND-WORTH PENGUINE BOOK 1971)
2. N.K. BOSE - THE STRUCTURE OF HINDU SOCIETY (ORIENT LONGMAN-1975)
3. ROMESH THAPPER (ED)-TRIBE, CASTE, RELIGION AND INDIA (MACMILLAN) 1977.
4. MACIVER & PASE - SOCIETY.
5. DAVID GMUNDEL MAUM- SOCIETY IN INDIA (BOMBAY POPULAR PRAKASHAN, 1972).

6. ANDRI BETEILLI - THE BACKWARD CLASSES IN NEW SOCIAL ORDER (OUP 1984)
7. ANDRI BETEILLE - INEQUALITY AND SOCIAL CHANGE (OUP 1972).
8. P. GISKORT - FUNDAMENTAL OF SOCIOLOGY.
9. T.M. BOTOMER - SOCIOLOGY (GEORGE ALLEN & UNWIN BOMBAY)
10. KUSSRGSLY DAVIS - HUMAN SOCIETY
11. JOHNSON W. - SOCIOLOGY
12. M.N. SHRIBUVASAB - SOCIAL CHANGES IN MODERN INDIA
13. K.M. KAPADDIA - MARRIAGE AND FAMILY IN INDIA.
14. T.K.OOMEN & C.N. VENUGOPAL - SOCIOLOGY FOR LAW STUENT (EASTERN BOOK COMPANY, LUCKNOW)
15. INKELES ALEX - WHAT IS SOCIOLOGY ? (PRENTICE-HALL OF INDIA)
16. JAYARAM N. - INTRODUCTORY SOCIOLOGY (MAC MILLAN MADRAS)
17. HARRY M. JOHNSON -SOCIOLOGY A SYSTEMATIC INTRODUCTION BHARTIYA SAMAJ.
18. INDRA DEVA - BHARTIYA SAMAJ.
19. MADAN C.R. - SOCIAL PROBLEM IN INDIA.

PAPER – III
POLITICAL SCIENCE-IV (MAJOR)
(INDIAN GOVERNMENT AND POLICIES)

UNIT- I

Making and sources of Indian Constitution, preamble, salient features of the Constitution, Nature of constitution

UNIT – II

Fundamentals Rights and duties, directive principles of state policy, Union and State legislature – organization and functions

UNIT- III

Union Executives: (President, Prime Minister) powers and functions

State Executives: (Governor and Chief Minister) power and functions

UNIT – IV

Indian Judiciary: Organization, powers and functions, Election Commission of India importance of Local self Government (Panchayati Raj System)

UNIT – V

Indian party system, influence of religion, caste, regionalism and language on Indian politics

Suggested Readings

Ashirvadam E.	Modern Political Theory
Sir E. Barker	Principle of Social and Political Theory
Las	Grammar of Policies
D. Held	Political Theory
Tripti Jain	Foundations of Politics
Verma S.P.	Basic of Political Science
Dr. Om Nagpal	Foundations of Political Science

PAPER IV

CONTRACT - II

(Indian contract Act (See 124 to End) Sales of Goods & Partnership.

UNIT-I Indemnity & Guarantee (See 124 to 147)

Contract of Indemnity : Definition, its commencement and extent of indemnifiers liability, His right and when he can sue ? (See 124-125).

Contract of Guarantee : Guarantee and indemnity, surety consideration continuing guarantee and its revocation (see 126-132)

Discharge of surety and principle debtor, co-surety and remedy for ommission (see 133 to 139).

Guarantee and Mental aspects ; Uberrima fides, liability of surety and co-surety in contribution (see 140-147) and suit by bailees or bailor against wrongdoer and apportunment of relief and compensation (see 180-181).

UNIT-II Bailment & Pledge (Sec. 148 to 181)

Bailment : Definition of Bailor and Bailee and its kinds ; mode of delivery of goods bailed, duty of bailor and bailee to each other and examption, mixturing good bailed and its consequences (sec. 148 to 157).

Repayment of expenses increased by bailer ; restoration and return of goods ; consignor as a bailor, his right to sue if consignment is not returned ; Gratitious bailment and effect of death on it. Bailor's rights and responsibility to bailee and right of third person. (sec. 158 to 167).

Position of finders of goods, His liability towards owners ; and his obligation to keep goods safe and rig... to dispose of good (if perishable). Bailee's lien and general line of Bankers etc. (sec. 168 to 171)

Bailment of Pledge : Pawner and Pawnee ; their rights, right to redeem in case of default. Pledge by merchantile against, Pledge under voidable contract and pledgor with limited interest (172 to 179)

UNIT-III Agency - (sec. 182 to 238)

Appointment and authority of agent who is agent and principle ? Who and by whom an agent may be appointed ? Mode of appointment of agents. Duties and rights of agent and his authority, sub-agent and his position under the act, delegation of power. His responsibility towards agent and principle. (sec. 182 to 195).

Ratification its mode and its effect. Rotification of unauthorised act. Revocation of authority and its various mode termination of agency, compensation for revocation. Revocation and renunciation position of partys after termination of authorities. (sec. 196 to 210).

Agents various duties towards principles, position when agents renumeration is due ? and Agents lien in principal's property. (sec. 211-221).

Principles duty to agent : His right to be indemnified against consequences of lawful act and acts done in good faith and for negligent act of principal, Principals liability for ultra vires act of agent, agent is not personally liable on behalf of principal, liability of the principal for acts of agent including misconduct of the agent. Effect of Fraud and his representation of the agent. (sec. 222-238).

UNIT-IV Sales of Goods : Partnership :

Sales of goods act 1930 (Whole Act) which includes concept of sale on contract instances of sale of good and the nature of such contract, essentials of contract of sale, essential condition in every contract of sale, implied terms in contract of sale, the sale of caveat emptor and the exceptions there to under the sales of goods act. Changing concept of caveat emptor. Effect and meaning of implied warranties in a sale, transfer of tittle and passing of risk. Delivery of goods : various rules regarding delivery of goods. Unpaid seller and his rights. Remedies for breach of contract.

Partnership Act 1932

Provisions of Indian Partnership Act 1932, including - definition and nature of partnership. Advantage and disadvantages vis a vis partnership and private limited company. Mutual relationship between partners. Authority of partners, admission of partners, outgoing of partners. Registration of patanership & Dissolution of partanership.

UNIT-V Leading Cases relating to the Paper

(1) Bank of Bihar v. Dr. Damodar Prasad (AIR, 1969 SC. 297)

(2) Lallan Prasad v. Rahmat Ali (AIR 1967, SC 1322)

(3) PSNS Ambalrana Chettiar Co. v. Express News Papers Ltd., Bombay (AIR 1968, SC 741)

(4) K.K. Shah v. Mrs. K.B. Dadiba (AIR 1970 S.C. 1147)

(5) Bina Murlidhar Hunde V. Kanahiyalal lakram Hunde (AIR 1999 SC 2171)

(6) M/s. Lalliwal Biharilal v. Rambaboo Vaishya (AIR 1990 M.P. 64)

(7) Premlata v. M/s. Ishwar Das Chamanlal (AIR 1995 S.C. 714)

(8) Gherulal Parekh v. Mahadeo Das (AIR 1959 S.C. 78)

Books Recommended :

1. Avtar Singh - Contract Act (2000) E.B.C. Lucknow.
2. Saharay H.K. - Indian Partnership a Sales of goods Act (2000)
3. Beatson (Ed.) - Anson'c law of contract (1998) Oxford, Universal London.
4. J.S. Khergarwala - Negotiable Instrument Act
5. A.G. Guest (Ed.) - Banjamin's Sale of Goods (1992) Sweat & Maxwell.
6. Pollock Mulla on contract (1999) Tripathi, Bombay.
7. T.R. Desai - Contract sales of goods & Partnership
8. Indian Partnership Act 1932
9. Krishann Nair - Law of Contract (1999) Orient.
10. Avtar Singh - Principles of the law of sales & goods and hire purchase (1990) E.B.C. Lucknow.
11. Rawlings - The Sales of goods Act (1998) Universal.
12. Avtar Singh - Introduction to law of Partnership

SYLLABUS FOR B.A.LL.B SEMESTER-V

S.No	Papers	Max. Marks
1	Jurisprudence and Legal Theory	100
2	Law of Torts including Motor Vehicle Act and Consumer Protection Laws	100
3	Law of Crimes –I (I.P.C.)	100
4	Law of Crimes –II (Criminal Procedure Code , Juvenile Justice Act & Probation of Offenders Act)	100
Total Marks		**400**

SYLLABUS FOR B.A.LL.B SEMESTER-VI

S.No	Papers	Max. Marks
1	Law of Evidence	100
2	Constitutional law -I	100
3	Constitutional law -II	100
4	Environmental law including Wild Life Protection and Animal Welfare	100
Total Marks		**400**

SYLLABUS FOR B.A.LL.B SEMESTER-V

PAPER - I

JURISPRUDENCE AND LEGAL THEORY

UNIT-I INTRODUCTION MEANING, NATURE AND SCOPE

a) What is Jurisprudence? Its meaning, Nature & Scope.

b) Its study as a basic problem concerning the law.

c) Jurisprudence as a Normative Science its relation with other sciences

d) Jurisprudence in Eastern scriptures both in Hindu and Muslins.

UNIT-II

a) Jurisprudence and law - Definition of law its nature kind and classification.

b) Law and morality state & law sovereignty

c) Administration of justice

d) Sources of law Custom, Legislations, Precedents, Religion and Agreement.

UNIT-III SCHOOLS OF JURISPRUDENCE THEIR EXPONANT AND THEIR VIEWS

a) Historical and Philosophical

b) Analytical Legal Positivism

c) Sociological and Economical School

d) Pure theory of law and Realist school, Indian Legal Thinker, Manu and Kautilya.

UNIT-IV LEGAL CONCEPTS

a) Rights and Duties

b) Possession and ownership

c) Person

d) Title

UNIT-V LIABILITY PROPERTY OBLIGATION & EVIDENCE

a) **Liability** - Definition, Nature, Kind - Civil and Criminal General conditions of liability - Negation, Their Theories Subjective & Objectives, Mental aspects, Duty of care, Standard &^ Care, Exemptions for Liability.

b) **Obligation** - Definition, kinds and sources of obligation.

c) **Property** - Its meaning and kinds and theories mode & acquisition, Its relation with law.

d) **Evidence** - Procedural and Substantial, Element of Judicial procedure Evidence its nature and kinds.

BOOKS RECOMMENDED -

1. HLA Hart - The Concepts of Laws (Oxford) ELBS
2. Salmond - Jurisprudence (Tripathi) Bambay
3. G.W. Paton - Jurisprudence (Oxford) ELBS
4. RWM Dias - Jurisprudence (Indian Rep.) (Aditya), New Delhi.
5. V.D. Mahajan - Jurisprudence Legal Theory (EBC), Lucknow
6. W. Fridmann - Legal Theory (1999) (Universal) Delhi.
7. S.N. Dhyani - Jurisprudence - A study of Indian Legal Theory (Metropolitan), New Delhi.

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PAPER –II

LAW OF TORTS INCLUDING MOTOR VEHICLE ACCIDENT ACT & CONSUMER PROTECTION LAWS

UNIT-I LAW OF TORTS

Definition, Nature, Scope, Object & General Principles of Law of Torts:

Historical Background of law of Torts - Evolution in England and India, Form of Action and its un-codified characters. It's Indian Origin from the principles of equity justice and good conscience.

Definition Torts : Its comparison with crime and breach of contract, its nature, purpose and functions, general principles of liability, its kinds, demnum sine injuria and injuria sine demnum. General Elements in torts - Acts and omission voluntary and non-voluntary act.

Mental Element in torts - Malice, intention, negligence, motive, recklessness, carelessness, malafide, malfeasance, misfeasance, non-feasance and fault.

UNIT-II Immunities, Justification, Remedies, Discharge and Effect of Death.

Immunities from tortious liability. Justification and defences in action of torts - Act of God Act of State, Judicial act, inevitable accident, Private defence, necessity, consent, leave and license.

Remedies - damages and its kind, quantum of damages, injunction and its types, Specific restitution of property, joint-tort feasors, contribution between wrongdoer, remedies under constitution and compensation as prescribed by statutes, self help, distress damage feasant, discharge of torts - by accord and satisfaction, waiver by election, release acquiescence judgment recovered and statute of limitation and effect of death on tort claim.

Wrongs relating to person & property relations; rights:

Wrongs relating to person, assault, battery, false imprisonment and malicious prosecution. Wrong relating to domestic and other rights. Intimidation and conspiracy, fraud and deceit.

Wrongs relating to immovable - trespass to land, trespass by animal, trespass conversion and detention.

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UNIT-III NEGLIGENCE, Nuisance, Defamation and Liability for Wrongs Committed by Others:

Negligence - Its nature, condition and exception, negligence of various persons is occupied, carriers counsel, doctors, animal, keepers, dangerous goods holder, street and statutory duty and contributing negligence.

Nuisance - Nature classification and kind injury to property and remedies.

Defamation - Its kinds libel and slender, its definition and essentials, repetition, defences in defamation and remedies for defamation.

Liability for wrongs committed by others - liability by ratification by relations i.e. master and servants, principal and agent, owner and independent contractor, liability of the State, doctrine of common employment, liability for abatement, absolute and strict liability.

UNIT-IV THE MOTOR VEHICLES ACT, 1988:

Introduction- aims and objects of M.V.A, title, extent and commencement of the act with modification, definitions, licensing of drivers of motor vehicles(Ss 3-28), licensing of conductors of stage carriages,(Ss 29-38), registration of motor vehicles,(Ss 39-65), control of transport vehicles,(Ss 66-96), control of traffic,(Ss 112-138), liability without fault in certain cases,(Ss 140-144), insurance of motor vehicles against third party risk,(Ss 145—164), claims tribunals,(Ss 165-173), offences, penalties and procedure,(ss174-205), power of police officer to impound documents and detain vehicles used without certificate of registration, permit etc., summary disposal of cases, appeal and revision on orders passed by original authority,

The first schedule and the second schedule.

UNIT-V THE CONSUMER PROTECTION ACT, 1986

Introduction- Aims, object and scope of Consumer Protection ACT, Definitions, Central Consumer Council, State Consumer Council.

Consumer Disputers Redressal Agencies- Composition, Jurisdiction and function of district forum, State Commission and National Commission, Procedure adopted in dealing with complaint and appeal cases, Enforcement and execution of orders by Consumer Fora under section 25 and 27 of Consumer Protection ACT,1986.

LEADING CASES:

1. Indian medical association vs. V.P. Shantha (AIR1896 SC530)

2. Lucknow Development Authority vs. M.K. Gupta (AIR1994 SC787)

3. Kasturi lal Ralia Ram vs. State of U.P. (AIR 1955, S.C.1939)

4. Saheli & woman resource centre vs. commissioner of police (AIR1990 S.C.51)

5 M.C. Mehta vs. Union of India (AIR1987 SC1086)

Books Recommended:

1. Ratanlal Dhirajlal - The law of torts (1997), Wadwa Nagpar.
2. Winfield and Jolowitz - on Torts (1999) Sweet & Maxwell, London.
3. Salmond and Houstan - Tort (1999) Butterworth, London.
4. P.S. Achutan Pillai - The Law of Torts (2004) E.B.C. Lucknow.
5. D.N. Saraf - Law of consumer protection in India (1995) Tripathi.
6. P.R. Majundar - Law of consumer protection in India (1998) Orient, New Delhi.
7. Ramaswami Aiyer - Law of Torts (1999) Tripathi, Bombay.
8. M.D. Chaturvedi – Apkrtyo ki vidhi (1998) EBCL (in Hindi)

PAPER – III

LAW OF CRIMES

UNIT-I HISTORY EXPLANATION PUNISHMENT & GENERAL EXCEPTIONS

(a) History of Criminal Law & Applicability of Indian Penal Code, Salient Feature of IPC (Sec. 1 to 5)

(b) General Explanation and definition in the code (Chapter II)

c) Important section relating to punishment - its nature, simple & rigorous punishment solitary confinement . Fine General rules of commutation and termination of punishment on payment of fine, limit of punishment in several offences. Discretion in awarding punishment.

d) General exceptions - factors negating guilty intention, mental incapacity, minority, insanity involuntary intoxication.

Private defence - When private defence extent to causing the death to protect body and property, necessity and mistake of fact, (Sec. 76 to 106)

UNIT-II ABETMENT CRIMINAL CONSPIRACY AND OFFENCES AGAINST THE PUBLIC TRANQUILITY AND PUBLIC HEALTH AND OF FALSE EVIDENCE (Chapter V, V-A, VIII, XI)

a) Abatement - Abettor etc. (Chap. V)

b) Criminal Conspiracy (Chap. VA) and sedition (Chap. 124A)

c) Offences against the public tranquility safety and health - Unlawful assembly, Rioting, Affray, Public Nuisance, Adulteration, Rashly Driving & Obscenity.

d) False Evidence - Giving false evidence and fabricating false evidences & Harboring offenders.

UNIT-III OFFENCES AGAINST HUMAN BODY (Chapter XVI)

a) Culpable Homicide, Murder, Distinction between culpable homicide and murder, mental element required for murder, situation justifying, treating murder as culpable homicide not amounting to murder, Grave and sudden provocation, causing death by negligence and dowry death. (Sec. 299 to 304b)

b) Injuries to unborn children - Miscarriage with or without consent. Rash and Negligent act causing death (Sec. 312-317)

c) Hurt - Grievous and simple, voluntarily and involuntarily and on provocation, wrongful restraint and wrongful confinement. (Sec. 349 to 358)

d) Criminal force and assault, Kidnapping from lawful guardianship and from outside India. Abduction (Sec. 359 to 362) Rape, custodial rape and unlawful offences.

UNIT-IV OFFENCES AGAINST PROPERTY (Chapter XVII)

a) Theft, Extortion Robbery & Decoity and its various forms.

b) Criminal misappropriation of Property, Criminal Breach of trust and receiving stolen property and its various forms and manners. (Sec. 403-414)

c) Cheating and cheating by persons and dishonesty fraudulent removal and disposition of property. (Sec. 415-424)

d) Mischief, Mischief by hurt and intimidation, criminal trespass, house trespass and its form, House breaking and its forms.

UNIT-V OFFENCES RELATING TO DOCUMENTS, MARRIAGE REPUTATION AND HONOUR

a) Forgery and its various forms Making false documents, Property marks and Bank notes.

b) Cohabitation with other women, except lawful marriage Adultery (Chap. XX)

c) Defamation (Sec. 499)

d) Criminal intimidation insult and annoyance (Chapter XXII) and attempts to commit offences. (Sec. 511)

BOOKS RECOMMENDED -

1. S.M. Mishra - Indian Penal Code - Latest Ed. Universal, Delhi.
2. Ratanlal Dhirajlal - Indian Penal Code - 39th Ed. Student Ed., Wadhwa, Nagpur.
3. Ratanlal Dhirajlal - India Penal Code (Hindi) - Wadhwa, Nagpur 350.00.
4. K.D. Gaur - A Text Book on the India Penal Code (1998), Universal Delhi.

PAPER – IV

Cr. PC JJA & PROBATION OF OFFENDERS' ACT

UNIT-I INTRODUCTION, CONSTITUTION AND POWERS OF COURTS AND OFFICERS, PROCESSES TO COMPEL, APPEARANCE AND THE PTODUCTION OF THINGS

a) Introduction definition and constitution of criminal court and offices. (Sec. 1-25).

b) Powers of courts and superior officers of police and aid to the magistrate and police (Sec. 26-40).

c) Power of police to arrest persons, arrest by private person and arrest by magistrate, Right of the arrested person, Right to know the grounds of arrest and Right to be taken to magistrate without delay and may not be detained for more than 24 hours and his other rights. (Sec. 41-60)

d) Processes to compel appearances of persons and production of things, summon and warrant, How these are served ? The procedure of its execution, Proclamation and attachment, search warrants, seizure and other provisions relating to production of things. (Sec. 91-105)

UNIT-II SECURITY FOR KEEPING PEACE & MAINTENANCE PREVENTIVE ACTION, INVESTIGATION, INQUIRY & TRIAL & CONDITIONS FOR INITIATION OF PROPERTY

a) Security for keeping the peace and good behavior, maintenance of wife and children. (Sec. 106-128)

b) Maintenance of public order and tranquility, unlawful assemblies, public nuisance, urgent cases of nuisance or apprehended danger. (Sec. 144). Dispute related to immovable property. (Sec. 129-148)

c) Preventive action of police officers and their power to investigate, FIR and its evidentiary value (Sec. 145-157 of Evidence Act), Recording of confessions (sec. 164), Search and its procedure. (Sec. 149-176)

d) Jurisdiction of criminal courts in inquiries and trial - Place of inquiry
and trial and condition requisite for initiation of proceedings. (Sec. 177-199)

UNIT-III COMPLAINT, CHARGES, TRIALS BEFORE SESSION & MAGISTRATES, WARRANT AND SUMMONS CASE & SUMMARY TRIALS

a) Complaints and commencements of proceedings before magistrate (Sec. 200-210)

b) The charges - forms and Joinder of charges, Trial before court of session. (Sec. 211-237)

c) Trials of warrant and summon case before magistrate. (Sec. 238-259).

d) Summary Trials and attendance of person confined and detained in person. (Sec. 260-271), and accused of unsound mind. (Sec. 328-339).

UNIT-IV PROVISIONS RELATING TO JUDGEMENT, BAIL, APPEALS, REFERENCE, REVISION AND TRANSFER OR CASES ETC.

a) Provisions relating to judgments, its forms and contains. (Sec. 353-371)

b) Appeals, revision and reference. (Sec. 372-405)

c) Transfer of cases and Execution, suspension, Remission and commutation of sentences. (Sec. 413-435)

d) Provision relating to Bail and Bonds. (Sec. 436-450)

UNIT-V JUVENILE JUSTICE (CARE & PROTECTION OF CHILDREN ACT 2000 & PROBATION OF OFFENDERS ACT 1958.

a) Definitions of Juvenile etc under JJ (C & P of C) Act 2000, Juvenile justice Board and its procedure Observation Homes, Special Homes for Juvenile in conflicts of law, Escaped juvenile child welfare committee and its power and duties (Sec. 1-40)

b) Rehabilitation and Reorientation process - adoption, Foster care and after care organization and other important miscellaneous provisions (Sec. 41-70)

c) Probation of offenders' Act 1958 - Meaning and definition of Probation, its nature and history.

d) Admonition and Exemption from punishment below 21 years of age, Power of probation officer and his duty under the Act. (Sec. 1-19)

BOOKS RECOMMENDED -

1. D.D. Basu - Criminal Procedure code 1973, Rs. 400.00.
2. Ratanlal Dhirajlal -Criminal Procedure Code 17th Ed. 2004, Wadhwa, Nagpur.
3. Woodroffe - Commentaries on Code of Criminal Procedure. 2 Vol. 2000, Universal, Delhi.

SYLLABUS FOR B.A.LL.B SEMESTER-VI

PAPER – I

LAW OF EVIDENCE

UNIT-I INTRODUCTION, INTERPRETATION, CONCEPTIONS AND RELEVANCY (Chapter I & II)

a) Introduction- Main feature of the Indian Evidence Act. Problem of Applicability of Evidence Act.

b) Types of Evidence - Oral, Written and Circumstantial evidence, Medical evidence and evidence of relatives, Eye witness, Chance witness and child witness and direct witnesses.

c) Standard of proof and presumption - May presume, shall presume, conclusive proof, proved, disproved and not proved.

d) Relevancy of facts - Doctrine of resgestae (Sec. 6, 7, 8, 10). Evidence of common intention (Sec. 10). The problem of relevancy of "otherwise" irrelevant facts (Sec. 11). Relevant facts for proof of custom (Sec. 13) Facts concerning body and mental state. (Sec. 14 & 15)

UNIT-II ADMISSION, CONFESSION AND DYING DECLARATION AND STATEMENT MADE UNDER SPECIAL CIRCUMSTANCE (Sec. 17 to 39)

a) Admission - General principles concerning admission (Sec. 17 to 23)

b) Confession - Difference between admission and confession, non admissibility of confession caused by inducement, threat and promise and confession made before a police officer, Admissibility of custodial confession and other section relevant to confession. (Sec. 24-31)

c) Dying Declaration - The justification for relevance on dying declaration. The judicial standard for appreciation of evidentiary value of dying declaration (Sec. 32 & 33)

d) Statement made under special circumstance and how much of a statement is to be proved, (Sec. 34-39)

UNIT-III RELEVANCY OF JUDGEMENT, CHARACTER AND EXPERT TESTIMONY

a) Relevancy of judgment - General principles, Admissibility of judgment in civil and criminal matter. Fraud and collusion in obtaining judgment (Sec. 40-44).

b) Expert testimony - General Principles, Who is an expert ? Type of Expert evidence.

c) Opinion of relationship when relevant - specially proof of marriage and opinion as to the existence of right or custom or usage and tenancy and problem of judicial defence to expert testimony. (Sec. 45-51)

d) Relevancy of character in civil and criminal cases. (Sec. 52-55)

UNIT-IV ORAL AND DOCUMENTARY EVIDENCE, PRESUMPTION AND EXCLUSION (Chapter IV, V & VI)

a) Oral Documents and how it is proved ? requirement for valid and admissible oral documents. (Sec. 59-60)

b) Documentary Evidence - General Principles, public and private documents, How it is proved ? (Sec. 61-78)

c) Presumption as to documents of various types and kinds. (Sec. 79-90).

d) Exclusion of oral by documentary evidence. (Sec. 91-99)

UNIT-V THE BURDEN OF PROOF, ESTOPPEL, WITNESSES, EXAMINATION AND CROSS EXAMINATIONS (Part III)

a) The burden of proof - Facts which need not be proved. (Sec. 56-58), General Conception of onus, General and Special presumption and exception as to onus, presumption as to dowry death etc. (Sec. 101-114A)

b) Estoppel and witnesses - Estoppel by deed and estoppel by conduct, equitable and promissory estoppel. (Sec. 115-117). Various kinds of witness, communication - privileged and confidential Accomplice and information as to the commission of offences. (Sec. 118-134)

c) Examination of witnesses - General principles of examination, cross and re-examination, Leading questions (Sec. 141-143), Lawful question etc.

d) Cross examination of witness - General Principles of cross examination, lawful questions in cross examination, (Sec. 141-146), Compulsion to answer questions put to witness,

Hostile witness impeaching of the standing and or credit of witness (Sec. 135-166)

Books Recommended -

1. Ratanlal Dhirajlal - Law of Evidence, 21th Ed. 2004, PB, Wadhwa, Nagpur.
2. Sarkar - On Evidence (2 Vol.) 15th ed. 2002, Wadhwa, Nagpur, 2390=00
3. Avatar Singh - Principles of law of Evidence, Universal, Delhi.
4. Vepa P. Sarathi - Law of Evidence EBC, Lucknow.

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PAPER-II
CONSTITUTION LAW-I

CONSTITUTIONAL LAW OF INDIA

UNIT-I Philosophy of Constitution, Definition and Classification, Main features of Federal and Unitary Constitutions, Nature and Salient features of Indian Constitution, Welfare State, Preamble of the Indian Constitution, Union and its Territory(Art. 1-4), Formation of New States, Citizenship(Art. 5-11).

UNIT-II State, Fundamental Rights and their position under the Constitution, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies including Public Interest Litigation(Art.12-35)

UNIT-III Directive Principles of State Policy, their relevance, Comparison with Fundamental Rights, Classification of Directive Principles of State Policy, Correlation between Fundamental Rights(Art.36-51) Fundamental Duties(Art.51-A).

UNIT-IV Union Executive- President, Vice President, Council of Ministers, Attorney General, and conduct of Government Business (Art. 52-78). Union Legislature (The Parliament)-Constitution, Composition, Duration of Houses, Qualification of Members and other General Provisions, Officers of the Parliament(Art. 79-104),Powers, Privileges and immunities of the members (Art. 105-106),Legislative Procedure including procedure in financial matters(Art. 107-122), Legislative Powers of the President(Art. 123), Union Judiciary- Supreme Court of India(Art. 124-144), Comptroller General of India(Art.148-151)

UNIT-V State Executive-Governor, Council of Ministers, Advocate General for the State, Conduct of Government Business(Art. 152-167) State Legislature-Constitution, Composition, Powers, Privileges and immunities of State Legislatures and their Members, Legislative Procedure(Art. 168-212) Legislative Powers of Governor(Art. 213)
State Judiciary- High Courts in the States and Subordinate Judiciary (Art. 214-237):

LEADING CASES:

(1) Meneka Gandhi Vs. Union of India, AIR 1978 SC 597
(2) Hussainara Khatoon Vs. Home Secretary State of Bihar AIR 1979 SC 1396
(3) J.R. Cohilo Vs. State of Tamilnandu, AIR 2007 SC 861

RECOMMENDED BOOKS:

1	V.N. Shukla	Constitution of India
2	J.N. Pandey	Constitutional Law of India
3	M.P. Jain	Constitution of India
4	D.D.Basu	Shorter Constitution of India
5	Kagzi's	The Constitution of India
6	M.D. Chaturvedi	Bharat Ka Savindhan(Hindi)

Paper-III

CONSTITUTIONAL LAW-II
CONSTITUTIONAL LAW OF INDIA

UNIT-I Administration of Union Territories(Art.239-241), The Panchayats-Definitions, Gram Sabha, Constitution and Composition of Panchayats, Reservation of Seats, Duration, Disqualifications for Membership, Powers, Authority and responsibilities of Panchayats(Art.243-243-O)The Municipalities-Definition, Constitution and Composition of Municipalities and Wards Committees, Reservation of Seats, Duration, Disqualifications for Membership, Powers, Authority and responsibilities of Municipalities, Power to impose Taxes, Finance Commission etc.(Art.243-P-243-ZG)
The Scheduled and Tribal Areas (Art.244-244-A)

UNIT-II Relations between Union and the States-Legislative Relations (Art.245-255)
Administrative Relations, Disputes Relating to Waters and Co-ordination Between States (Art. 256-263), Provisions Regarding Finance(Art.264-279) Finance Commission(Art.280-281)Miscellaneous Financial Provisions(Art.282-290)Borrowing by the Government of India and the States(Art.292-293), Constitutional Provisions Regarding Property, Contracts, Rights, Liabilities Obligations and Suits(Art.292-300)
Right to Property (Art.300-A)

UNIT-III Trade Commerce and Intercourse (Art.301-307) Service under the Union and the States (Art. 308-313) Public Service Commissions (Art.315-323) Administrative Tribunals and Tribunals for other Matters (Art. 323-A-323-B), Provisions regarding Election and Election Commission (Art.324-329), Special Provisions regarding to certain Classes (Art. 330-342)

UNIT-IV Official Language-Language of the Union, Regional Languages, Language of the Supreme Court and the High Courts etc, Special Directives as to Languages(Art.343-351), Emergency Provisions(Art. 352-360) Miscellaneous Provisions(Art.361-367), Amendment of the Constitution(Art. 368),Temporary, Transitional and Special Provisions(Art,369-392),Short Title, Commencement, Authoritative Text in Hindi and Repeals, All Schedules and Amendments.

UNIT-V **Leading Cases:**

(1)- P.L.Dhingra Vs. Union of India, AIR 1958 S.C. 36
(2)- T.N. Seshan Vs. Union of India (1995) 4 SCC 611
(3)- Minerva Mills Vs. Union of India AIR 1980 S.C. 1789.

RECOMMENDED BOOKS:

1	V.N. Shukla	Constitution of India
2	J.N. Pandey	Constitutional Law of India
3	M.P. Jain	Constitution of India
4	D.D.Basu	Shorter Constitution of India
5	Kagzi's	The Constitution of India
6	M.D. Chaturvedi	Bharat Ka Savindhan(Hindi)

PAPER – IV

ENVIRONMENTAL LAWS INCLUDING WILD LIFE PROTECTION AND ANIMAL WELFARE

UNIT-I ENVIRONMENT & POLLUTION

a) What is environment? What is Pollution?

b) Types of Pollutions - its causes and effect;

c) AIR, WATER, SOIL, MARINE and NOISE Pollution.

d) Thermal Pollution and Nuclear Hazardous.

e) Pollution and Controlling Measure

Water (Prevention and Control of) Pollution Act, 1974

AIR (Prevention and Control of) Pollution Act 1981.

Relevant Provisionms of IPC 1860 i.e. S. 188.268, 269, 272.

277, 288, 290, 430.

UNIT-II ENVIRONMENTAL PROTECTION OF POLLUTION

a) Pollution Protecting agencies their power and functions.

b) Means of Protections and Sanctions in various Acts.

c) Protection of Bio-Diversity.

Legal Control - ECO friendly experimentation on animal plant, seed and micro organism, Disposal of Hazardous waste.

d) Emerging Protection through delegeted legislation.

e) Environment Protection (Act 1986)

UNIT-III INTERNATIONAL CONCERN ON ENVIRONMENT

a) Global conferences in environment e.g. - Stock Holm (1972) Nairobi Decembver 1982.

& Rio conferences (Prithvi Conferences) (1992) etc.

b) Ozone depletion. Vienna convention for Protection of the Ozone Layer (1985) its causes and effect on Earth, Green house effects, wet lands Mangrove etc.

c) U.N. Declaration on Right to development.

UNIT-IV WILD LIFE ANIMALS & ENVIRONMENT

a) Wild life, sancturies and National Parks.

b) State Monopoly in the sale of wild life and wild life articles.

c) Offences against wild life.

Wild life (Preservation) Act 1959.

Wild life Protection Act 1972 with amendment.

d) Forest conservation Act 1980.

Prevention of cruelty to Animal Act 1960.

UNIT-V ENVIRONMENT AND JUDICIARY

a) Morena Mandal Sahkari shakkar karkhana Society Vs. BIP Board of Prevention of Water Pollution (1993) M.P.L.J. 270.

b) Suresh Kumar Vs. State of Bihar AIR 1991 SC 420.

c) M.P. Rice Mills Association Vs. State of M.P. 1999.

d) Sntosh Kumar Singh Vs. Secretary Ministry of Environment New Delhi 1997(2) M.P.L.J. 602.

e) M.C. Mehta Vs. U.O.I. (1994) S.C.C. 750.

Books Recommended -

1. Trivedi R.K. & P.K. Goel-Introduction to Air Pollution (Techno Science Publication).
2. Jadhav & Bhosle V.M. -Environmental Protection and Laws (Himalaya Publishing House, Delhi)
3. Clark R.S. - Marine Pollution (Cleradon Press Oxford)
4. Cenninghm W.P. Cooper, T.H. Gorhani & Hepworth M.T. - Environmental Encyclopeadia (Jaico Publishing House, Mumbai - 1196 P.)
5. Rao R.N. & Dutta A.K.- Waste water Treatment (Oxford & IBH) 1987.
6. R.B. Singh & Suresh Mishra- Environmental Law in India (Concept Publishing Co. (New Delhi 1996).
7. Leela Krishnan P. (Ed.) - Law & Environment (EBC Lucknow 1990)
8. Leela Krishnan P.P. - The Environmental Law in India Butterworth India (1999)
9. Nagendra Singh - Environmental Law in India (1986)
10. Suresh Jain - Environemntal Law in India (1986)
11. B.L. Babel - Environmental Protection Law 1997.
12. Kailash Thakur - Environmental Protection Law & Policy in India (Deep & Deep Publishing Co., New Delhi (1977).
13. R.K. Trivedi - Hand Book of Environemntal laws, Rules Guidelines Compliance and standard Vol. I & II.

SYLLABUS FOR B.A.LL.B SEMESTER-VII

S.No	Papers	Max. Marks
1	Family Law-I Hindu law	100
2	Family Law-II Muslim law	100
3	Administrative Law & Right to Information Act	100
4 5	Law of Equity and Indian Trust Act,1882 (Practicals) : Professional Ethics and Professional Accounting System.	100
Total Marks		**500**

SYLLABUS FOR B.A.LL.B SEMESTER-VIII

S.No	Papers	Max. Marks
1	Labour and Industrial Law-I	100
2	Labour and Industrial Law-II	100
3	Human Rights and Public International Law	100
4	Insurance Law	100
5	(Practicals) : Alternative Disputes Resolution	100
Total Marks		**500**

SYLLABUS FOR B.A.LL.B SEMESTER-VII

PAPER – I

HINDU LAW

UNIT-I Nature, Origin, Sources, Applicability and General Principles of Inheritance :

Nature and origin of Hindu law, applicability of Hindu Law sources of Hindu law - Smiritis and their commentaries, custom, legislation, judicial decision, equity, justice and good consience as a source, general principle of inheritance (prior to Hindu succession Act 1956) in mitakshra law and Dayabhaga School and difference between Mitakshara and Dayabhaga succession and the Hindu Marriage Act 1955. (doctrine of representation & spes successionis)

UNIT-II Schools, Joint Hindu Family, Coparcenary adoption and provisions of Hindu Adoption and Maintenance Act 1956.

Schools of Hindu Law - Mitakshra and Dayabhaga and their sub-schools, difference between the Mitakshra and Dayabhaga school, comparation between them, Migration and the schools of law.

Joint Hinu Family - Origin, growth, nature and constitution members of J.H.F. and property of J.H.F.

Coparcenary - its nature, distinction between J.H.F. and copercenary, rights of copercener, Karta, his powers and duties, alienation of property comparision between Mitakshara and Dayabhag law. Debts - its liability to pay, nature and duration of liability, doctrine of pious obligation and anticedent debt, Bengal rule of Dayabhaga law, rule of Damdupat.

Adoption - Object form and requirement of valid adoption. Persons who may lawfully take in adoption - adoption by widow under authority from his husband, nature and form of authority, general rules as to adoption by widows, and termination of widows power to adopt Persons lawfully capable of giving in adoption & persons who may be lawfully taken in adoptionce only son, orphan, stranger, adoption by two persons, simultaneous result and effect of adoption, right of adopted son in property Maintenance under Hindu Las and provision of Hindu Adoption and Maintanance, Act 1956, and changes made by this Act.

UNIT-III Partitions, Stridhan, Women's Estate Gift & Hindu Succession Act 1956

Partition - Meaning of partition, partition and family arrangement, person entitled to partition, property lible to partition. Allotment of

share, final shares, reopening of partition and reunion point of similarity and distinction Mitakshara and Dayabhaga partial partition, its effect.

Stridhan : its meaning, kinds, special feature and characteristics, enumeration of stridhana, rights of a women over her stridhan, general rule to succession, common to all school, succession to stridhana, under Mitakshra and Dayabhaga school, maidens property.

Women's Estate - its meaning, nature and sources. Incidents of widow's estate, power of alienation, reversion, compromise surrender and setting aside. Unauthorised alienation and effect of Hindu Succession Act 1956.

Gift - its definition under T.P. and Hindu law. its subject matter, essential of valid gift, restriction and revocation. 'donatio mortis causa' and gift to trust and Provision of Hindu Succession Act 1956.

UNIT-IV Wills imparatible estate, religious and charitable endowments and H.M. Act 1955 & H.M. & G. Act 1956 :

Wills- Its definition, person capable of wills, property as a subject matter of wills, under mitakshara and Dayabhaga law revocation and alteration of wills. Bequest to unborn person when it is void ? Rules against perpertuity, latter of administration and probate.

Impartible estate - its definition, origin and nature, rules of succession and seperation of impartible estate.

Religious and charitable endowment- Essential of endowment kinds- idol, math, devasthanam, and Dharemshala, Mahant, Hindu Marriage Act 1955 & Hendu and Minority & Guardian ship Act 1956.

UNIT-V Some codified laws relating to Hindu & Leading Cases

Special Marriage Act 1954 (Whole Act)

Dowery Prohibition Act 1981 (Whole Act)

Family Courts Act 1984 (Whole Act)

Following Leading cases has been prescribe.

1. Shri Narayanlal V. Shridhar AIR 1996, SC 2371.
2. Jogendar Singh V. Smt. Jogender AIR 1998 SC, 1654.
3. Kisan Lal V. State (2000) ISCC 310.
4. Rameshwari Devi V. State of Bihar AIR 2000 SC 735 (739).
5. Balwant Kaur V. Chaman Singh AIR 2000 SC 1908-12.

6. Digamber Adhar Patel V. Dev Rani Girdhari Patel AIR (1995) SC 1728.

Books Recommended :

1. R.K. Agrawal - Hindu Law, C.L.A., Allahabad.
2. Paras Diwan - Modern Hindu Law (Universal).
3. S.T. Desai (Ed.) - Mulla Hindu Law (1996), Butterwrith, India.
4. Paras Diwan - Law of adoption, minority, guardianship and custody (2000) Universal.
5. Basu N.D. - Law of succession (Universal).
6. Paras Diwan - Law of intestate and testamentary succession (1998), Universal.

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PAPER II

FAMILY LAW II
MUSLIM LAW

UNIT-I History, Origin Development Sources and Schools of Muslim Law

Historical background of Islamic law - its origin and comparision with other personal laws. Who is Muslim ? Prophet and his companion, his tradition, development of muslim law.

Sources of muslim law- Primary sources Quran, Hadis, Ijma, Kyas, secondary sources- custom judicial decision legislation, comparison with sources of Hindu law.

Schools (section and sub-section) of Muslim law - Sunni School - Hanifi, Maliki, Shifai and Humbali, Shia School and their sub-sections, difference between both Shia and Sunni on important matter. Effect of conversion to Islam and Apostasy.

UNIT-II Marriage Dower (Mehr) and Divorce :

Marriage (Nikah) - Its object and nature, requisite and condition for valid marriage. Effect of incapacity absolute, ralative and declaratory, kind of marriage, option of puberty. Restitution of conjugal rights muta marriage, difference between Shia & Sunni law and marriage.

Dower (Mehr)- Definition, nature & classification of dower law of shia sect on dower, confirmation of dower, remission of dower, non-payment of dower effect of apostacy on mehr iabilities of heir for dower, dower as a debt. widows rights in case of non-payment of dower, Kharchi-i-pandan, & Mehr-i-misl.

Divorce (Talaq)- Quranic provisions regarding talaq kind, nature, classification and effect of divorce on the parties, apostacy and conversion as ground of divorce, Iddat utility its ratianale and utility divorce through agrement or by mutual consent Khula, Mubarat, Ila & Zihar, Lian; Effect of false charges of adultary. Tolaq-i-Tafwid, Fask (Anulment of marriage by court) provision of dissolution of Muslim marriage Act. 1939. Legal Effect of Divorce, Difference between Shia & Sunni Law on Divorce.

UNIT-III Parentage, Legitimacy & Acknowledgement, Guardianship and Maintenance :

Parantage - Maternity and paternity. How it is established ? Legitimacy and acknowledgement, acknowledgement as a proof Of legitimacy, presciption of legitimacy condition of valid

acknowledgement and its effects. Position of adoption in Muslim Law ? A comparision between acknowledgement and adoption.

Guardianship (Vilaya) - Concept of guardianship in Islam. Appointment of guardian. Their kinds age of majority, disqualification of guardian, guardianship of property. Power of guardian to despose of to purchase and to alienate the immovable property of the miner.

Maintenance (Nafaqa)- Introduction, definition and quran decree regarding maintenance, Person entitled to maintenance. Relevent provision of Muslim women (Protection of right on divorce) Act 1986.

UNIT-IV Succession Administration Inheritance and Wills :

Succession- General rule of succession and exclusion from succession.

Administration - Administration of the estate of a decesed. Provision of Indian succession act 1925.

Inheritance- General rule of Inheritance (sunni & shia) Position of birth right and heritable property. Principle of renunciation and transfer of chance of succession (spes succession) vested inheritance classification of heirs- sharer, restduary and distance kindered. Their share and distribution of property. Doctrine of increase (Aul) Return (Radd) and position of rules relating to (shia & sunni) illegitimate child, missing person, acknowledge kins man, universal legatee & successor by contact eldest son and childless widow.

Wills- Person capable of making wills, its forms, position of heir on wills, limit of testamentary power, abatement and lapse of legacy, subject of legacy, position of unborn person in wills, various kinds of bequest i.e. bequest in future, contingant and conditional alienation, revocation of bequest, its types, position of probate and letter of administration is case of muslim wills.

UNIT-V Marzul Maut Hiba & Waqf and Pre-emption & Leading Cases

Marzulmaut- Death bed gift, its condition for validity acknowledgement of debt at death-bed. Hiba (gift)- Definition, capacity of making gift extents of doners powers. Gift to unborn person, gift with intent to defraud creditor, position of gifts i.e. - gift of actionable claim and incorporal property, gift of equity of redemption, gift of property held adversely to doner, requisite for gift and essential of gift (declaration acceptaure & delivery of possession), Gift of morable and immovats and carpor & property and incorporal property and actionable claim, gift in family and out of family, gift to bailee to two are more donee : Mushaa, conditional & contingent gift, gift in future, revocation of gift, Gift

with exchange (Hiba-bil-iwaz) Hibh-ba shartul iwaz, sadaqah areeat.

Waqf- Definition, object and subject of waqf, condition for valid waqf, doctrine of cy-press. Form and kind of waqf, waqf how completed ? Revocation of waqf, contingant waqf, waqf aald aulad, alienation of waqf property, muttawalli- his appointment power and function & renuwal and provision of waqf act 1995, Khanqah, imambera, sajjadanashir kazi, takiya.

Pre-amption- its nature and kind, who may claim it, its requisite and condition.

Leading Cases :

1. Kapoor Chand v. Kedarunnisa (AIR 1953 S.C.413)
2. Janjira Khatoon v. Mohd. Fakrulla (AIR 1922 Cal 429)
3. Habibur Rahman v. Atafali (AIR 1922 PC 159)
4. Maina Bibi v. Chawdhari Vakil Ahme... 673 (PC) (AIR 1925 PC 63)
5. Ms. Jorden Diegdeh vs. S.S. Chopra (AIR 1985 SC 935)

Recommended Books :

1. Syed Khalid Rashid - Muslim law - EBC Lucknow (Hindi English)
2. A.A.A. Fyzee - Outline of Muhammada law (1998)
3. A.M. Bhattacharya - Muslim law and the constitution
4. Aquil Ahmed - Muslim law - CLA Allahabad (Hindi)
5. S.K. Awasthi - The waqf act 1995 (Hindi/English) India law House 22, Sikh Mohalla, Indore
6. Mulla's - Principles of Mohammedan law, Tripathi
7. Scatcht - Mohd. Jurisprudence.
8. Caulson - Principles of Mohd. mheritence.

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PAPER - III

ADMINISTRATIVE LAW

UNIT-I Introduction of administrative law, administrative process, discretion and direction :

Meaning, nature, history and function of administrative law, sources of administrativelaw, its origin and scope, reasons for its growth, its historical development in England, America and India, administrative law and constitutional law, droit administrative ... and council, D. Etate, constitutional foundation of administrative law, the rule of law, its meaning, supremacy of regular laws and equility before the laws, doctrine of seperation of powers, its meaning and its position in U.K., U.S.A. & India.

Administrative Process - Nature of administrate process, and its classification, legislative, judicial, quasi-judicial and pure executive action, their characteristics and difference among them.

Administrative Descretion - Meaning, nature and criteria, its use or principle applicable for its use, need for administrative discretion, limit on excercise of discretion, malafide excercise of discretion acting under dictation, constitutional imperetive... and use of discretionary authority, non-application of mind, unreasonableness and standard of reasonableness, taking irrelevant consideraion or not taking in to consideration among releveant matter, non excercise of discretionary powers, administrative arbitrariness and bias. Procedural safe guards for use of discretion.

Administrative Direction - its use and classification, its unenforceabrility.

UNIT-II Delegated legislation, Adminsitrative adjudication & Tribunal

Delegated legislation, its historical background and function, reasons for its growth, need for delegation of administrative power, kinds of delegated legislation, sub-delegated legislation and conditional legislation, constitutionality of delegated legislation in Britain and India, Re Delhi Laws Act, Power of exclusion and inclusion and power to modify statutes, essential legislative functions, requirement for the validity of delegated legislation.

Judicial control of delegated legislation - Doctrine of ultravires, its kinds, substantive and procedural grounds for its applicability, consulation, sub delegation, publication, administrative directions, circular legislative or parliamentary control on delegated legislation, laying procedure, policy statement, committees on delegated legislation and hearing before it, sub delegation & powers, guide-lines for it, and control of sub delegation, administrative adjudication and tribunals, reasons for proliferation of administrative tribunals, functional approach characteristics and

feature of administrative tribunals, Basic difference between a court and a tribunals, position of tribunals in India, CAT its purpose, establishment and composition, jurisdiction power and authorities, aspect of tribunal practice and administrative procedure, procedure before the enquiry or hearing, procedure at the tribunal hearing and procedure after tribunal hearing, frank committee report, administrative tribunal act 1985, administrative tribunals and appeal judicial review and finality of the tribunal decision, reopening of tribunal proceeding rule of resjudicate, Administrative tribunals in India.

UNIT-III Judicial Control of Administrative Action and Natural Justice

Power of the High Court, writ jurisdiction of High Court under arical 226, limitation of jurisdiction, territorial limit, general limitations, Locus standi, non-existance of alternative remedies lashes, acquiescence, doctrine of legitimate expectation, doctrine of public accountability, doctrine of proportionality, grounds and condition for writs and orders, mandamus, certiorary prohibition, Quo warrants, Habeous corpus, nature of relief practice and procedure, power of supreme court under Art 32, role of natural justice on administrative law - principals of natrual justice, (1) No man shall be a judge in his own cause or if he has any bias (Pecunary personal & official) against a party or any interest in subject matter of the enquiry (2) andi Alterm Partem - "Hear the other side and limit of audi altarum partem (3) The party must be known the reasons for the decisions, the use of principle of natural justice in deciplinary process and exclusion & violation of principles of natural justice and its effect.

UNIT-IV State Liability for Wrongs Act & Commission of Inquiry & Corporate:

Liabilities for torts, distinction between sovereign and commercial functions, contitutional provisions in this regard, act of state and statutory immunities contractual liability of Govt., Government privilege in legal proceeding state secrets, public interest, transperancy and right to information estoppec and waiver.

Remedies against administratative acts, constitutional remedies writ injunctions, its nature and types, distinction between injunction and mandamus, suit for declaration, its condition and nature, suits for damages.

Public enquiry and commission of enquiry, general enquiry under service rules, procedure in disciplinary action and Provisions of commission of enquiry act 1952, and

Corporation : Corporations, its kinds and characteristics, its classification, legal and constitutional provisions & their responsibilities in contract and in tort, position of their employee

whether they are civil servants ? control on corporation, legislative control, judicial control, governmental control and public controls.

UNIT-V-Ombudsman,Vigilancecommission&RighttoInformationAct

Ombudsman, its development in Newzealand, Britain and Australia, Position of Ombudsman in India, Lokpal and Lokayukt and their position, Public Interest litigations its nature and importance in Democracy.Central vigilance commissions its powers and functions

Right to Information Act,2005-Introduction, Right to Information and Voluntary Organization, Right to Information in the Foreign Countries, Request for Right to Information, Constitution, Rights and Obligations of the Information Agencies, Procedure of Disposal of Applications and Complaints by State Commissions with special reference to Section 18, 19 and 20 of Right to Information Act 2005.

: **leading cases**

1. A.K. Karipak v. Union of India (AIR 1970 SC 150)
2. Bharat Bank Ltd. v. Employees of Bharat Bank (AIR 1970, SC188)
3. Registrar Co-operative societies v. Kunjabamu and other (AIR 1980, SC350)
4. Hira Nath Mishra v. Principal, Rajendra Medical College, Rachi (AIR 1973 SC1260)
5. Bhagat Raja, Union of India (AIR 1967 SC1606)
6. Kasturilal Ralia Ram v. State of U.P. (AIR 1965 SC1039)

Books Recommended :

1. Jain and Jain - Principles of Administrative law, Tripathi (1986).
2. Wade - Administrative law (Indian Rep.) Universal Delhi.
3. J.C. Garner - Administrative law, Butherworth (1990)
4. D.D. Basu - Comparative Administrative law (Prentice Hall).
5. I.P. Massey - Administrative law EBC, Lucknow. (1996).
6. M.P. Jain - Cases and material on Indian Administrative law (Vol I & II) 1998

   Universal book traders Delhi.
7. S.P. Sathe - Administrative law (1998), butterworth (India), Delhi.
8. De Smith - Judicial review of Administrative Action (1995) with supplement, Sweet & Maxwell.
9. M.A. Fazal - Judicial control of administrative action in India Pakistan & Bangladesh (2000), Butterworth India.

10. Indian law institute - Cases and material on Admininstrative law in India vol. I (1996), Delhi.
11. D.R. Saxena - Ombudsman, Deep & Deep Delhi.
12. Tusharkanti Saha - Adminstrative law - Kanishk Publication, New Delhi.
13. V.G. Ramchandran - Administrative law, Eastern Book Co., Lucknow.
14. Foulkes - Introduction to Administrative law, Butterworth.
15. Bhagwati Prasad Banerjee - Writ Remedies (1999) Wadhwa, Nagpur.
16. M.P. Jain - The evolving Indian Administrative law (1983) Tripathi, Bombay.

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Paper- IV

LAW OF EQUITY AND INDIAN TRUST ACT, 1882

PART-A

EQUITY

UNIT-I Historical Introduction- Concept of Equity, Principles of Equity, Nature and Scope of Equity, Equity under the Roman, English and Indian Legal System.

Origin and Growth of Equity in England-Origin of Equitable Jurisdiction, Procedure in Equity.

UNIT-II Division of Equity Jurisdiction-Exclusive, Concurrent and Auxiliary Jurisdiction Equity and the Common Law- Distinctive Features of Equity and Common Law, Relation of Equity with Common Law, Fusion of the Administration of Equity and Common Law, The Judicature Act, 1873-1875, Object and Effect of the Judicature Act

UNIT-III Maxims of Equity.

Nature of Equitable Rights and Interest, Classification of Equitable Rights, Penalties and Forfeitures, Mortgages, Liens and Charges, Married Women, Guardians, Infants, Idiots and Lunatics, Conversion and Re-conversion, Election, Performance Satisfaction and Ademption, Administration of Assets, Mistake , Misrepresentation, Fraud and Undue Influence, Accident, Set-off, Equitable Assignments and Equitable Estoppels.

PART-B

UNIT-IV **INDIAN TRUST ACT, 1882**

Historical Background- Importance of Trust, Origin and Development of Trust under Roman Law, English Law and Indian Law.

Definition of Trust and Comparison with other Analogous Relations, Kinds of Trusts, Public or Charitable Trust, Doctrine of Cypres, Creation of Trust, The Appointment and Discharge of Trustees, The Duties and Liabilities of Trustees, The Rights and Powers of Trustees, Disabilities of Trustees, Rights and Liabilities of Beneficiaries, Vacating the Office of Trustee, Extinction of Trust, Certain Obligation in the Nature of Trust.

UNIT-V **LEADING CASES:**

1- Deoki Nandan Vs. Murlidhar and Others AIR 1957 S.C. 133.
2- Jankiram Ayyar Vs. Neelkanth Ayyar, AIR 1962 S.C. 536.
3- Shyamlal Yadu Rao Bhau Vs. Yesha Ram Lodku Pavan AIR 1954 Nag. 334
4- Satyanarayan Vs. G. Velloji Rao AIR 1965 S.C. 1465

RECOMMENDED BOOKS:

1-	Snell	Principles of Equity
2-	S.T.Desai	Indian Trust Act
3-	G.P. Singh	Equity, Trust and Specific Relief
4-	Aqil Ahmed	Equity, Trust with Fiduciary Relations and Specific Relief Act
5-	Basanti Lal Babel	Equity, Trust and Specific Relief Act(In Hindi)
6-	Suryanarayan Iyer	Indian Trust Act

Paper-V

PROFESSIONAL ETHICS AND PROFESSIONAL ACCOUNTING SYSTEM

(PRACTICALS)

OUTLINE OF THE COURSE: Professional Ethics, Accountancy for Lawyers and Bar-Bench Relations

This Course will be taught in association with practicing lawyers on the basis of following materials.

(i) Mr. Krishnamurthy Iyer's book on "Advocacy"
(ii) The Contempt Law and Practice
(iii) The Bar Council Code of Ethics
(iv) 50 selected opinion of the Disciplinary Committees of Bar Councils and 10 major judgments of the Supreme Court on the subject
(v) Other reading materials as may be prescribed by the University

SCHEME OF EXAMINATION

(1)	Written Examination	50
(2)	Seminar two (each of 10 marks)	20
(3)	Project Report (on any topic of the material)	20
(4)	Viva-Voce	10

The written examination shall be conducted from the prescribed course. The seminar shall also be conducted from the important topics of the materials. The presentation of Project Report and appearance in seminar and viva-voce examination is compulsory. The candidate who does not appear in seminar and viva-voce examination or who does not prepare Project Report will be declared fail in this paper.

The Practical work/Project Report shall be submitted by the students in own handwriting in the College. The evaluation shall be made by the college on the basis of participation and record. The college after valuation shall be sent the diaries and marks to the University. The Principal may himself evaluate and allot marks on the record or may authorize any senior member(s) of the staff, for this purpose. In the later case The Principal shall countersign on the awarded marks.

DETAILED COURSE CONTENT OF WRITTEN EXAMINATION (50 marks):

UNIT-I GENESIS NATURE AND EVOLUTION OF INDIAN BAR

a) Evolution of Indian Bar - Regulating Act 1773. Bengal Regulation of 1793. and The Legal Practitioners Act 1846.

b) The Legal Practitioners Act 1853 and the legal practitioners Act 1879.

c) The Bar Councils Act 1926 and The Report of the All India Bar Committee 1953.

d) History and circumstances before the passing of the Advocate Act 1961.

UNIT-II SOURCES & SANCTIONS OF PROFESSIONAL ETHICS & MISCONDUCTS

a) Sources of Rules of Professional Ethics - Judicial and extra Judicial sanctions and advantages of study of professional ethics.

b) Lawyers misconduct - Professional and others.

c) Equipment of Advocate Reverence for the law learning public service, brotherhood organization. Love for professional ideals.

d) Independence and integrity of The Bench and the Bar.

UNIT-III PRIVILEGES RIGHTS POWERS AND DISABILITIES OF LEGAL PRACTITIONERS

a) Right and duties of Advocates

b) Privileges of Advocate

c) Powers of Legal practitioners

d) Disabilities of legal practitioners

UNIT-IV **ADVOCATES AND THEIR RELATION WITH OTHERS IN THE LIGHT OF B.C.I. RULES 1976**

a) Advocate and the Court.

b) Advocates relation with his opponent and with his client.

c) Advocates relation with his colleagues and witnesses

d) Advocates and the public and other employment and Advocates

UNIT-V **ADVOCATE ACT, CODE OF ETHICS AND CONTEMPT OF COURT**

a) Indian Advocates Act, 1961.

b) The contempt law & practice - Indian contempt of court Act 1976.

c) Other statutory provisions relating to contempt in IPC, Cr.P.C and CPC.

d) Supreme Court on professional misconduct - Important cases.

BOOK RECOMMENDED

1. C.L. Anand - Professional Ethics of the Bar (Law Book Co., S.P. Marg Allahabad).
2. V.G. Ramchandran's - Contempt of Court EBC, Lucknow.
3. The Bar Council Code of Ethics and Indian Advocate Act 1961.
4. Indian Contempt of Court Act 1996.
5. M. Krishnamurthy - Advocacy
6. AVROM Sherr - Advocacy, Universal Book Traders, 80, Gokhale Market, Delhi.

SYLLABUS FOR B.A.LL.B SEMESTER-VIII

Paper-I

LABOUR AND INDUSTRIAL LAWS-I

This Paper includes Following Statutes

(1) The Industrial Disputes Act, 1947

(2) The Trade Unions Act, 1926

(3) The Workmen's Compensation Act, 1923

(4) The Payment of Wages Act, 1936

(5) The Minimum Wages Act, 1948

Detail Course Contents

UNIT-I **General Introduction**-Industrial Jurisprudence, Labour Policy in India, Industrial Revolution of India, Evil of Industrialization, Labour Problems, Principles of Labour Legislation, Growth of Labour Legislation in India, Classification of Labour and Industrial Legislations.

UNIT-II **The Industrial Disputes Act, 1947**—Preliminary, (Sec. 1-2), Authorities under this Act (Sec. 3-9), Notice of change (Sec. 9A -9 B), Reference Of Certain Individual Disputes To Grievance Settlement Authorities (Sec. 9C), Reference of Disputes to Boards, Courts or Tribunals (Sec. 10- 10A), Procedure, Power and Duties of Authorities (Sec. 11-21), Strikes and Lockouts (Sec. 22-25), Lay-Off and Retrenchment (Sec. 25A-25J), Unfair Labour Practice (Sec. 25T-25U), Penalties (Sec. 26-31).

UNIT-III **The Trade Unions Act, 1926**-- Preliminary,(Sec. 1-2), Registration of Trade Unions (Sec. 3-14), Rights and Liabilities of Registered Trade Unions (Sec. 15-28), Regulations (Sec. 29-30), Penalties and Procedure (Sec. 31-33).

The Workmen's Compensation Act, 1923-- Preliminary, (Sec. 1-2), Workmen's Compensation (Sec. 3-18), Commissioners – Reference to Commissioners, Appointment and Powers of Commissioners, Powers and Procedure of Commissioners, Appeals (Sec. 19-21), Rules 32-36, All Schedules, All Schedules and amendments made from time to time.

UNIT-IV **The Payment of Wages Act, 1936**-- Preliminary, (Sec. 1-2), Responsibility for Payment of Wages (Sec. 3-6), Deductions which may be made from wages (Sec. 7-13), Authorities under the Act, Inspectors, Facilities to be afforded to Inspectors, Authorities to hear claims, Single application in respect of claims from unpaid group, Appeal (Sec. 14-17),

Power of authorities appointed under section 15 (Sec. 18-19), Miscellaneous Provisions (Sec. 20-26).

UNIT-V **The Minimum Wages Act, 1948**-- Preliminary, (Sec. 1-2), Fixing of minimum rates of wages (Sec. 3-6), Advisory Board (Sec. 7-9), Wages in kind (Sec. 10-17), Maintenance of Registers and Records, etc. (Sec. 18-21), Penalties, etc. (Sec. 22-26), Power of Govt. to make rules (Sec. 27-31), All Schedules and all amendments made from time to time

LEADING CASES:

1. A Maikenji Vs. J.S. Ishaq AIR 1970 SC 1906
2. Banglore Water Supply and Sewerage Board Vs. A. Rajappa and Others AIR 1978 SC 553
3. Pottery Majdoor Panchayat Vs. The Perfect Pottery Co. Ltd. A.I.R. 1979, S.C. 1356.

Books Recommended:

1. H.K. Sharey - Industrial & labour laws in India (Prenctice-Hall) New Delhi.
2. I.A. Sayieed - Labour laws, Himalayan Publishing Co. Nagpur
3. Reshma Arora - Labour law, Himalayan Publishing Co. Nagpur
4. S.K. Mishra - Labour and Industrial law - Allahabad law agency H.N. 387, Sector 16-A Faridabad.
5. Taxmann - Labour laws - Bare Act (Taxmann allied series, Allahabad)
6. S.C. Shrivastava - Treatise on social security and labour laws EBC Lucknow.
7. S.N. Mishra - Labour & Industrial laws CLA Allahabad.
8 P.L. Malik - Hand Book of Labour and Industrial laws, EBC Lucknow.
9. Seth D.D. - Commentaries on Industrial Act (Law publishing house - Allahabad)
10. K.D. Shrivastava - Commentary of payment of wages act (1998) EBC Lucknow.
11. O.P. Malhotra - The law of Industrial Disputes (1998) Universal Delhi.
12. V.G. Goswami - Labour and Industrial laws, CLA Allahabad.
13. P.K. Padhi –Labour and Industrial Laws, Prentice Hall of India Pvt. Ltd. New Delhi.

Paper-II

LABOUR AND INDUSTRIAL LAWS-II

This Paper includes following Statutes:

(1) The Employees' State Insurance Act, 1948

(2) The Factories Act, 1948

(3) The Child Labour(Prohibition and Regulation) Act, 1

(4) The Maternity Benefits Act, 1961

(5) The Gratuity Act, 1972

Detail Course contents:

UNIT-I **The Employees' State Insurance Act, 1948**—Preliminary (Definitions) (Sec. 1-2), Corporation, Standing Committee and Medical Benefit Council (Sec. 3-25), Finance and Audit (Sec. 26-37), Contributions (Sec. 38-45), Benefits (Sec. 46-59), Adjudication of Disputes and Claims (Sec. 74-83), Penalties (Sec. 84-86).

UNIT-II **The Factories Act, 1948**-- Preliminary (Definitions) (Sec. 1-7), Inspecting Staff (Sec. 8-10), Health (Sec. 11-20), Safety (Sec. 21-41), Welfare (Sec. 42-50), Working hours of Adults (Sec. 51-66), Employment of Young persons (Sec. 67-77), Annual leave with wages (Sec. 78-84).

UNIT-III **The Child Labour(Prohibition and Regulation) Act, 1986**- Preliminary (Definitions) (Sec. 1-2), Prohibition of Employment of Children in certain occupations and processes (Sec. 3-5), Regulation of conditions of work of children (Sec. 3-5), Miscellaneous (Sec. 14-26).Causes of child labour and Present prospect of child labour in India.

UNIT-IV **The Maternity Benefits Act, 1961**-- Preliminary (Definitions) (Sec. 1-3), Employment of, or work by woman prohibited during certain period , Right to payment of maternity benefit, Notice of claim for maternity benefit and payment thereof, Payment of maternity benefit in case of death of a woman, Payment of medical bonus, Leave for miscarriage, Other leaves, Nursing breaks, Dismissal during absence of pregnancy, Deduction of wages, Appointment of Inspectors, Powers and duties of Inspectors (Sec. 4-22), Cognizance of Offence (Sec. 23).

UNIT-V **The Gratuity Act, 1972**-- Preliminary (Definitions) (Sec. 1-2), ControllingAuthority, Payment of Gratuity, Nomination (Sec. 3-6), Determination of the amount of gratuity (Sec. 7), Inspector , Recovery of gratuity, Penalties (Sec. 8-9), Cognizance of Offences (Sec. 11-14), Power to make rule (Sec. 15)

LEADING CASES:.

(!) B.Shah Vs. Labour Court AIR 1978 SC 12

(2) Ahemdabad Private Primary Education Association Vs. Administrative Officers (2004) I SCC 755

(3) Peoples Union for Democratic Rights Vs. Union of India AIR 1982 SC 1480

Books Recommended:

1. H.K. Sharey - Industrial & labour laws in India (Prenctice-Hall) New Delhi.
2. I.A. Sayieed - Labour laws, Himalyan Publishing Co. Nagpur
3. Reshma Arora - Labour law, Himalyan Publishing Co. Nagpur
4. S.K. Mishra - Labour and Industrial law - Allahabad law agency H.N. 387, Sector 16-A Faridabad.
5. Taxmann - Labour laws - Bare Act (Taxmann allied series, Allahabad)
6. S.C. Shrivastava - Treatise on social security and labour laws EBC Lucknow.
7. S.N. Mishra - Labour & Industrial laws CLA Allahabad.
8 P.L. Malik - Hand Book of Labour and Industrial laws, EBC Lucknow.
9. Seth D.D. - Commentaries on Industrial Act (Law publishing house - Allahabad)
10. K.D. Shrivastava - Commentary of payment of wages act (1998) EBC Lucknow.
11. O.P. Malhotra - The law of Industrial Disputes (1998) Universal Delhi.
12. V.G. Goswami - Labour and Industrial laws, CLA Allahabad.
13. P.K. Padhi –Labour and Industrial Laws, Prentice Hall of India Pvt. Ltd. New Delhi.

PAPER – III

HUMAN RIGHTS AND PUBLIC INTERNATIONAL LAW

UNIT-I HUMAN RIGHTS IN GENERAL

a) Human Rights its meaning and Nature.

b) Its definitions and classification.

c) Human Rights as a Right in juristic Sense.

d) Its existence in religions.

UNIT-II HUMAN RIGHTS IN INTERNATIONAL PERSPECTIVE :

a) Human Rights its development and emerging trend in Universal sphere & Role of NGO's & specialised agencies in its protections.

b) International Bill of Rights and Universal Declaration of Human Rights 1948.

c) The conventions on the Rights of Child and The conventions on the elimination of discrimination against woman.

d) International convention on Economic Social & Cultural Rights 1966.

UNIT-III HUMAN RIGHTS IN REGIONAL & NATIONAL PERSPECTIVE

a) Constitutional Protection of Human Rights in India.

b) Protection of Human Rights Act 1993.

c) Human Rights Protection frame work of India - National Human Rigths commission its constitutional powers and duties.

d) The conventions on the elimination of all forms of Racial discrimination and struggle against Aparthied.

UNIT-IV PUBLIC INTERNATIONAL LAW & STATE

a) Public International Law its defintion, Nature, Sources, Hisotry and development.

b) Relationship between international and Municipal law and difference between Public International law and Law of conflicts subjects of PIL.

c) State - its nature, evolution, and criteria of statehood, its recognition, succession and responsibility.

d) Nationality, Extradition Asylum and principle of self determination.

UNIT-V INTERNATIONA LAW AND USE OF FORCE

a) Law of War and peace, Intervention and Neutrality, Treaty Covenant, immunities.

b) Law of the Sea - Territorial.water, continental shelf, sea bed, occean-floor, Economic zone, Blockade, contiguous zone.

c) Settiement of International dispute by use of force, by peaceful means. Role of UNO and their specilised agencies.

Recommended Reading Material :

1. J.K. Starke - An Introduciton to the International Law.
2. J. L. Brierley - The Law of Nations (Oxford)
3. A.K. Pillai - National Human Rights Commission.
4. S.K. Verma - An Introduction to Public International Law (Prentice-Hall India).
5. All the Covenants and Conventions.
6. Shaw M.N. - International law (CUP).
7. M.C. Nair - The Law of Treaties (Oxford)
8. Paras Diwan & Piyushi Diwan - Human Rigths & The Law - Universal & Indian.
9. S.K.Kappor - Human Rigths under International Law and Indian Law Central Law Agency Allahabad.
10. D.D.Basu - Human Rights in Constitutional Law (Prentice - Hall

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PAPER- IV

INSURANCE LAW

UNIT-I INTROCUCTION, NATURE, HISTORY AND DEVELOPMENT

a) Definition and nature of Insurance. Difference between Assurance and Insurance.

b) Concept of Insurance and Law of contract and Law of torts.

c) History and Development and importance of Insurance, contract of insurance and its characteristics.

d) Provision of Insurance Act 1938.

UNIT-II GENERAL PRINCIPLES OF INSURANCE

a) Various principles of Insurance - Principles of co-operative probability and legal principles, Principles of good faith and non-disclosure, Misrepresentation in insurance contract. Principles of contribution and principles of proximate.

b) Principles of insurable interest - The risks, classification of risks, Provision of warranty & Principles of warranty and subjugation.

c) Nature, kind and classification of insurance contract.

d) The policy - classification of policies, its forms and contents, its commerncement, duration, calculation of premium, cancellation, alteration, reduction, rectifications, construction and assignment of subject matter.

UNIT-III LIFE INSURANCE AND MARINE INSURANCE

a) Nature, scope and definition, condition for life insurance contract. The policy and formation of life insurance contract, circumstances affecting the risk. Amount recoverable under the policy and person entitled to payment, settlement of claim and payment of money. Distinction between nomination and assignment and double insurance and reinsurance. Life Insurance Corporation Act 1956.

b) Marine insurance - Meaning, Scope and History. Essential elements of marine insurance contract, classification, procedure and conditions of marine insurance and provisions of Indian Marine Insurance Act 1963.

c) Tax benefit from life insurance and Life Insurance (Emergency provisions) Act 1956.

d) Provision of the General Insurance Business (Nationalization) Act 1972.

UNIT-IV INSURANCE AGAINST THIRD PARTY RISKS

a) Insurance against third party risks, Motor vehicle Act 1988 (Chapter XIII)

b) Motion, scope, definition, statutory, contract between Insurer and Driver. Rights of third party. Limitation on third party rights. Duty to inform third party.

c) Effect of insolvency or death on claim certificate of insurance or conditions to be satisfied.

d) Claim tribunals' constitutions, functions, application for compensation, Who can apply ? Procedure and powers of claim tribunals and its awards.

UNIT-V MISCELLENEOUS INSURANCES AND PRESENT POSITION IN THE LIGHT OF GLOBALIZATION

a) Miscellaneous insurance, including fire insurance.

b) Provisions of public liability Act 1991 Except Schedule.

c) Insurance in Global perspective and in present scenario.

d) Provisions of Insurance Regulating and Development Authority Act 1999.

BOOK RECOMMENDED :

1. Ivamy - General Principles of Insurance Law (1993) Butterworth
2. M.N. Shrinivasan - Principles of Insurance Law (1997), Ramaniya Publisher, Banglore.
3. John Birds - Modern Insurance Law (1988), Sweet & Maxwell.
4. Brij Anand Singh - New Insurance Law (2000) Union Book Publisher, Allahabad.
5. M.N. Mishra - Law of Insurance, Central Law Agency, Allahabad

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PAPER- V
ALTERNATIVE DISPUTES RESOLUTION
(PRACTICALS)

Outline of the Course :

(i) Negotiation skills to be learned with simulated program.

(ii) Conciliation skills.

(iii) Arbitration Law and Practice including International arbitration and Arbitration rules.

The course is required to be conducted by senior legal practitioners through simulation and case studies. Evaluation may also be conducted in practical exercises at least for a significant part of evaluation.

SCHEME OF EXAMINATION

(1)	Written Examination	50
(2)	Seminar two (each of 10 marks)	20
(3)	Project Report (on any topic of the material)	20
(4)	Viva-Voce	10

The written examination shall be conducted from the prescribed course. The seminar shall also be conducted from the important topics of the materials. The presentation of Project Report and appearance in seminar and viva-voce examination is compulsory. The candidate who does not appear in seminar and viva-voce examination or who does not prepare Project Report will be declared fail in this paper.

The Practical work/Project Report shall be submitted by the students in own handwriting in the College. The evaluation shall be made by the college on the basis of participation and record. The college after valuation shall be sent the diaries and marks to the University. The Principal may himself evaluate and allot marks on the record or may

authorize any senior member(s) of the staff, for this purpose. In the later case The Principal shall countersign on the awarded marks.

DETAILED COURSE CONTENT OF WRITTEN EXAMINATION (50 marks):

UNIT-I Arbitration : meaning scope and types, Arbitration Agreement- essentials , nds , Who can enter into arbitration agreement? Validity, Reference to arbitration, Interim measures by Court

.UNIT-II Arbitral Tribunal, Appointment, Jurisdiction of arbitral tribunal, Grounds of challenge, Powers, Procedure, Court assistance, Award, Rules of guidance, Form and content, Correction and interpretation, Grounds of setting aside an award--Want of proper notice and hearing , Contravention of composition and procedure, Impartiality of the arbitrator, Bar of limitations, Res judicata, Consent of parties, Enforcement.

UNIT-III Appeal and Revision, Enforcement of foreign awards, New York Convention Award, Geneva Convention Awards.

UNIT-IV Conciliation: Distinction between "conciliation", "negotiation", "meditation" and "arbitration", Appointment of conciliator, Interaction between conciliator and parties, Communication, disclosure and confidentiality, Suggestions by parties, Resort to judicial proceedings, legal effect, Costs and deposit repeal.

UNIT-V Rule making power: Legal Services Authorities Act, Lok Adalat, Legal Camp.

BOOKS RECOMMENDED:

1. Avtar Singh : Arbitration and Conciliation.
2. Goyal : Arbitration and Conciliation Act.
3. Shukla : Legal remedies.
4. Jhabvala : Law of Arbitration and Conciliation.
5. Dr. N.V.Paranjape: Arbitration and Alternative Dispute Resolution.

SYLLABUS FOR B.A.LL.B SEMESTER-IX

PAPER - I

LAND LAWS INCLUDING OTHER LOCAL LAWS

1. The Chhattisgarh Land Revenue Code 1959 (Amended 2006)

2. The C.G. Ceilings on Agricultural Holding Act, 1960 (as Amended 2006)

UNIT-I C.G. LAND REVENUE CODE - Historical Development, Definitions, Abadi, Agriculture,Agriculture Year, Bonafide Agriculturist, Board, Co-operative Society,Government, Forest, Government Lessee, Holding. Improvement, Land, Landless Person, Land Records,Legal Practitioner, Mango Grove, Orchard, Recognised Agent, Rent,Revision,Revenue Officer, Revenue Year, Sub-Division of Survey Number, Tenant,Tennure Holder, Timber Tree,Urban Area, Unoccupied Land,Village, To Cultivate Personally, Survey Number.

UNIT-II Board of Revenue, Revenue Officers and their Classes and Powers, Procedure of Revenue Courts,Appeal Revision and Review, Land and Land Revenue,Revenue Survey and Settlement in Non-Urban Areas, Assessment and Re-asessment of Land Revenue in Urban Areas.

UNIT-III Land Records,Boundaries And Boundary Marks and Survey Marks, Tenure Holders, Governmaent Lessee and Service Land, Occupancy Tenents, Alluvian and Diluvian, Consolidation of Holding, Village-Oficers, Rights in Abadi and Unoccupied Land and its Produce.

UNIT-IV C.G.on Agricultural Holding Act, 1960 : Definitions, Exemptions and Restrictions on Transfer of Land, Fixing of Ceiling Area, Determinationof Surplus Land ana Acquisition Thereof, Payment of Compensation in Cumbrances on Surplus Land,Offences and Penalties and Miscellaneous.

UNIT-V **Leading Cases**

1. State of M.P. Vs. Poonam Chand, 1968, J.L.J. 116.
2. M.P. State Vs.Babulal And others, 1980, J.L.J. 856 (SC).
3. Harprasad. B Horelal Vs. Board of Revenue, 1964, M.P.L.J. 370.
4. Nandu Vs. Babu and others. 965, M.P.L.J. 178.
5. Manmohan Lal Shukla Vs. Board of Revenue, 1964, M.P.L.J. 32.

Books Recommended :

1. M.P. Land Revenue Code - H.N. Dwivedi.
2. M.P. Land Revenue Code - R.D. Jain.

INTELLECTUAL PROPERTY LAW

PAPER-II

UNIT-I Introduction Nature Basic Concepts and International Conventions

Nature and meaning of Intellectual property, need for protection of right of intellectual property. The types of intelletual property. The types of intellectual property and enhancement of area of I.P. History and introduction to the leading international intstrument concerning intellectual property rights i.e. WIPO (world intellected property organisation) and its paris convention on protection of industrial property (PIP) and patents co-operation treaty (PCT) The Berne (1971) and Rome convention (1961) on copy right. Universal copy right convention (UCC) of 1952, and neighbouring rights and madrid agreement on trade mark registration.

The general agreement on tariffs and trade (GATT) and its creations, World trade organisation (WTO), Uruguay Round (April 1997) and its highly significant instrument "Trade Related intellectual property agreement" (TRIPS).

UNIT-II Copyrights its contents and forms & related act :

Copyrights its history and definition, provisions of Copy-right act 1957 and copyrights (amedment) act 1994 which includes copyright its nature and meaning. Subject matter of copyright, forms of copyrights, ownership of copyrights assignment of copy rights. copyrights as an authors special rights. Notion and criteria of infringment, their definition and exception, proposition relating to infringement, authorisation of infringment, acts not constituting infringment, infringment of literary, dramatic, musical and artistic works, cimetographic films and sound recording.

Remedies against infringment of copyright - nature and kind of remedies civil and criminal under Copyright Act sec. 55-57, 62, 63-70, slender of title Anton Piller order, international copyrights, copyrights societies and copyright office, copyrights board, legislation of copyright and appeal.

UNIT-III Trade Marks & designs - their nature & related acts :

Introduction definition evolution and concept of trade marks, Districtions between trade marks and property works, the doctrine of honest current user and doctrine of deceptive similarity, provisions of The trade mark act 1999, it includes definition and interpretation, condition for registration, trade mark registry. Property in a trade-mark, registration of trade mark, its refusal, Berne principles of registration of trade marks, its procedure and evidence. Marks, not registrable, effect and limit on effect. registered trade work, assignment and transmission of registered

trade marks, use of trade mark and registered user, ractification and correction of the registration, collective marks, provisions relating to textile goods, offences, penalties and procedure, appellate board, its constitution, powers and duties and procedures and other miscellaneous provisions of the act, provisions of Design act 2000, it includes following chapter - definition, registration of design, copyright in registered design legal proceedings, general powers and duties of controller Evidence agency & powers of central government.

UNIT-IV Patents its introduction grant, registration and patents act 1970 :

Provisions of Patents act 1970 which includes patents, its introduction concept and history, process of obtaining patents, specification, application for patents, examination of application, position to grant a patent, invention not patentable, register of patents and patent office, register and obligation of a patent. Transfer of patent right, Right of the Govt. in case of use of invention provisions for secracy of certain invention. Patents in addition, procedure for restoration of lapse palents. revocation and surrender of patients. Registeration of patents, patents office, its constitution, controller and its power, infringement of patents and treat of infringement proceedings of officers penalties for the Volation of act. licences .. of right, compulsory licences patent agent etc. and miscellaneous provision of the act.

UNIT-V The Information Technology Act 2000 and Leading Cases

Provision of ITA 2000, it includes introduction, need, coverage, definition digital signature, electronic record certifying authorities, electronic governance, their regulation, penalties, cyber regulation appellate tribunals under ITA act and following leading cases.

1. Grama phone co. of India v. B.B. Pandey (AIR 1984 SC 667)
2. Indian Performing Right Society Ltd. v. Eastern India Molion pictures association (AIR 1977 SC 1443).
3. Monsanto Co. v. Caromandal Idag product (AIR 1986, SC 712).
4. American House Product Corpn. v. Mac Laboratories (Pvt) Ltd. (AIR 1986 SC 137)
   (Dristan Case)

Books Recommended :

1. Parvin Anand - The law of Intellactual Property (Batter Worth)
2. Bibek Deb Roy - The Intellectual Property Rights (B.R. Publishing, New Delhi)

3. Terrel - Law of Patents (Rajiv Gandhi Institute of Concept Studies)
4. P.S. Sanyal & Kishore Singh - Indian Patent System
5. Stewart - International copyright and neighbouring right.
6. P. Narayanan - Intellectual Property Law (Eastern Law House, Kolkata / Delhi, 315/-)
7. Vikas Vashisth - Intellectual Property Law (Bharat Law House)
8. Cornish W.R. - Intellectual Property Patents, Trade Names, Copyrights and allied rights (1999) (Universal law publishing Co. Pvt. Ltd.) Ansal's Dilkhush Industrial Estate, G.T. Karnal Rd., Delhi.
9. W.R. Cornish - Intellectual Property (Sweet & Maxwell)
10. Mata Din - Law of passing off and infringement action of trade marks.
11. UIE Anderfelt - International patent legislation and developing countries.
12. The Patent Act 1970
13. The Design Act 2000
14. The Trade Mark Act 1999
15. The Copyright Act 1957.
16. The Information Technology Act, 2000.

PAPER – III

COMPANY LAW

(The Companies Act, 2013 WITH AMENDMENTS)

UNIT-I Introduction, History and Definition of Company, Registration of Corporate Entity, Corporate Veil, Company and Hindu undivided Family, company and Partnership, Club, Association of Persons, Advantages and Disadvantages of Incorporation, Kinds Companies and Application of the Act.

Interpretation and Definitions of Various Terms.

UNIT-II Formation of Companies, Promotion, Promotor and his Rights and Liabilities, Incorporation, Memorandum of Association and Articles of Association, Doctrine of Ultra-Vires, Prospectus, Definition, Contents of Prospectus Punishment for Misrepresentation in the Prospecuts, Members of the Company, Members and Shareholders and Public Trustees.

UNIT-III Share and Share Capital,Allotment of Share,Statutory Restriction on Allotment, General Principles as to Allotment, Company which cannot issue prospectus,, Irregular Allotment, Return as to Allotment, Issue of Share at Discount, Underwriting Commission, Brokerage, Issue of Share at Premium,Share Capital : Definition, Nature of Share Certificate, Position of Transferor and Transferee, Procedure, Blank Transfer, Right to Refuse Registation, Restriction on the Acquisition and Transfer of Share, Certificate of Transfer, Kinds of Share, Power of Company to Accept Payment in Advance of Calls. Reserve Liability, Alteration of Capital Reorganisation of Share Capital. Reduction of Capital, Share Warrant.

Directors, Position of Directors, Appointment, Powers and Duties of Directors, Other Office Bearers of the Company.

UNIT- V Dividend, Debenture, Accounts and Audit, Borrowing Powers of the Company, Investment and Contract, Majority Powers and Minority Rights and Rule of Foss and Harbottle, Mismanagement and Reonedies ---------- Compromise.

Arrangement, Reconstruction and Amalgamation, Investigation and Liquidation and Consequences of Winding up of the Companies.

UNIT-IV Leading Cases

1. Saloman Vs. Soloman and Company Ltd., 1897, PC 22.
2. Income Tax Commissioner Vs. Shri Meenakshi Mills, A.I.R., 1967, SC 819.
3. Nareshchand Vs. Calcutta Stock Exchange Association AIR 1971, SC 422.
4. N. Goverdhandas & Company Vs. N.W. Industries Pvt. Ltd. AIR 1971, SC 2600.
5. Official Liquidator Vs. P.A. Tandolkar AIR 1973, SC 1104.
6. R. Methlone Vs. Bombay Life Insurance Corporation Ltd. AIR 1953, SC 195.

Books Recommended :

1. Company Lax - Philip. K. Thayil.
2. Lectures on Company Law - S.M. Shah.
3. Indian Company Law - Awtar Singh.
4. Company Law - R.R. Maurya.
5. Company Law - Dr. Ramchandran.
6. Students Guide to Company Law – Taxmann
7. Company Law- N.V Paranjape.

PAPER- IV

LAW OF TAXATION

UNIT – I GENERAL INTRODUCTION:

Historical Perspective
Historical Development of Tax Laws in India
Concepts of tax
Nature & characteristics of taxes
Distinction between tax & fee, tax, & cost
Distinction between Direct & Indirect tax

UNIT- II INCOME TAX ACT, 1961:

Preliminary – Short Title, Extent and Commencement, Definitions, Previous Year Defined(Sec. 1-3) - Basis of charges of Income Tax: Residential status of assesses – its impact on tax liability(Sec. 4-9) Incomes which do not form part of total income(Sec. 10-13)

UNIT-III

Computation of Total Income(Heads of income) Salaries, Income from House Property, Profits and Gains of Business or Profession, Capital Gains and Income from Other Sources – general concepts – chargeability to tax – admissible & inadmissible deductions, exclusions and deductions from income(Sec. 14-59)
Income of other persons included in assessee's Total Income(Sec. 60-65), Aggregation of Income and set- off and carry forward of losses(Sec. 66-80) Deductions to be made in computing total income, Deductions in respect of certain Payments and certain incomes and other deductions, Rebate of Income Tax and Relief for Income Tax(Sec. 80A-89),

UNIT- IV

Income tax authorities- Appointment and Control, Jurisdiction, powers & functions, Disclosure of Information(Sec.116-138), Procedure for Assessment(Sec.139-158), Collection and Recovery of Tax-Deduction at source and Collection at source, Advance payment of tax, Collection and Recovery , Interest Chargeable in some cases and Refunds,(Sec. 190-245)Allotment of permanent account number, Settlement of Cases-Appeals and Revision, Appeals to the Appellate Tribunal, Reference to High Court, Appeals to High Court, Appeals to the Supreme Court, Revision and reference(Sec. 245A-269) Penalties Imposable(Sec. 270-275) Offences and Prosecutions-Penalties and prosecutions under income tax act, 1961 for non- compliance, contravention, avoidance and evasion of tax(Sec. 275A-280)

UNIT – V C.G. VALUE ADDED SALES TAX ACT, 2003

Preliminary-Short Title, Extent and Commencement, Definitions, Taxing Authorities, Incidence of Tax(Sec. 1-7) Levy of Tax(Sec. 8-15) Registration of Dealers(Sec.16-18),Returns, Assessment, Payment and Recovery of Tax(Sec.19-38), Refund of Tax, Accounts and Issue of Acts, invoices or cash memoranda(Sec.39-42) Certain powers of the Commissioner and Delegation by the Commissioner(Sec.43-47), Appeals, Revision and Rectification(Sec.48-56), Detection and Prevention of Tax Evasion(Sec.57-63), Offences and Penalties(Sec.64)Miscellaneous and Power to make Rules(Sec.65-74)

LEADING CASES:

1- Commissioner of Income Tax Vs. Anwar Ali AIR 1970 SC 1982

2- Calcutta Discount Co. Ltd. Vs. Income Tax Officer,(1961)41 ITR 191(SC) Reoppening of Assessment Section-147(9)

3- Dwarka Das Keshardeo Morarka Vs. Commissioner of Income Tax(1962)42 ITR 529 On law of Estoppel in Taxation

4- Jute Corporation of India Vs. CIT, AIR 1991 SC 341

BOOKS RECOMMENDED:

1- A.K. Saxena	Income Tax Act
2- Kailash Rai	Income Tax Act
3 V.K. Shusha Kumari	Law of Income Tax
4- B.L. Babel	Pratyaksh Kar Vidhayan, Aparadh, Abhiyojan Evam Shastiyam

Paper –V
Moot Court Exercise and Internship

This paper may have three components of 30 marks each and a viva for 10 marks :

a. Moot Court (30 marks)- every student may be required to do at least three moot courts in a year with 10 marks for each. The moot court work will be on assigned problem and it will be evaluated for 5 marks for written submissions and 5 marks for oral advocacy.

b. Observance of Trial in two cases, one Civil and one Criminal (30 marks).

Students may be required to attend two trials in the course of the last two or three years of LL.B studies. They will maintain a record and enter the various steps observed during their attendance on different days in the court assignment. This scheme will carry 30 marks.

(c)Interviewing techniques and Pre-trial preparations and Internship dairy 30 marks.

Each student will observe two interviewing sessions of clients at the Lawyer's Office/ Legal Aid Office and record the proceedings in a diary, which will carry 15 marks. Each student will further observe the preparation of documents and court papers by the Advocate and the procedure for the filing of the suit/ petition. This will be recorded in the dairy, which will carry 15 marks.

(d)The fourth component of this will be Viva Voce examination on all the above three aspects. This will carry 10 marks.

The Court work shall be submitted by Student in own handwriting in the College/SOS in Law. The evaluation shall be made by the college/SOS in Law on the basis of participation and record. The college/SOS in Law after valuation shall sent the diaries and marks to the University. The Principal/ Head may himself evaluate and allot marks on the record or authorize any senior members of the staff, for this purpose. In the later case the Principal/Head shall countersign on the awarded marks.

Books Recommended:

1. Moot Court, Pre-trial Preparation and Participaticipation in trial Proceedings - O.P. Mishra (Advocate).
2. Moot Court Pre-trial Preparation and Participation in trial Proceedings - Dr. S.P. Gupta.

3. Moot Court Pre-trial Preparation and Participation in trial Proceedings – J.P.S.Sirohi.
4. Practical training for Law students – Prof. J. k. Mittal.

SYLLABUS FOR B.A.LL.B SEMESTER-X

PAPER - I

TRANSFER OF PROPERTY ACT, 1882 AND INDIAN EASEMENT ACT, 1882

UNIT - I Historical evolution of Law of property, Introduction, Short title, Commencement, Repeal of Acts, Interpretation Clause (Ss 1-3), Transfer of Property by act of Parties - Definition of Property, Rule of Transferability, Persons Competent to Transfer, Operation of Transfer and Oral Transfer (Ss 5-9), Condition Restraining Alienation, Restriction Repugnant to Interest, Condition Making Interest Determinable on Insolvency or Attempted Alienation (Ss 10-12), Transfer for the Benefit of Unborn Person, Rule against Perpetuity etc. (Ss 13-18), Vested interest and Contingent Interest (Ss 19-24), Conditional Transfer, Doctrine of Acceleration, Doctrine of Conditional Limitation (Ss 25-34), Doctrine of Election (Ss 35-37), Transfer of Immovable Property (Ss 38-53-A).

UNIT-II Sale of immovable property : Definition, Competency of Parties, Difference between Sale and Agreement to Sale, Rights and Liabilities of buyer and Seller (Ss 54-57), Mortgages charges of immovable (Ss 58), Property, Definition, Kinds of Mortgages, Obligation to transfer to third party instead of Mortgagor, Rights and Libilities of Mortgager (Ss 58-66), Rights and Libilities of Mortgagee (Ss 67-77), Other Provisions Related to Mortgage including charges (Ss 78-104).

UNIT-III Leases of immoval property Definition, Essential Elements of Leases, Modes of Leases, Rights and Liabilities of Lessor and Lessee, Doctrine of Waiver, Determination of Lease and Other Related Provisions (Ss 105-117), Exchanges (Ss 118-121), Gift (Ss 122-129), Transfer of Actionable Claims (Ss 130-137).

UNIT -IV Indian Easement Act, 1882 :- Introduction (Ss 1-3), Easement in General (Ss 4-7), Imposition, Acquisition and Transfer of Easements (Ss 8-19), Incidents of Easement (Ss 20-21), Disturbance of Easement (Ss 32-36), Extinguishment, Suspension and revival of easements (Ss 37-51), Licenses, Definition, Ingredients and Revocation of Licenses (Ss 52-64)

UNIT - V Leading Cases :

1. Nainsukhdas Shivnarayan Vs. Goverdhan das AIR 1948, Nagpur 110.
2. Associated Hotel of India Vs. R.N. Kapoor AIR 1962, SC 1262.
3. Jama Masjid Vs. Koci Manindra Deviah and other, AIR 1962, SC 807.
4. Kedarnath Vs. Shivnarayan AIR 1970, SC 1717.
5. Kanji Manji Vs. Trusters of Port of Bombay AIR 1963, SC 268.
6. Murari Lal Vs. Devkaran AIR 1965, SC 225.

Books Recommended

1. Transfer of Property Act - Mulla
2. Sampatti Antaran Adhiniyam - G.P. Tripathi
3. Sampati Antaran Adhiniyam - S.N. Shukla
4. Transfer of Property Act 1882 - S.N. Shukla
5. Law of Easement - S.T. Desai
6. Transfer of Property Act, 1882 - G.P. Tripathi

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PAPER - II

CIVIL PROCEDURE CODE AND LIMITATION ACT

1. **Civil Procedure Code 1908**
2. **Limitation Act, 1963**

UNIT - I Civil Procedure Code - Historical Background, Introduction, Short Title, Definition, Kinds of Courts and their Jurisdiction, Stay of Suit, Resjudicata, Bar to Further Suit etc. (Ss 1-14), Place of Suing, Institution of Suit, Summons and discovery, Judgment and Decree, Interest and Costs (Ss 15-35-B), Execution Proceedings, Courts by which decree may be executed, Procedure in Execution, Arrest, Detention, Attachment and Sale, Resistance to Execution (Ss 36-74), Incidental Proceedings, Suit in Particular case, Suit by or against the Government, Suit by Aliens and by or against foreign rulers/ambasdors suits against rulers of former Indian States and Interpleader Suit (Ss 75-88), Appeals, Reference, Review and Revision (Ss 96-115), Miscellaneous Proceedings, Application for Restitution, Right to Lodge a Caveat, Power to make-up deficiency of Court fees, Inherent Powers of Courts, Amendment of Judgement, decrees and order and General power to Amend (Ss 144-153).

UNIT-II Parties to Suits, Plaintiff and Defendants, Representative Suit, Joinder, Misjoinder and non- joinder, (Order - I Rules 1-13), Frame of Suit, Recognised Agents and Pleader, Institution of Suits, Issue and Service of Summons (Order II - V), Pleading Generally, Plaint, Written-Statement, Set-off and Counter-Claim (Order VI-VIII), Appearance of Parties and Consequences of non-appearance, dismissal of suits and ex-party Decree and Order, Examination of Parties by the Court, Discovery and Inspection, Admission, (Order IX-XII), Settlement of Issues and Determination thereof, Summary Disposal, Summoning Attendance and Examination of Witnesses, Adjournment of Hearing and Affidavit (Order XIV-XIX).

UNIT-III Judgement and Decree, Execution of Decrees and Orders, Death, Marriage and Insolvency of Parties, Withdrawal and Adjustment of Suits (Order XX-XXIII), Commission, Suits by or against the Government and Public Officers, Suits Involving a Substaintial Question of Law, Suits by or against Military, Nevel or Airmen, Suits by or against Corporation, Suits by or against Firms, Trustees, Executors and Administrators, Suits by or against Minors and Persons of Unsound Mind, Suits Relating to Matters, Concerning the Family, Suit by Indigent Persons, Suits Relating to Mortgagor, Interpleader Suit (Order XXIV-XXXV), Arrest and

Attachment before Judgment, Temporary Injunctions and Interlocutory Order, Appointment of Receiver, Appeal from Original Decrees, Appeal from Appellate Decrees, Appeal from Orders, Appeal by Indingent Persons, Appeal to the Supreme Court, Reference and Review (Order XXXVIII-XLVII).

UNIT-IV Limitation Act, 1963 - Historical Background,Short Title, Extent,Commencement and Definition (Ss 1-2), Limitation of Suits, Appeals and Applications (Ss 3-11), Computation of Period of Limitation, Exclusion of Time in Legal Proceedings, Effect of Death on or befor the accrual of right to Sue, Effect of Fraud or Mistake, Effect of Acknowledgement in Writing, Effect of Substituting or Adding New Plaintiff or Defendant etc. (Ss 12-24), Acquisition of Ownership by Possession, Acquisition of Easement by Prescription, Reversioner and Extinguishment of Right to Property (Ss 25-27).

UNIT-V **Leading Cases -**

1. P.G.H. Patil Vs. R.S. Patil and others AIR 1957, SC 363.
2. M.P. Shrivastava Vs. Mrs. Veena AIR 1967, SC 1193.
3. Kiran Singh & Others Vs. Chaman Paswan and others AIR 1954, SC 340.
4. State Vs. Administrator AIR 1972, SC 749.
5. Hindustan Auaeronautics Vs. Ajit Prasad AIR 1973, SC 76.

Books Recommended

1. Civil Procedure Code - Mulla
2. Civil Procedure Code - Viswanath Iyer
3. Code of Civil Procedure - P.K. Majumdar
4. A Guide to Civil Procedure Code - Rama Rao
5. Civil Procedure Code - Sarkar
6. Civil Procedure Code - M.P. Jain
7. Law of Limitation & Prescription - U.N. Mitra
8. Law of Limitation - Dr. N.M. Swami
9. Limitation Act - Sarkar

PAPER - III

INTERPRETATION OF STATUTES

UNIT-I Principles and Legislation-Law Making - Legislature, Executive and Judiciary, Principle of Utility, Operation of these Principles upon Legislation, Distinction between Morals and Legislation.

INTERPRETATION OF STATUTES - Introduction, Meaning, Commencement, Operation and Repeal of Statutes, Purpose of Interpretation of Statutes Classification of Statutes.

UNIT-II GENERAL PRINCIPLES OF INTERPRETATION - Primary Rules, Literal Rule, Golden Rule, Mischief Rule (Rule in the Hydon's Case) Rule of Harmonious Construction. Secondary Rules, Noscitur a Soclis, Ejusdem Generis, Reddendo Singula Singulis, Utres Magis Valeat Quam Pereat, Contemporanea Expositio est Fortissima in Lege.

PRESUMPTIONS IN STATUTORY INTERPRETATION - Presumption as to Jurisdiction, Presumption Against inconvenient or Absurd, Presumption Against Intending Injustice,Presumption Against Impairing Obligations or Permitting from One's Own Wrong, Prospective Operation of Statutes.

UNIT-III AIDS TO INTERPRETATION AND MAXIMS OF STATUTORY INTERPRETATION - Internal Aids and External Aids, MAXIMS - Delegates Non Potest Delegare, Expressio Unius Exclusio Alterius, Generalia Specialibus non Derogant, In Pari Delicto Potior Est Condition Possidentis,Utresvalet Potior Quam Pareat, Expressum Facit Cessare Tacitum, Jure Nature Sunt Immutabillia.

UNIT-IV Interpretation with Reference to the Subject Matter and Purpose - Beneficial Construction,Strict Construction of Penal Statutes and Taxing Statutes, Construction and Interpretation of Welfare Legislation, Harmonious Costruction of the Statutes, Interpretation of Statutes in Pari Materia, Amending, Consolidating and Codifying Statutes, Mandatory and Directory Enactments and Conjunctive and Disjunctive Enactments.

UNIT-V Principles of Constitutional Interpretation - Principles of Implied Powers, Incidental or Ancillary Power, Doctrine of Pith and

Substance and Colourable Legislation, Principles of Implied Prohibition, Occupied Field and Territorial Nexus, Doctrine of Severability and Repugnancy and Doctrine of Eclipse and Ancillary Powers.

Retrospective and Prospective Operation of Statutes.

Books Recommended :

1. Principles of Statutory Interpretation - G.P. Singh.
2. Interpretation of Statutes and Legislation - M.P.Tondon and Rajesh Tondon.
3. Statute Law - Craies.
4. Interpretation of Statutes - V.P. Sarthi.
5. Maxwell's Interpretation of Statute - N.M. Tripathi.

PAPER - IV

CRIMINOLOGY AND PENOLOGY

UNIT-I Definition of Crime and Criminology, Relation of Criminology with other Sciences, Schools of Criminology, Classification of Crimes, its causes and means of control, Socio-economic crimes, white Collar Crime, Organized crime, and crime against women.

UNIT-II Juvenile delinquency, its determining factors, differential association, anomaly, and Economic pressure. Difference between Crime and Juvenile Delinquency, Vagarency and Recidivism, Borstals system, reformatory and other correctional institutions of Juvenile, Juvenile court and observation Homes.

UNIT-III Definition of Penology and its scope. Theories of punishment, its objects and kinds, capital punishment and its efficacy, Human Rights and Penology.

UNIT-IV Indian prison system, Its administration, organization, mode of Recruitment and Training for Jail personal, Jail manual and powers of prison Officials, classification of Prisoners - Male, Female, Juvenile and Adult, under-trial, Rights of the Prisoners, and duties of custodial staff.

Probation and Parole - Probation of offender's Act - 1958. The suspended sentence. Nature of Parole. Authorize for granting parole and supervision, conditional release. After care service and Prisoners Aid Cell.

UNIT-V Police and Criminal Justice, Structural organization of Police at Central and State, mode of recruitment and training. Powers and Jurisdiction of Police under various Acts. Arrest, Scizer, Methods of Police Investigation and Liability of Police for custodial death.

RECOMMENDED READING MATERIAL

1. IYER -Prospects in Criminology-Law and Social changes (1980).
2. MANHEIM - Comparative Criminology - A Text Book (1965).
3. ROSS A. - Law and Deviance (1981).
4. SUTHERLAND - Principle of criminology (1978).
5. S. RAO - Crime in our Society (1983).
6. A. SIDDIQUE - Criminology Problem and Perspective (E.B.C.) (Lucknow)
7. E. SUTHERLAND - White Collar Crime (1949).
8. P.H. KOHN - Juvenile Offender and the Law (1971).

9. W. RACKLESS - The prevention of Juvenile delinquency (1972)
10. I.L.I. - Habitual Offender and the Law (1983).
11. INSTITUTE OF SOCIAL DEFENCE- Towards delinquency Control.
12. DAVID ABRAHAMSON - Crime and the Human mind (1974).
13. WALKER, N. - Crime and Criminology - a Critical Introduction.
14. RADZINOWITZ LEION - Ideology of crime (1960).
15. GUILACK SHELDON - Unrevealing Juvenile delinquency.
16. J.M. SETHNA - Society and the Criminals.
17. DAVID ABRAHAMSON - The psychology of Crime.
18. KRISHNA IYER REPORT ON FEMALE PRISONERS - 1986.
19. SCHAZBBRA - The quantum of punishment in Criminal Law.
20. ALF ROSS - ON GUILT-Responsibility and Punishment.
21. LAW COMMISSION OF INDIA - Forty Second Report - Chapters (1971)
22. T.K. BANERJEE - Back Ground of Indian Criminal Law (1990)
23. K.S. SHUKLA - Adolescent off ender (1985).
24. UNITED NATIONS - Begging Rules on Treatment of Young Offenders.
25. P.P. RAJGOPAL - Violence and Response - A Critique of Indian Criminal Justice and System.
26. KATHERNE S. WILLIAMS - Text Book on Criminology (1997), Blackstone London (1997).
27. LOVE LAND - The Frontiers of Criminology (1995) Sweet & Maxwell) 1995.
28. D.C. PANDEY - Hostile offenders and the law (1983).

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PAPER - V

DRAFTING, PLEADING AND CONVEYANCING

There shall be two parts of this paper. Part- A will consists of theoretical aspect of drafting, pleading and conveyancing caring 70 marks.

Part- B will be based on the practical works caring 30 marks including 10 marks of viva-voce.

The theatrical paper of 70 marks will be taught through the class instructors and simulation exercises preferably with the assistance of retired judges/ practicing lawyers.

PART – A (70 marks)

Part – A shall consist of the following:

UNIT - I Pleading:

(i) Civil: General Principles of Pleadings with Special Reference to the Following :-

Plaint and written statement with reference to the suits mentioned below :-

(a) Money Suit

(b) Ejectment Suit

(c) Injunction

(d) Interlocutory application under the provisions of C.P.C.

(e) Suits under Hindu Marriage Act, 1955

(f) Suits for Specific Performance of Contract

(g) Original Petition

(h) Affidavit

(i) Execution Petition

(j) Memorandum of Appeal and Revision

(k) Petition under Articles 226 and 32 of the Constitution of India.

UNIT-II

(ii) **Criminal:** - Criminal Pleadings with respect to the following:-

(a) Drafting of First Information Report (FIR U/S 154, Cr.P.C.)

(b) Drafting of Challan/Charge sheet (under section 173, Cr.P.C.)

(c) Drafting of Charge by the Court

(d) Complaints for Commission of offences u/s 294, 323/324, 325, 341, 352 and 506 of the Indian Penal Code.

(e) Criminal Miscellaneous Petition. Interlocutory Application.

UNIT-III (a) Drafting of Bail Application u/s 436 and 437 of Cr.P.C.

(b) Drafting of Anticipatory Bail Application u/s 438, Cr.P.C.

(c) Drafting of Cancellation of bail application u/s 439 (i) and (ii) of Cr.P.C.

(d) Maintenance application u/s 125-128, Cr.P.C.

(e) Memorandum of Appeal and Revision.

UNIT-IV **Conveyancing** : General Principles of Conveyancing with special reference to the following :-

(a) Sale Deed

(b) Mortgage Deed

(c) Lease Deed

(d) Exchange Deed

(e) Gift Deed

(f) Will Deed

(g) General Power of Attorney

(h) Promissory Note

UNIT - V (a) C.G. High Court Rules and Orders (Civil)

(b) C.G. High Court Rules and Orders (Criminal)

PART – B (30 marks)

Part – B will be based on the practical work carrying 30 marks including 10 marks of viva-voce.

Practicals

Students will be required to attend the Civil Court for 5 days. The student will observe the proceedings of the Court and take down notes thereon.

After the completion of the attendance and observation of the Court the student will have to submit the report of the proceedings and procedural aspects with their own comments

The evaluation shall be made by the College/SOS in Law on the basis of Participation and record. The Principal/ Head may himself evaluate and allot marks on the record or authorize any senior member of the staff for this purpose. In the later case, the Principal/Head shall countersign on the awarded marks.

Books Recommended :-

1. Mogha's - Pleading
2. Mogha's - Conveyancing
3. N.S. Bindra - Pleading and Practice
4. Murli Manohar - Art of Conveyancing and Pleading
5. Shiv Gopal - Conveyancing, Precedents & Forms.
6. A.K. Banergee and S.k. Awasthi – Guide to Drafting.
7. Prof. J.K. Mittal : Practical training for law student

ORDINANCE NO. 60
MASTER OF LAWS (LL.M.) EXAMINATION

1. The Course for the Degree of Master of Laws under this Ordinance shall Extend over a period of two academic years comprising four semesters in all, for each semester there shall be held an examination in the papers prescribed for the said semester concerned. These semesters shall be called as :

LL.M. Part-I	-	First Semester
LL.M. Part-I	-	Second Semester
LL.M. Part-II	-	First Semester
LL.M. Part-II	-	Second Semester

2. LL.M. First Semester shall be made in the month of July every year and the Second Semester examination shall be held in the month of January of the following year.

   Examinations for all the Semesters shall be held twice a year, namely, January/February and July/August.

3. (a) A Candidate who after having passed the three years course for the degree of Bachelor of Laws of the University or of any other statutory University recongnised as equivalent thereto, with atleast 55% of marks (incase of ST/SC/OBC candidate 50% of the marks LL.B. or equivalent Examination) has prosecuted a regular course of prescribed study for one Semester session in the University Department of Law or any college affiliated to the University shall be eligible to appear at the LL.M. Part-I, First Semester Examination.

   (b) A candidate who after having passed LL.M. Part-I, 1st Semester Examination of the University has prosecuted a regular course of prescribed study for one semester session in the University Department of Law, or in an affiliated College shall be eligible to present himself/herself at the LL.M. part-I, Second Semester Examination.

   (c) A candidate who, after having passed LL.M. Part-I, Second Semester Examination of this University has prosecuted a regular course of prescribed study for one Semester session in the University Department of Law or a College affiliated to the University shall be eligible to appear at LL.M. Part-II, First Semester Examination.

   (d) A candidate who after having passed the LL.M. Part-II, First Semester Examination of this University has prosecuted a regular course of study for one Semester session in this University Department of Law or a College affiliated to the University shall be eligible to appear at the LL.M. Part-II, Second Semester Examination.

4. (a) No candidate shall be permitted to appear for any of the LL.M. Semester

Examination unless he has attended atleast 75% of the total number of Lectures and Seminars held during the Semester session.

(b) Every student of the College/University Teaching Department seeking admission to the examination shall submit through the Principal or Head of the Department as the case may be, application on prescribed form, together with necessary fees and following certificates from the Principal / Head of the Department, viz certificates of :

i. Good Conduct
ii. Fitness to present , himself/herself at the examination and,
iii. Of having attended the class teacher's seminars, etc. during the session atleast the minimum number's prescribed in sub-para (a) above.

(a) No candidate who has appeared in any LL.M. Semester Examination but has not been declared successful thereat in accordance with the provisions contained in the following sub para shall be eligible for admission to the next higher semester class examination.

(b) In order to declare successful at any of the Ll.M. Semester examination every candidates will have to obtain atleast 40% marks in individual papers and atleast 50% marks in aggregate.

Provided that for the purpose of declaration of the result of candidates appearing in LL.M. Part-II, Second Semester Examination, the marks obtained by them in the written examination as well as the viva-voce shall be taken into account.

A Successful candidate shall be assigned division on the basis of the marks obtained by him/her in all the four semester examinations taken together. Those who secure 60% marks or more shall be placed in the FIRST DIVISION. All other successful candidates shall be placed in the SECOND DIVISION.

A candidate who has been declared unsuccessful at a semester examination may at his/her option re-appear at it subsequently as ex-student without being required to attend regular course of study again for the same semester subject to the condition that such a candidate shall abide by and shall be governed by provision of this and **other ordinances as applicable**.

5. The Executive Council shall publish the results of the examination as soon as possible for it.

SCHEMES OF THE EXAMINATION

1 (a) Every candidate appearing for LL.M. Part-I, First Semester shall be examined in the following four papers of 100 marks each in which 80 marks for theory paper and 20 marks for Internal Assessment.

Paper I - LEGAL AND CONSTITUTIONAL HISTORY OF INDIA
Paper II - CONSTITUTIONAL LAW & NEW CHALLENGES – I
Paper III - CONSTITUTIONAL LAW & NEW CHALLENGES –II
Paper IV - RESEARCH METHODOLOGY

(b) Every candidate appearing for LL.M. Part-I, Second Semester shall be examined in the following four papers of 100 marks each in which 80 marks for theory paper and 20 marks for Internal Assessment.

Paper I - JURISPRUDENCE AND LEGAL THEORY
Paper II - INTERPRETATION OF STATUTES AND THEORY OF LEGISLATION
Paper III - INDIAN ADMINISTRATIVE LAW
Paper IV - HUMAN RIGHTS AND ENVIRONMENTAL DEVELOPMENT POLICY

LL.M. PART-I, FIRST SEMESTER EXAMINATION
(Jan/Feb 2018)

Sr. No.	Course Code	Course	No. of Credit	Max Marks	Min. Marks
1	101	Legal and Constitutional History of India	05	IA – 20, Theory-80	
2	102	Constitutional Law and New Challenges -I	05	IA – 20, Th. -80	
3	103	Constitutional Law and New Challenges -II	05	IA – 20 Th. – 80	
4	104	Research Mythology	05	IA – 20, Th. - 80	
Total			20	Total – 100	

LL.M. PART-I, SECOND SEMESTER EXAMINATION
(July/Aug 2018)

Sr. No.	Course Code	Course	No. of Credit	Max Marks	Min. Marks
1	105	Jurisprudence and Legal Theory	05	IA – 20, Theory-80	
2	106	Interpretation of Statutes and Theory of Legislation	05	IA – 20, Th. -80	
3	107	Indian Administrative Law	05	IA – 20 Th. – 80	
4	108	Human Rights and Environmental Development Policy	05	IA – 20, Th. - 80	
Total			20	Total – 100	

(c) Every candidate appearing for LL.M. Part-II, First Semester Examination shall be examined in the following papers of 100 marks each in which 80 marks for theory paper and 20 marks for Internal Assessment.

Constitutional and Administrative Law

Paper I - Constitutional Law of UK and Commonwealth Relation
Paper II - Constitutional Law of USA and Comparative Studies of Other Federal Systems
Paper III - Constitutional Law of Canada and Australia
Paper IV - Constitutional Law of Japan and Switzerland

Crimes and Torts

Paper I - Criminology
Paper II - Penology
Paper III - General Principles of Criminology Law and IPC
Paper IV - Law of Evidence

LL.M. PART-II, FIRST SEMESTER EXAMINATION

Constitutional and Administrative Law
(Jan/Feb 2019)

Sr. No.	Course Code	Course	No. of Credit	Max Marks	Min. Marks
1	109	Constitutional Law of UK and Commonwealth Relation	05	IA – 20, Theory-80	
2	110	Constitutional Law of USA and Comparative Studies of Other Federal System	05	IA – 20, Th. -80	
3	111	Constitutional Law of Canada and Australia	05	IA – 20 Th. – 80	
4	112	Constitutional Law of Japan and Switzerland	05	IA – 20, Th. - 80	
Total			20	Total – 100	

LL.M. PART-II, FIRST SEMESTER EXAMINATION

Crimes and Torts
(Jan/Feb 2019)

Sr. No.	Course Code	Course	No. of Credit	Max Marks	Min. Marks
1	113	Criminology	05	IA – 20, Theory-80	
2	114	Penology	05	IA – 20, Th. -80	
3	115	General Principles of Criminology Law and IPC	05	IA – 20 Th. – 80	
4	116	Law of Evidence	05	IA – 20, Th. - 80	
Total			20	Total – 100	

(d) Every candidate appearing for LL.M. Part-II, Second Semester Examination shall be examined in the following papers of 100 marks each in which 80 marks for theory paper and 20 marks for Internal Assessment.

Constitutional and Administrative Law

Paper I - Law and Social Transformation in India
Paper II - Administrative Law (UK, USA, France and India)
Paper III - Dissertation
Paper IV - Viva-Voce

Crimes and Torts

Paper I	-	Law of Torts – General Principles
Paper II	-	Specific Torts – Special Topics (1) Negligence (2) Vicarious Liability
Paper III	-	Dissertation
Paper IV	-	Viva-Voce

LL.M. PART-II, SECOND SEMESTER EXAMINATION
Constitutional and Administrative Law
(July/Aug 2019)

Sr. No.	Course Code	Course	No. of Credit	Max Marks	Min. Marks
1	117	Law and Social Transformation in India	05	IA – 20, Theory-80	
2	118	Administrative Law (UK, USA, France and India)	05	IA – 20, Th. -80	
3	119	Dissertation	05	100	
4	120	Viva-Voce	05	100	
Total			20	Total – 100	

LL.M. PART-II, SECOND SEMESTER EXAMINATION
Crimes and Torts
(July/Aug 2019)

Sr. No.	Course Code	Course	No. of Credit	Max Marks	Min. Marks
1	121	Law of Torts – General Principles	05	IA – 20, Theory-80	
2	122	Specific Torts – Special Topics (1) Negligence (2) Vicarious Liability	05	IA – 20, Th. -80	
3	123	Dissertation	05	100	
4	123	Viva-Voce	05	100	
Total			20	Total – 100	

(e) Dissertation shall be compulsory for each student Topics of the dissertation shall be allotted by the Head of the Department. This paper contains 100 marks for script writing.

Each student shall also appear for a Viva-Voce examination of 100 marks. This will be held before a Board of three examiners of whom two will be external and one internal. The absence of one external examiner may, however, be

condoned by the Kulpati, if it is caused due to unavoidable circumstances, ordinarily, the head of Department of Law will be the Internal examiner.

(f) Distribution of marks of Internal Assessment: - 20 marks of Internal Assessment as to theory papers shall be divided as following –

(1)	Written Examination	- 10 marks
(2)	Seminar	- 05 marks
(3)	Attendance	- 05 marks (above 75% - 05 marks & above 60% - 03 marks)

(g) The following are the Groups of papers, any one of which shall be offered by the candidates appearing for LL.M. Part-II, Examination, Viz

Group – I, Constitutional and Administrative Law

LL.M. Part-II First Semester

Paper I	-	Constitutional Law of UK and Commonwealth Relation
Paper II	-	Constitutional Law of USA and Comparative Studies of Other Federal Systems
Paper III	-	Constitutional Law of Canada and Australia
Paper IV	-	Constitutional Law of Japan and Switzerland

LL.M. Part-II Second Semester

Paper I	-	Law and Social Transformation in India
Paper II	-	Administrative Law (UK, USA, France and India)
Paper III	-	Dissertation
Paper IV	-	Viva-Voce

Group – II, Crimes and Torts

LL.M. Part-II First Semester

Paper I	-	Criminology
Paper II	-	Penology
Paper III	-	General Principles of Criminology Law and IPC
Paper IV	-	Law of Evidence

LL.M. Part-II Second Semester

Paper I	-	Law of Torts – General Principles
Paper II	-	Specific Torts – Special Topics (1) Negligence (2) Vicarious Liability
Paper III	-	Dissertation
Paper IV	-	Viva-Voce

Group – III, Personal Laws

LL.M. Part-II First Semester

Paper I	-	
Paper II	-	
Paper III	-	
Paper IV	-	

LL.M. Part-II Second Semester

Paper I	-	
Paper II	-	
Paper III	-	**Dissertation**
Paper IV	-	**Viva-Voce**

Group – IV, Merchantile Law

LL.M. Part-II First Semester

Paper I	-	
Paper II	-	
Paper III	-	
Paper IV	-	

LL.M. Part-II Second Semester

Paper I	-	
Paper II	-	
Paper III	-	**Dissertation**
Paper IV	-	**Viva-Voce**

Group – V, International Law Group

LL.M. Part-II First Semester

Paper I -
Paper II -
Paper III -
Paper IV -

LL.M. Part-II Second Semester

Paper I -
Paper II -
Paper III - **Dissertation**
Paper IV - **Viva-Voce**

PAPER – I (PAPER CODE – 101)

LEGAL AND CONSTITUTIONAL HISTORY OF INDIA

This Course is intended to acquaint students of higher studies in law with the legal and Constitutional History of India beginning from 1600 upto date. Abroad reference will also be made to the history of nationalist movement:

UNIT – 1

1. INTRODUCTORY : Early Charters and Surat Factory, Legislative Power, King's Commission, Charter of 1600, Charter 1661, Surat Factory.

2. ADMINISTRATION OF JUSTICE IN MADRAS (1639-1726) : First period : 1639 – 1665, Judicial System, Second Period : 1665-1686, Third Period : 1686-1726, Admiralty Court, Mayor's Court, Crimes and Punishments.

3. ADMINISTRATION OF JUSTICE IN BOMBAY (1668-1726) : First Period : 1668-1683, Charter of 1668, Judicial System, Judicial system of 1672, Second Period : 1684-1690, Third Period : 1718-1726, Working of the Court.

4. ADMINISTRATION OF JUSTICE IN CALCUTTA (1690-1726) : Moghul Judicial System, Zemindar's Judicial Powers, Judicial System at Calcutta.

UNIT – II

5. MAYOR'S COURT : Corporation, Judicial System, Legislature, Charter of 1726, Madras Charter of 1687, Working of the Judicial System : 1726-1754, Charter of 1753, Courts for the Indians, Defects of the Judicial System.

6. BEGINNING OF THE ADALAT SYSTEM : Company becomes Diwan, Significance of Diwani, Execution of Diwani Functions, Judicial Plan of 1772, An Appraisal of the Plan, Plan of 1774, Sardar Nizamat Adalat.

7. SUPREME COURT AT CALCUTTA : Provisions of the Regulating Act, Legislative Authority, Charter of the Supreme Court, Supreme Court and Nizamat & Diwani, Trial of Nandkumar, The Patna Case, The Cossijurah Case, Gora Chand Dutt Case etc., Act of Settlement, 1781, Pits India Act, 1781, A Dual Judicial System.

8. Supreme Court at Bombay and Madras, Re-organization of the Adalat System, Judicial Measures of Waren Hastings and Cornwallis, Scheme of Criminal Judicature 1790, Further Reforms up to 1793, Defects of the Scheme of 1793, Cornwallis Vs Hastings, Appraisal of the System of 1793.

UNIT – III

9. Progress of the Adalat System: Sir John Shore, Wellesley Amherst, Criminal Judicature after Cornwallis, Adalat System in Bengal: Willium Bentinck and after, Judicial System Beyond Bengal, Racial Discrimination in the Judicial System. Present Judicial System.

10. HIGH COURT: The Indian High Courts Act, 1861, Charter of the Calcutta High Court, Allahabad High Court, The Indian High Courts Act, 1911, The Government of India Act, 1915, Other High Courts, High Courts under the Government of India Act, 1935, Jurisdiction of the High Courts.

11. From Privy Council to Supreme Court : Basis of the Privy Council's Jurisdiction, Appeals to Privy Council, Progress of Indian Appeals : 1833-1845, High Courts-Appeals to the Privy Council, Appeals by special Leave, Appraisal of the System of Appeals to the Privy Council, Move for an Indian Appeal Court, Federal Court, Demise of Appeals to the Privy Council, Supreme Court, Post Constitutional Development.

UNIT – IV

12. Development of Criminal Law (1772-1860), Development of Law : Presidency Towns, Development of Civil Law: Mofusil, Codification of Law : 1833-1882

13. Legislature in India (1861-1950) : The Indian Councils Act, 1861, The Indian Councils Act, 1892, The Indian Councils Act, 1909, The Government of India Act 1909 and The Government of India, Act 1919, The Government of India Act, 1935.

14. Law Reform : , Law Reform, History of Reform, Need for Law Reform, Hindu Law and the Courts, Law applicable to sects and sub-sects, Muslim Law and Custom, Hindu Law and Custom, Hindu Law and Legislature, Muslim Law and Legislature, The Special Marriage Act, 1954, Codification of Hindu Law, Uniform Civil Code, Law Commission in India, Administrative of Justice, Reports of the Law Commission of India.

UNIT – V

15. Constitutional Developments Leading to Indian Independence (1937 to 1947) : The Cripp's Mission, 1942, Draft declaration, Proposal relating to interim Settlement, Quit India Movement, 1942, Wavell Plan and Simla Conference of 1945, The Cabinet Mission.

16. Provincial Representation in the Constituent Assembly

17. Formation of the Interim Government.

18. The Indian Independence Act, 1947, Effects of the Indian Independence Act, 1947, Shaping of the Indian Constitution, Some Aspects of the Indian Constitution, Evolution of the Indian Constitution, Sources of the Indian Constitution.

19. Personal Laws of Hindus and Mohammedans :

20. Law Reporting in India, Growth of the Legal Profession, Legal Education.

BOOKS RECOMMENDED :-

Jain M.P.	:	Outlines of Indian Legal History
Acharya B.K.	:	Codification in British India
Pylee M.V.	:	Constitutional History of India
Archilbold W.A.J.	:	Outline of India Constitutional History
Banerjee A.G.	:	Indian Constitutional Documents (Vol. I,II,III)
Fawcett Charies	:	First Century of British Justice in India
Cowell Herbert	:	History and Constitution of the Courts Legislative Authority in India
Kaye, J.W.	:	The Administration of the East India Company
Setalvad M.C.	:	Constitutional History of India
Stephans J.F.	:	Minute on the Administration of Justice in British India
Keith A.B.	:	Constitution History of India
Morey W.H.	:	Administration of Justice in British India
Rankin G.G.	:	Background of Indian Law
Punniah K.V.	:	Constitutional History of India
Trevelyan E.J.	:	The Constitutional and Jurisprudence of the Courts of Civil Justice in British India
Field C.D.	:	Some observations on Codification in India, 1833.
Jayaswal	:	Tagore Law Lectures (917)
Stocks	:	Anglo Indian Courts
Singh G.N.	:	History of the Constitutional Development and Nationalis Movement in India
Kulshreshth, V.D.	:	Hkkjr dk oS/kkfud bfrgkl
Paranjape, V.N.	:	Indian Legal & Constitutional History

LL.M. Part-I, First Semester

PAPER – II (PAPER CODE – 102)

CONSTITUTIONAL LAW & NEW CHALLENGES - I

This Course is intended to acquaint students with the organization and structure of the Indian Polity, its characteristic features and evolution. A comparative study of Constitutional Law of UK & USA is also desirable.

UNIT – 1

1. INTRODUCTION :- Organs of the Government, classification of Constitutions, Forms of Government.

2. HISTORICAL BACKGROUND :- Framing of Indian's Constitution.

3. SALIENT FEATURES OF THE INDIAN CONSTITUTION :- Preamble.

UNIT – II

4. THE UNION AND ITS TERRITORY : Article (1 to 4), Citizenship Article (5 to 11)

5. FUNDAMENTAL RIGHTS (Article 12 to 35) : Concept, Historical Background, nature and scope of Fundamental Rights, Fundamental Rights vis-à-vis Human Rights, States and Laws Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Saving of Certain Laws, Right to Constitutional Remedies.

6. DIRECTIVE PRINCIPLES OF STATE POLICY (Article 36 TO 51) and FUNDAMENTAL DUTIES (Article 51-A)

UNIT – III

7. THE UNION (Article 52 to 147) : The Executive (Article 52 to 78)

8. THE STATE (Article 152 to 237) : The Executive (Article 153 to 167)

UNIT – IV

9. Union Legislature : Parliament of India (Art 79 to 123)
10. State Legislature : Legislative Council & Legislative Assembly (Art 168 to 213)

UNIT – V

11. Union Judiciary : Supreme Court of India (Art 124 to 147), COMPTROLLER AND AUDITOR-GENERAL OF INDIA (Art 148 to 151)
12. State Judiciary : High Court of India (Art 214 to 232), SUBORDINATE COURTS (Art 233 to 237)

BOOKS RECOMMENDED :-

Pandey J.N.	:	The Constitutional Law of India
Kumar Narendra.	:	Constitutional Law of India
Rai Kailash	:	Constitutional Law of India
Shukla V.N.	:	Constitution of India
Jain M.P.	:	Indian Constitution
Basu D.D.	:	Commentaries on Indian Constitution
Sen D.K.	:	Comparative Study of Indian Constitution
Seervai H.M.	:	Constitutional Law of India

Keith A.B.	:	Constitutional History of India
Tripathi P.K.	:	Spotlights and Constitutions
Dauglus W.O.	:	Studies in Indian and American Constitutional Law
Gledhill A.	:	Fundamental Rights
Setalvd M.E.	:	The Indian Constitution.
Subramaniam	:	Case Law of Indian Constitution
Basu	:	Case Law on Indian Constitutional Law
Shiv Rao B.	:	The framing of Indian Constitution
Where K.C.	:	Modern Constitution
Indian Law Institute	:	Central State Relations
Indian Law Institute	:	Delegated Legislation in India
Austin	:	The Indian Constitution : Cornerstone of a Nation
Where K. C.	:	Federalism

LL.M. Part-I, First Semester

PAPER – III (PAPER CODE – 103)

CONSTITUTIONAL LAW & NEW CHALLENGES -II

This Course is intended to acquaint students with the organization and structure of the Indian Polity, its characteristic features and evolution. A comparative study of Constitutional Law of UK & USA is also desirable.

UNIT – I

01 LOCAL AUTHORITIES : The Union Territories (Article 239 to 241), The Panchayats (Article 243 to 243-O) The Municipalities (Article 243-P to 243-ZG)

02 ELATIONSHIP BETWEEN THE UNION AND THE STATES (Article 245 to 263): Legislative Relations (Article 245 to 255), Administrative Relations (Article 256 to 263)

UNIT – II

03 FINANCE, PROPERTY, CONTRACTS AND SUITS (Article 264 to 300-A) : Finance, Financial Provisions, Borrowing, Property, Contracts, Rights, Liabilities, Obligations and Suits, Right to Property, Trade, Commerce and Intercourse within the Territory of India (Article 301 to 307).

UNIT – III

04. SERVICES UNDER THE UNION AND THE STATES (Article 308 to 323).

05. TRIBUNALS (Article 323-A & 323-B), Elections (Article 324 to 329), Special Provisions relating to Schedule Caste and Schedule Tribal Caste (Article 330 to 342), Language of the Union (Article 343 to 344), Regional Language (Article 345 to 347), Language of the Supreme Court and High Courts (Article 348 to 351)

UNIT – IV

06. EMERGENCY (Article 352 to 360) and Miscellaneous (Article 361 to 367)

UNIT – V

07. UTION (Article 368) : All Amendments of the Constitution till date and All the Schedules.

BOOKS RECOMMENDED :-

Pandey J.N.	:	The Constitutional Law of India
Kumar Narendra.	:	Constitutional Law of India
Rai Kailash	:	Constitutional Law of India
Shukla V.N.	:	Constitution of India
Jain M.P.	:	Indian Constitution
Basu D.D.	:	Commentaries on Indian Constitution
Sen D.K.	:	Comparative Study of Indian Constitution
Seervai H.M.	:	Constitutional Law of India
Keith A.B.	:	Constitutional History of India
Tripathi P.K.	:	Spotlights and Constitutions
Dauglus W.O.	:	Studies in Indian and American Constitutional Law
Gledhill A.	:	Fundamental Rights
Setalvd M.E.	:	The Indian Constitution.
Subramaniam	:	Case Law of Indian Constitution
Basu	:	Case Law on Indian Constitutional Law
Shiv Rao B.	:	The framing of Indian Constitution
Where K.C.	:	Modern Constitution
Indian Law Institute	:	Central State Relations
Indian Law Institute	:	Delegated Legislation in India
Austin	:	The Indian Constitution : Cornerstone of a Nation
Where K. C.	:	Federalism

LL.M. Part-I, First Semester

PAPER –IV (PAPER CODE – 104)

RESEARCH METHODOLOGY

UNIT – I

01 ntroduction, Scope of Sociology, Nature of Social Phenomenon, Characteristics of Social Phenomenon

02 Law-- Meaning of Law, Nature of Law, Purpose of Law, Sociology of Law, Importance of duty/ obligation, Relation between juristic science and social science

UNIT – II

03 Meaning, Nature and Scope of Legal Research—Introduction, meaning of research, Legal Research, Importance and Utility of Research, Nature of legal research and legal research method, Benefits of legal research, Necessity of legal research, Scope of legal research, Aims and objective of legal research, Motivating factors of legal research, Facts, events and data of legal research, Basic assumptions of socio-legal research, Quality of a good legal researcher.

UNIT – III

04 Legal research Methodology—Meaning of methodology, Research method and Research technique, Main Characteristics of research methodology.

05 Background and Development of Legal Research in India—The different Phases of legal research in India(First, Second, Third and Fourth Phases of legal research in India)

06 Various Kinds of Legal Research-- Kinds of research according to objectives of study material, Kinds of research according to the methods available for doing research, Legal Reasoning, Concept and their Role in Scientific legal investigation, Theory and research.

07 Major Steps involved in doing legal research(The legal research process), Selection or Formulation of legal research problem or topic.

UNIT – IV

08 Hypothesis—Meaning, Characteristics and Sources of Hypothesis, Types of Hypothesis, Testing of the Hypothesis, Legal Research Design, Part of Research Design, Characteristics of a good research design, Types of research design, Sampling design for legal research, meaning of Sampling, Merits and demerits of sampling, Characteristics, Types of Sampling

09 Research Data, Forms, Sources, Tools and Collection of Data, Different methods for collecting the data, Observation Method and its different kinds, Interview Method and its different kinds, Schedule Method and its kinds, Questionnaire Method and its kinds, Case Study Method and Survey Method

UNIT – V

10 Data Processing—Editing, Coding, Classification and Tabulation, Analysis and Interpretation of Data, Generalization in Legal Research, Problem of measurement in legal research, Scaling technique in legal research, Sociometry in legal research, Jurimetrics.

11 Method of using Libraries and the use of Computer in legal research, Inter-Disciplinary Research

12 Preparation of Research Report and its Writing.

REFERENCE BOOKS:

1---Dr. S.R. Myneni-Legal Research Methodology, Published by Allahabad Law Agency
2---Dr. H.N. Tiwari- Legal Research Methodology, Published by Allahabad Law Agency
3---Shilpa Agrawal- Legal Research Methodology
4---Indian Law Institute-Legal Reserch and Methodology, Edited by S.K. Verma and M. Afzal Wani
5---William P. Statisky- Legal Research
6---Evwinc Surrency- A Guide to Legal Research
7---William J. Goode& Paul K. Hatt-Method in Social Research
8---Dr. H.N. Giri-Legal Research Methodology (Written in Hindi)
9---Dr. Sanjay Kulshrestha-Vidhik Anushandhan Paddhatiya(Written in Hindi)

10—Dr. Bashanti Lal Babel-Legal Education and Research Methodology(Written in Hindi)

LL.M. Part-I, Second Semester

PAPER – I (PAPER CODE – 105)

JURISPRUDENCE AND LEGAL THEORY

UNIT-I

1. CRITICAL SURVEY OF LEGAL THEORIES : Natural Law and the search for absolute values, the problem of natural law, ancient theories, reasons and the law of nature, natural law and social contract (Grotius, Hobbes, Locke, Rousseau) Revival of Natural Law theories

UNIT-II

2. . PHILOSOPHICAL IDEALISM AND THE PROBLEM OF JUSTICE : German Transcedental Idealism (Kant, Fichte, Hegel) Neo Kantian Philosophy and Scientific legal idealism, modern value, philosophy and Law.

UNIT-III

3. THE IMPACT OF SOCIAL DEVELOPMENT ON LEGAL THEORIES, HISTORICAL EVOLUTION AS A GUIDE TO LEGAL THOUGHT, BIOLOGY, SOCIETY AND LEGAL EVOLUTION, MODERN SOCIOLOGICAL THEORIES OF LAW.

UNIT-IV

4. POSITIVISM AND LEGAL THEORIES : Kelsen's pure theory of law, Utilitarianism, the Jurisprudence of interests and legal idealism,

Legal Theory and contemprory problems : Legal theory of Modern political movements, socialistic and communist theories of law, Neo- Scholastic Doctrine and modern catholic legal philosophy.

UNIT-V

5. LIABILITY PROPERTY OBLIGATION & EVIDENCE

a) Rights and Duties

b) Possession and ownership

c) Person

d) Title

e) **Liability** - Definition, Nature, Kind - Civil and Criminal General conditions of liability - Negation, Their Theories Subjective & Objectives, Mental aspects, Duty of care, Standard &^ Care, Exemptions for Liability.

f) **Obligation** - Definition, kinds and sources of obligation.

g) **Property** - Its meaning and kinds and theories mode & acquisition, Its relation with law.

h) **Evidence** - Procedural and Substantial, Element of Judicial procedure Evidence its nature and kinds.

BOOKS RECOMMENDED -

1. HLA Hart - The Concepts of Laws (Oxford) ELBS
2. Salmond - Jurisprudence (Tripathi) Bambay
3. G.W. Paton - Jurisprudence (Oxford) ELBS
4. RWM Dias - Jurisprudence (Indian Rep.) (Aditya), New Delhi.
5. V.D. Mahajan - Jurisprudence Legal Theory (EBC), Lucknow
6. W. Fridmann - Legal Theory (1999) (Universal) Delhi.
7. S.N. Dhyani - Jurisprudence - A study of Indian Legal Theory (Metropolitan), New Delhi.
8. M.S. Pandit, Out lines of Ancient Hindu Jurisprudence

LL.M. Part-I, Second Semester

PAPER – II (PAPER CODE – 106)

INTERPRETATION OF STATUTES & THEORY OF LEGISLATION

The Courses is intended to acquaint the students of advance studies in Law with the History and Development of Legislation with special reference to the Western Legal Systems and a comparative study of legislation in India Legal System particular attention is to be paid to the Benthamite movement of legislation and its comparative impact on other legal systems. The subject of study shall inter-alias include- (1) Principles of Legislation (2) Methods of Legislation, and (3) Interpretation of Statutes.

UNIT-I

1. **PRINCIPLES AND LEGISLATION – LAW :-** Legislature, Executive and Judiciary, Principle of Utility, Operation of these Principles upon Legislation, Distinction between Morals and Legislation.

INTERPRETATION OF STATUTES - Introduction, Meaning, Commencement, Operation and Repeal of Statutes, Purpose of Interpretation of Statutes Classification of Statutes.

UNIT-II

(2) GENERAL PRINCIPLES OF INTERPRETATION - Primary Rules, Literal Rule, Golden Rule, Mischief Rule (Rule in the Hydon's Case) Rule of Harmonious Construction. Secondary Rules, Noscitur a Soclis, Ejusdem Generis, Reddendo Singula Singulis, Utres Magis Valeat Quam Pereat, Contemporanea Expositio est Fortissima in Lege.

PRESUMPTIONS IN STATUTORY INTERPRETATION - Presumption as to Jurisdiction, Presumption Against inconvenient or Absurd, Presumption Against Intending Injustice,Presumption Against Impairing

Obligations or Permitting from One's Own Wrong, Prospective Operation of Statutes.

UNIT-III

(3) **AIDS TO INTERPRETATION AND MAXIMS OF STATUTORY INTERPRETATION** - Internal Aids and External Aids, MAXIMS - Delegates Non Potest Delegare, Expressio Unius Exclusio Alterius, Generalia Specialibus non Derogant, In Pari Delicto Potior Est Condition Possidentis,Utresvalet Potior Quam Pareat, Expressum Facit Cessare Tacitum, Jure Nature Sunt Immutabillia.

UNIT-IV

(4) INTERPRETATION WITH REFERENCE TO THE SUBJECT MATTER AND PURPOSE : Beneficial Construction, Strict Construction of Penal Statutes and Taxing Statutes, Construction and Interpretation of Welfare Legislation, Harmonious Construction of the Statutes, Interpretation of Statutes in Pari Materia, Amending, Consolidating and Codifying Statutes, Mandatory and Directory Enactments and Conjunctive and Disjunctive Enactments.

UNIT-V

(5) **PRINCIPLES OF CONSTITUTIONAL INTERPRETATION :** Principles of Implied Powers, Incidental or Ancillary Power, Doctrine of Pith and Substance and Colorable Legislation, Principles of Implied Prohibition, Occupied Field and Territorial Nexus, Doctrine of Severability and Repugnancy and Doctrine of Eclipse and Ancillary Powers. Retrospectiv and Prospective Operation of Statutes.

Books Recommended :

Bentham : Theory of Legislation

Jethro Brown	: Undertaking Principles of Modern Legislation
Decey A.V.	: Law and Public Opinion
Illbert C.	: Mechanics of Law Making
Maxwell	: The Interpretation of Statute
Sing G.P.	: Principles of Statutory Interpretation
Beal	: Rules of Interpretation
Ginsberg	: Law and Public Opinion and England 20th Century
Rathan Swami	: Legislation Principle and Practice
Craise	: Interpretation of Statute Law
James	: Bentham and Legal Theory
Dale W.	: Legislative Drafting a New approach
Cross R.	: Statutory Interpretation
Odgers	: Constriction of Deeds and Statute
Swaroop J.	: Legislation and Interpretation
Bentham	: Principles of Statutes in British India
Sarthi, V.P.	: Interpretation of Statutes.
Tripathi, N.M.	: Maxwell's Interpretation of Statute
Dicey A.V.	:Law and Public opinion in England
Arora J.D.	: Principles of Legislation (in Hindi)

LL.M. Part-I, Second Semester

PAPER – III (PAPER CODE – 107)

INDIAN ADMINISTRATIVE LAW

UNIT-I

1. **Introduction of administrative law, administrative process, discretion and direction :**

Definition of Administrative Law, Development of Administrative Law, Nature and Scope of Administrative Law, Rule of Law and Administrative Law, Separation of Powers and Administrative Law, Changing role of the State and It's impact on Administrative Law.

Administrative Process - Administrative Processes in India : The President vested with the Executive Power (1) Emergency powers of the President (2) An Evaluation of the President's powers (3) Can Mandamus be availed of against abuse of power under part XVIII of the Constitution, Ministerial Responsibility, The Indian Approach as to Minister's Powers., Development of Administrative Law in India. The Progress of Administrative Adjudication

Administrative Discretion - Meaning, nature and criteria, its use or principle applicable for its use, need for administrative discretion, limit on exercise of discretion, malafide exercise of discretion acting under dictation, constitutional imperative... and use of discretionary authority, non-application of mind, unreasonableness and standard of reasonableness, taking irrelevant consideration or not taking in to consideration among relevant matter, non exercise of discretionary powers, administrative arbitrariness and bias. Procedural safe guards for use of discretion.

Administrative Direction - its use and classification, its unenforceability.

UNIT-II

Delegated legislation, Administrative adjudication & Tribunal

Reason for development of Delegated Legislation, methods of Delegates: Power to fill in details, Power of inclusion and

exclusion, Power to modify the statute, Power to bring and Administrative into operation,

Delegated legislation, its historical background and function, reasons for its growth, need for delegation of administrative power, kinds of delegated legislation, sub-delegated legislation and conditional legislation, constitutionality of delegated legislation in Britain and India, Re Delhi Laws Act, Power of exclusion and inclusion and power to modify statutes, essential legislative functions, requirement for the validity of delegated legislation.

Judicial control of delegated legislation - Doctrine of ultra virus, its kinds, substantive and procedural grounds for its applicability, consulation, sub delegation, publication, administrative directions, circular legislative or parliamentary control on delegated legislation, laying procedure, policy statement, committees on delegated legislation and hearing before it, sub delegation & powers, guide-lines for it, and control of sub delegation, administrative adjudication and tribunals, reasons for proliferation of administrative tribunals, functional approach characteristics and feature of administrative tribunals, Basic difference between a court and a tribunals, position of tribunals in India, CAT its purpose, establishment and composition, jurisdiction power and authorities, aspect of tribunal practice and administrative procedure, procedure before the enquiry or hearing, procedure at the tribunal hearing and procedure after tribunal hearing, frank committee report, administrative tribunal act 1985, administrative tribunals and appeal judicial review and finality of the tribunal decision, reopening of tribunal proceeding rule of resjudicate, Administrative tribunals in India.

UNIT-III

The Principles of Natural Justice : Principle of natural Justice and violation thereof, The first principles: Justice in one's own cause, Bias, Judge's Bias, The second principle- Hearing the other side, Limit to the rule of Audi alteram Partem, The third principle: party to know the reason for the decision, effect of contravention: void or voidable. Against whom natural justice are not violated, when rules of natural justice are not violated, General Principles as revealed by Judicial Decisions. Limits of Judicial Review, Exceptional exclusion of Natural Justice.

UNIT-IV

State Liability for Wrongs Act & Commission of Inquiry & Corporate:

Liabilities for torts, distinction between sovereign and commercial functions, constitutional provisions in this regard, act of state and statutory immunities contractual liability of Govt., Government privilege in legal proceeding state secrets, public interest, transparency and right to information estoppec and waiver.

Remedies against administrative acts, constitutional remedies writ injunctions, its nature and types, distinction between injunction and mandamus, suit for declaration, its condition and nature, suits for damages.

Public enquiry and commission of enquiry, general enquiry under service rules, procedure in disciplinary action and Provisions of commission of enquiry act 1952, and

Corporation : Corporations, its kinds and characteristics, its classification, legal and constitutional provisions & their responsibilities in contract and in tort, position of their employee whether they are civil servants ? Control on corporation, legislative control, judicial control, governmental control and public controls.

UNIT-V

Ombudsman,Vigilancecommission&RighttoInformationAct
Ombudsman, its development in Newzealand, Britain and Australia, Position of Ombudsman in India, Lokpal and Lokayukt and their position, Public Interest litigations its nature and importance in Democracy. Central vigilance commissions its powers and functions

Right to Information Act,2005-Introduction, Right to Information and Voluntary Organization, Right to Information in the Foreign Countries, Request for Right to Information, Constitution, Rights and Obligations of the Information Agencies, Procedure of Disposal of Applications and Complaints by State Commissions with special reference to Section 18, 19 and 20 of Right to Information Act 2005.

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Books Recommended :

1. Jain and Jain - Principles of Administrative law, Tripathi (1986).
2. Wade - Administrative law (Indian Rep.) Universal Delhi.
3. J.C. Garner - Administrative law, Butherworth (1990)
4. D.D. Basu - Comparative Administrative law (Prentice Hall).
5. I.P. Massey - Administrative law EBC, Lucknow. (1996).
6. M.P. Jain - Cases and material on Indian Administrative law (Vol I & II) 1998

Universal book traders Delhi.

7. S.P. Sathe - Administrative law (1998), butterworth (India), Delhi.

8. De Smith - Judicial review of Administrative Action (1995) with supplement, Sweet & Maxwell.

9. M.A. Fazal - Judicial control of administrative action in India Pakistan & Bangladesh (2000), Butterworth India.

10. Indian law institute - Cases and material on Admininstrative law in India vol. I (1996), Delhi.

LL.M. Part-I, Second Semester

PAPER – IV (PAPER CODE – 108)

HUMAN RIGHTS & ENVIRONMENTAL DEVELOPMENT POLICY

UNIT-I

1. CONSTITUTION AND HUMAN RIGHTS: Fundamental Rights. Directive Principles and Fundamental Duties, International Human Rights and the Indian Constitution, Judicial Review and Administrative Actions with reference to Human Rights, State of Human Rights during Emergency
(v) Judicial Activism – protection of human rights, Liberty, Equality and Fraternity in Human Rights Perspective.

UNIT-II

2. SPECIAL LAWS FOR PROTECTION OF SPECIFIC CATEGORIES / VULNERABLE SECTIONS OF THE PEOPLE : Reservations and the Right to Equality, Protection of Minorities-Cultural and Educational Rights, Contract and Unorganized Workers, Bonded Labor, Tribal People
3.

UNIT-III

4. ENFORCEMENT OF HUMAN RIGHTS : Judiciary: Article 32, Article 226 – Public Interest Litigation, National Specialized Agencies: Law Commission, SC/ST commission, Minorities Commission, Women's Commission, Human Rights Commissions, Criminal Justice Delivery System, Legal Aid, NGO's, Social movements and pressure groups working through democratic institutions such as lobbying MPS, Media, International Redressal Mechanism.

UNIT-IV

5. THE CONCEPT OF ENVIRONMENT :

(1) Meaning and Historical Perspective, Traditions, Natural and Biological Sciences: Perspectives, Modern concept : Conflicting dimension.

(2) INTERNATIONAL PERSPECTIVES AND DEVELOPMENT: Stockholm Declaration, 1972, Right to development: UN Declaration on the Right to Development, 1986, Right to development versus right to clean environment, Rio Declaration: Sustainable development.

(3) ENVIRONMENTAL PROTECTION IN INDIA : Constitutional rights and duties, Precautionary principle, Public trust doctrine, Polluter pay principle

UNIT-V

6. ENVIRONMENTAL PROTECTION IN DEVELOPING COUNTRIES : (1) Poverty, Indigenous people and Tribal, Developing economies, Depletion of forest and natural resources.

INTERNATIONAL CONCERN : World environment movement, Natural and cultural heritage: Common Heritage Principle, Role of international and regional organization ,International financing policy and world environment fund, Global Environmental Facility (GEF).

Books Recommended :

1. J.K. Starke - An Introduciton to the International Law.
2. J. L. Brierley - The Law of Nations (Oxford)
3. A.K. Pillai - National Human Rights Commission.
4. S.K. Verma - An Introduction to Public International Law (Prentice-Hall India).
5. All the Covenants and Conventions.
6. Shaw M.N. - International law (CUP).
7. M.C. Nair - The Law of Treaties (Oxford)
8. Paras Diwan & Piyushi Diwan - Human Rigths & The Law - Universal & Indian.
9. S.K.Kappor - Human Rigths under International Law and Indian Law Central Law Agency Allahabad.

(2) 10. D.D.Basu -Human Rights in Constitutional Law (Prentice - Hall).

Group A
CONSTITUTIONAL AND ADMINISTRATIVE LAW

THIRD SEMESTER
PAPER – I (PAPER CODE 109)

CONSTITUTIONAL LAW OF UK AND COMMONWEALTH RELATITION

Unit-I

The nature of British Constitutional development, Rise and growth of Parliament. The nature of the British Constitutional Law, Fundamental Laws and Judicial review of legislation, The scope of Constitutional Law, The functions of the Government doctrine of separation of power, The rule of law general characteristics of the British Constitution conventions of the British Constitutional law, nature and classification of the conventions.

Unit-II

The central government- The monarchy and its relevance, The Royal prerogative and immunities general nature of the prerogative, The prerogative in domestic areas and foreign affairs, The cabinet and the Prime-Minister Parliamentary Supremacy-History, Growth and nature of Parliamentary Supremacy Limitation on the sovereignty of Parliament, The birth growth composition fundamental and importance of the House of Lords, The development, organization, powers and functions of the House of Commons, Parliamentary or legislative procedure, committee system, Parliamentary privileges.

Unit-III

The United Kingdom and Europe- Introduction, The Sources of Community Law, European Community Act 1972, Community

Law as a source of domestic Law, Parliament and Community Law, The impact of Community Law, The Armed Forces and the Emergency Powers of the executive emergency powers and personal freedom.

Administration of Justice- Features and organization of the British Judicial system, Composition, Powers and Jurisdiction of the Supreme court the Privy councils, The Judicial functions of the Privy council at present day.

Unit-IV

Rights and Duties of the individual – Rights of the individual under the United Kingdom Constitution, International Covenants, European Convention for the protection of human rights and fundamental freedoms, 1950 and European Social charter, 1961 and the Human Rights Act, 1998 Freedom of person and freedom of property, freedom of expression, freedom of assembly and freedom of Association, Nationality Citizenship, Immigration and Extradition.

Unit-V-

The Commonwealth- Dependent Territories- The British Islands, Territories of the commonwealth, British Colonies, The Colonial Validity Act, 1965, Independence with in the commonwealth- The Dominions and the statute of Westminster (The Statute of Westminster 1931), Extension of U.K. legislation to the dominions, The common-wealth at present day, Appeals to the Privy Council- Appeals from dependent territories and Appeals from Independent commonwealth countries.

BOOKS RECOMMENDED:

Dicey A.V.	**:**	**Law of the Constitution**
Wade and Phillips	**:**	**Constitutional Law**
Hood and Phillips	**:**	**Constitutional Law**
Keir and Lawson	**:**	**Cases on Constitutional Law**
Jenning and Young	**:**	**Constitutional Law of the Common Wealth**
Jenning	**:**	**Law and Constitution**
Yeardley and Young	**:**	**Introduction to British Constitutional Law**
Mackintosh	**:**	**British Constitution**
Jenning	**:**	**Cabinet Government**

Cooley	**:**	**Constitutional Limitations**
Gladhill. A.		**British Commonwealth**
Hood Phillips & Jackson	**:**	**Constitutional and Administrative Law**
डॉ. वी. पी. सिंह	:	विश्व के प्रमुख संविधान

PAPER –II (PAPER CODE 110)

CONSTITUTIONAL LAW OF USA AND COMPARATIVE STUDIES OF OTHER FEDERAL SYSTEMS

Unit-I

General Background of the Constitution of USA—Historical Background of the
Constitution, Causes of the Revolution, Establishment of Confederation, Articles of Confederation, Nature of Confederation, Defect of Confederation, Failure of Confederation.
The Constitutional Convention—Making of the Constitution(Philadelphia Convention), Compromises of Philadelphia Convention, Ratification of the Constitution, Growth of the Constitution ,Methods and sources of the development of USA Constitution, Salient Features of the American Constitution.

Unit-II

Separation of Powers, Doctrine of Check and Balances, Criticism of the Separation of Powers in America. Delegation of Legislative Powers, Methods of Control over Delegation of Power.
Amendments of the Constitution—Procedure for Amendment of the Constitution, Ratification by the States, Scope of Amendments, All amendments of the Constitution.

Unit-III

American Federal System—Formation of Federation, Federal Feaures in the American Constitution, Distribution of Powers, Method of Distribution ,Powers of the Federal Government and the Powers of the State Governments(Powers possessed and Powers denied of both the Government) Residuary powers of the State Government, Doctrine of Implied Powers, Factors Responsible for the growth of National Powers in America.

The President—Characteristics of American Presidency, Election of President, Powers and Functions of the President, American Cabinet system

The American Congress—Composition, Powers and Functions of the Senate, Composition, Powers and Functions of the House of Representative, Legislative Procedure and Committee System.

Unit-IV

Federal Judiciary in America(Supreme Court and Judicial Review)—Organization of Federal Judiciary, Composition , Appointment, Tenure, Removal of the Judges of the Supreme Court, Working of the Supreme Court, Jurisdiction and Role of Supreme Court, Judicial Review, Judicial Activism or Judicial Self Control.

Fundamental Rights under the American Constitution—Classification and Description of Fundamental Rights (i) Personal Rights (ii)Rights relating to Judicial Process (iii)Rights to Property.

Unit-V

Co-operative Federalism, Financial Relation of Federal and State Government,

The Taxation and Fiscal powers of Congress, Direct Taxes and Excises.

Interstate Commerce Clause under the American Constitution, Doctrine of Immunity of Instrumentalities under the USA Constitution, Doctrine of Eminent Domain, Police powers of the State.

War Powers under the American Constitution, Military Law, Power to make Peace, Admission of New States, Citizenship.

BOOKS RECOMMENDED:

Growin	**:**	**Constitution of the United States**
Growin	**:**	**Constitution and what means today**
Thoms M. Cooley	**:**	**Constitutional Law in the USA**
Ridge	**:**	**Constitutional Law**
Tressolini	**:**	**American Constitutional Law**
Mason and Beane	**:**	**American Constitutional Law**
Pritchett C.H.	**:**	**American Constitutional**
Antieau	**:**	**Commentaries on the Constitution of USA**
Shapin	**:**	**American Constitutional Law**

Enight	**:**	**Constitutional Law**
Kelley & harbinson	**:**	**American Constitution**
डॉ. वी. पी. सिंह	:	विश्व के प्रमुख संविधान

PAPER – III (PAPER CODE 111)

CONSTITUTIONAL LAW OF CANADA AND AUSTRALIA

Unit I–

Historical Development, History of Constitution, Durham Report, Origin of Canadian Federation, Sources of the Constitution of Canada Salient Features of the Constitution, Conventions of the Constitution, Nature of the Constitution, Federal Features of the Canadian Constitution.

Unit II

Dominion Executive – crown, governor general of Canada, Powers of the Governor General, Real position of governor general, Utility and usefulness of the Governor General, The privy council of Canada

Canadian cabinet, composition, powers and functions of the cabinet Prime minister, position and power of PM

The Canadian Legislature – Composition , powers and functions of the senate ,Comparison between USA senate and Canadian senate Composition , powers and functions of the House of Commons ,Procedure of law making

Canadian Judiciary – features of Judiciary, courts of Canada, powers of Supreme Court of Canada, Judicial review in the constitution of Canada

Unit III

History of Development of Australia, making of the Constitution, features of the constitution of the Australia, Federal system in Australian constitution. Characteristics of federal system, Distribution of Powers, Reasons of the extension of powers of federal Government. The Federal Executive- The governor General, Powers and functions of the Governor General. Appointment of Prime Minister Powers and functions of Prime Minister, Position of Prime Minister, Cabinet, Composition , Powers and function of cabinet.

Unit IV

The Parliament- The senate, Composition, Powers and function of senate, House of Representative, Composition, Powers and functions of House of Representative President of Senate, Speaker of House of Representative Privileges etc. of Houses. Legislative procedure, Powers of the House in respect of legislation.

Unit V

The Judiciary- Organization of Judicial system in Australia, Powers, functions and jurisdiction of the High court of Australia,

Finance, Scope of trade and commerce power in Australian Constitution, Taxing powers, Doctrine of Immunities of Instrumentalities State autonomy in Australia, Commonwealth Grant Commission of Australia, Procedure of amendment of the constitution Incidental powers.

BOOKS RECOMMENDED:

Paton	**:**	**Law of Commonwealth of Australia**
Swat	**:**	**Cases on Constitutional Law of Australia**
Sweetman	**:**	**Australia Constitutional Developments**
Mitchell E.	**:**	**Essays on the Australian Constitution.**
Howard	**:**	**Australian Federal constitutional Law**
Lane	**:**	**An Introduction to the Australian Constitution.**
Lumb;	**:**	**The Constitution of common Wealth Australia**
Fajanbauem	**:**	**Australian Constitutional Law Cases**
Lane P.H.	**:**	**The Australian Federal System**
डॉ. वी. पी. सिंह :		विश्व के प्रमुख संविधान
डॉ. ओ पी. नागपाल		जापान, आस्ट्रेलिया और नेपाल का संविधान

PAPER – IV (PAPER CODE 112)

CONSTITUTIONAL LAW OF JAPAN AND SWITZERLAND

Unit I

Historical Background of Japan ,Importance Of The Study Of The Japanese Constitution , Constitutional Development Of Japan , Meiji Constitution Framing of The Modern Constitution.

Nature of The Japanese Constitution, Characteristics Features of the Constitution, Comparison between the old and new Constitution.

The Rights and Duties of the People-

Introduction, General Provision, Specific Rights, Procedure of amendment of the Constitution.

Unit II

The emperor- powers and functions of Emperor , Real Position of Emperor , The Cabinet , Composition of the Cabinet , Powers and Functions of The Cabinet.

The Legislature – History of Diet, Composition , powers and functions of the House of Representatives , Composition , Powers and Functions of the house of Councilors , Legislative Procedure , Committee System in Japanese Constitution.

Judiciary – Organization of Modern Judiciary, Constitution Powers and Jurisdiction of Supreme Court.

Unit III

Swiss Constitution – Historical Background, importance of the Swiss Constitution, Characteristics of the Swiss Constitution. Basic, Civil and social rights.

The Swiss Federal System, Dual polity System, Distribution of Powers, Federal status of the cantons, Extension of the powers of the centre procedure of amendment.

Unit IV

The Federal Legislature- Composition , Powers and functions of the council of states, privileges and Immunities, Composition , Powers and Functions of the National Council, Powers of the Federal Assembly, Working of the Federal Assembly.

Federal Executive—Organization of the Federal Council, Powers and Functions of the Federal Council, Relation of the Federal Council with the Federal Assembly, President of the Swiss Confederation, Nature of the Federal Executive, The Federal Chancellery.

Unit V

The Federal Tribunal—Organization of the Swiss Court System, Jurisdiction of the Federal Tribunal, The Federal Tribunal and Judicial Review,

Cantons- Administration of cantons, Districts and Communes method of Direct democracy in Swiss Constitution- Primary Assemblies, Referendum and Initiative, merits and demerits of Referendum and Initiative.

BOOKS RECOMMENDED:

Beckmann,George M	**The making of the Meiji Constitution. (Lawrence, 1957)**
Cabinet Secretariat	**The Constitution of Japan (Tokyo, 1947)**
Fujisawa, F.	**: The Recent Aims and Political Development of Japan**
Gubbins, J.H.	**: The Maaking of modern Japan (London,1922)**
Ike, N.	**The Beginning of Political Democracy in Japan Baltimore,1950)**
Butty N.	**: Parliamentary Democracy in Japan**
Kapoor A.C.	**: Selected Constitutions**
Hughes	**: The Federal Constitution of Switzerland**
Rao B.S.	**: Selected Constitution of the World**
Basu	**: Selected Constitution of the World**
डॉ. वी. पी. सिंह :	विश्व के प्रमुख संविधान
डॉ. ओ पी. नागपाल	जापान, आस्ट्रेलिया और नेपाल का संविधान

GROUP - I
CONSTITUTIONAL AND ADMINISTRATIVE LAW

FOURTH SEMESTER

PAPER – I (PAPER CODE 117)

LAW AND SOCIAL TRANSFORMATION IN INDIA

Unit I–

1. LAW AND SOCIAL CHANGE

Law as an instrument of social change.

Law as the product of traditions and culture. Criticism and evaluation in the light of colonization and the introduction of common law system and institution in India and its impact on further development of law and legal institutions in India.

2. RELIGION AND THE LAW

Religion as a divisive factor.

Secularism as a solution to the problem.

Reform of the law on secular lines : problems

Freedom of religion and non-discrimination on the basis of religion.

Religious minorities and the law.

Unit II

3. LANGUAGE AND THE LAW

Language as a divisive factor: formation for linguistic states.

Constitutional guarantees to linguistic minorities.

Language policy and the Constitution: Official language; multi-language system.

Non-discrimination on the ground of language.

4. COMMUNITY AND THE LAW

Caste as a divisive factor.

Non-discrimination on the ground of caste.

Acceptance of caste as a factor to undo past injustices.

Protective discrimination: Scheduled castes, tribes and backward classes.

Reservations; Statutory Commissions, Statutory provisions.

Unit III

5. REGIONALISM AND THE LAW

Regionalism as a divisive factor.

Concept of India as one unit

Right of movement, residence and business; impressibility of state or regional barriers.

Equality in matters of employment: the slogan "Sons of the soil" and its practice.

Admission to educational institutions: preference to residents of a state.

6. WOMEN AND THE LAW

Crimes against women.

Gender injustice and its various forms.

Women's Commission.

Empowerment of women: Constitutional and other legal provisions.

Unit IV

7. CHILDREN AND THE LAW

Child labour.

Sexual exploitation.

Adoption and related problems.

Children and education.

8. ALTERNATIVE APPROACHES TO LAW

The jurisprudence of Sarvodaya- Gandhiji, Vinoba Bhave; Jayaprakash Narayan- Surrender of dacoits; concept of grama nyayalayas.

Socialist thought on law and justice: An enquiry through constitutional debates on the right to property.

Indian Marxist critique of law and justice. Naxalite movement: causes and cure.

Unit V–

9. MODERNISATION AND THE LAW

Modernization as a value: Constitutional perspectives reflected in the fundamental duties.

Modernization of social institutions through law.
Reform of family law.
Agrarian reform- Industrialization of agriculture.
Industrial reform: Free enterprise Vs. State regulationIndustrialization Vs. environmental protection.
Reform of court process.
Criminal law: Plea bargaining; compounding and payment of compensation to victims.
Civil law: (ADR) Confrontation Vs. consensus; meditation and conciliation.; Lok adalats.
Prison reforms.
Democratic e centralization and local self-government.

BOOKS RECOMMENDED

Marc Galanter : Law and Society in Modern India (1997) Oxford
Robert Lingat : The Classical Law Of India (1998) Oxford
U. Baxi : The Crisis Of the Indian Legal System (1982), Vikas, New Delhi
U. Baxi : Law and Poverty Critical Essay. (1988) Tripathi, Bombay
Manushi : A Journal about Women and Society.
Duncan Derret : The State , Religion and Law in India (1999) Oxford
H.M. Seervai : Constitutional Law of India (1996) Tripathi
D.D. Basu : Shorter Constitution Of India (1996) Prentice- Hall of India (P) ltd
Sunil Deshta and Kiran Deshta : Law and Mernace of Child Labour (2000) Armol Publications Delhi.
Savitri Gunasekhare : Children, Law and Justice (1997) Sage
Indian Law Institute, Law and Social Change: Indo American Reflections, Tripathi(1988)
J.B.Kripalani, Gandhi : His life and Thought,(1970) Ministry of Information and Brodcasting, Government of India
M.P.Jain, : Outline of Legal History,(1993), Tripathi, Bombey.
Agens, Flavia, Law and Gender Inequality: The Position of Women's Rights in India (1999), Oxford

PAPER – II (PAPER CODE 118)

ADMINISTRATIVE LAW
(U.K U.S.A. FRANCE AND INDIA)

Unit-I

Growth and Development of Administrative law, Concept, Nature, Scope and Definitions of Administrative law, Sources of Administrative Law
Rule of Law-Development in UK, USA, France and India, Meaning and present position of Rule of Law
Separation of Powers-Development, Meaning and present
Position of Separation of Powers in Uk, USA, France and India Droit Administratif

Unit-II

Classification of Functions-Tripartite Functions of Administration
Delegated Legislation- Meaning, Nature and purpose of Delegated Legislation, Forms and Type of Delegated Legislation, Factors leading to the growth of Delegated legislation, Constitutionality of Delegated Legislation in UK,USA, France and India, Limits of Delegated Legislation, Control over Delegated Legislation in UK. USA, France and India, Sub-delegation and Administrative Directions

Unit-III

Administrative Adjudication and Administrative Tribunals—Growth of Administrative Tribunals in UK, USA, France, and India, Working of Administrative Tribunals, Administrative Tribunals and Judicial Review
Natural Justice—Concept and Definition , Principles of Natural Justice, Application of Natural Justice in UK, USA, France and India, Exceptions of the Principles of Natural Justice, Effect of Failure of Natural Justice
Unit-IV
Judicial Control of Administrative Actions through Writs-Need for Judicial Control, Position of Judicial Control of Administrative Actions in UK, USA,

France and India, Grounds of Judicial Review, Limits of Judicial Review, Exclusion of Judicial Review, Public Interest Litigation
Judicial Control of Administrative Actions(Remedies through ordinary Law) in UK, USA, France and India, Declaratory Action, Injunction and Action for Damages Judicial Review of Administrative Discretion

Unit-V

The Ombudsman- History, Development and Recent position in different Countries, The Lokpal Lokayukta, and Commissions of Inquiry.
Government Privileges and Immunities in Legal Proceedings, Doctrine of Estoppels and Waiver
Liability of the State in UK, USA, France and India, Act of State, Public Corporations and Regulatory Bodies

Note--: Following Acts shall also be deemed to be included in the Units of this paper.

(1) Federal Administrative Procedure Act,1946
(2) Federal Tort Claim ct, 1945
(3) Freedom Of Information Act,1966
(4) Tribunals & Inquires Act,1992
(5) The Crown Proceedings Act, 1947
(6) Parliamentary Commissioners Act, 1967
(7) Administrative Tribunal Act, 1985
(8) The Lokpal & Lokayukta Bill,2011

Books Recommended

Rebson : Justice And administrative Law

Griffth and Street: Principles of Administrative law.
Wade W.R.H. : Administrative Law
Schwartz B : American Administrative Law
De Smith S.A. : Judicial Review And Administrative Action
Allen C.K. : Law and order
Basu : Comparative Administrative Law
Prasd : Administrative Tribunal in Action
Jain&Jain : Principles of Administrative Law

I.L.I. : Cases and material on Administrative Law in India
Nair : Parliamentary control of Administrative Action
Flaukes : Introduction of administrative Law
Schwrtz : Legal control of Government Administration in Britain and the United States
Wyner : Executive Ombudsman in U.S.A.
Davis k.G. : Administrative Law Text
Davis K.G. : Administrative Law Cases.
Brown and Garner: French Administrative Law.
Bowatt : Ombudsman
Street : Justice in Welfare States.
Ramchandra V. : Administrative Law.
Fazal M.A. : Comparative Administrative Law of UK, USA, India and France
Laffe : Administrative Law cases and Materials
Markose A.T. : Judicial Control of Legislative action In India

Sathe : Administrative Law in India.
Jain : Administrative Law in India
Indian Law Institute: Delegated Legislation in India.

PAPER – III (PAPER CODE 119)

DISSERTATION

Dissertation shall be compulsory for each student Topics of the dissertation shall be allotted by the Head of the Department. This paper contains 100 marks for script writing .

PAPER – IV (PAPER CODE 120)

Viva-Voce

Each student shall also appear for a Viva-Voce examination of 100 marks. This will be held before a Board of three examiners of whom two will be external and one internal. The absence of one external examiner may, however, be condoned by the Kulpati, if it is caused due to unavoidable circumstances, ordinarily, the head of Department of Law will be the Internal examiner.

Group- II
CRIMES AND TORTS

PAPER – I (PAPER CODE 113)

CRIMINOLOGY

Unit-I

Definition of Criminology, Crime and Criminal Law, their theory and significance, Development of criminal law and criminology in India, Study of crime as behavior.

Unit-II

Schools of Criminology:- Pre-classical, Classical and Neo-classical and their theories Baccaria and Bentham, The Positive school and their contributors C. Lambroso, R Garafellow and E Ferricriews of other schools ie. cartographer sociological sociologist and clinical and multifactor's etc. and their contributors.

Unit-III

Types of Crimes and Criminals: Habitual, Sexual, Professional, Organized and white-collar. Terrorism Marginal and Victimless crimes, Modern and International crimes such as –cyber crime, Human organ crime, Hijacking, Feticide and Nuclear theft, crime against Women- Murder, Rape, Dowry-death, Torture, Kidnapping, abduction etc.

Unit-IV

Cause of Crimes:- Individual, Mental, Physical, Economical, Psychological and Religious, Sexual, Harmonial abreoviability as a cause of crime Social disorganization, movibility, Theory of Differentiate association. Anomie, Labeling, Gang delinquency, Effect mass media and role of state and politician as crime causation.

Unit-V

Juvenile Delinquency:- Its causes, Economic, Pressing, Gang culture, Differential association, Vagrancy, Truancy, Recidivism, Drug addiction, Tract went of Juvenile and their signification: Borsht system observation home Reformatories after care organization and Provision of the Juvenile Justice(care and protection of children) Act 2000.

Books Recommended

Sutherland & crassly	- Criminology
Taft & England	- Criminology
Reckless W.	- Criminology The Crime Problem
Vole G.B.	- Theoretical Criminology
Mannheim	- Compensation criminology
Lolika Asrkar	- Crime & Woman
Upendra Baxi	- Law & Poverty
Pillai S.	- Theory of Criminology
Cycil Burt	- Young Delinquents
Gilliam J.L.	- Criminology Penology
Gluck	- Delenquanti in working
A.Siddique	- Criminology Problem & Perspective
David Abhahanson	- Crime & Human Maid
Cove Land	- The Emitters of Criminology
Katherine S William	- Text Book of Criminology
Leon Radzeinoartz	- Ideology of Crime
W. Reckless	-The Prevention of Juvenile Delinquency
P.H.Kohen	- Juvenile Offenders & The Law
K.S.Shukla	- Adolescent Offenders
ILI (Delhi)	- Habitual Offenders & The Law
E.Sutherland	- White Collar Crime
M.Ponnanian	- Criminology and Penology

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PAPER – II (PAPER CODE 114)

PENOLOGY

Unit-I

Concept of Punishment: Its history and development Religious and Punishment: Types and Forms of Punish and as Ancient, medieval and Modern India. Its classification whether death penalty is necessary? Its merits and Demerits.

Unit-II

Theories of Punishments: Deterrence, Retributive, Expiation, Reprobation, Probation, Classical and utilitarian view on punishment: Punishment advantages and disadvantages: critical analysis in the righting in purpose scale and provision of criminal law and pardon, social necessity of law and order.

Unit-III

History of Penal system in development in India, Types of Prisons and Prisoners Basic principles for the treatment of prisoners National and International Rights of Prisoners under our Constitution and the Prisoners Act 1900.

Unit-IV

Probation and Parole: Its nature, origin and advantages, The Provision of Probation of offenders Act 1958, Comparison between Probation and parole. Its effects in Rehabilitation of Prisoners.

Unit-V

Power and jurisdiction of Police under Cr.pc U/s 302, 55, 161, 36,156,160,174,102 and 166 Criminal Justice Process, Organize ahead structure of Jail and Police in India Provision relating to custodial death, torture etc.

Books Recommended

P.K.sen	- Penology old and New
Gillian JL	- Criminology and Penology
Bhattacharya	- Prisons
Flexvor &Baldwani	- Juvenile court and Probation
M.Ponnanian	- Criminology and Penology
J.C.Chaturvedi	- Penology & Criminal Procedure Code

The Books recommended for code No.113 are also relevant and useful.

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PAPER – III (PAPER CODE 115)

GENERAL PRINCIPLES OF CRIMINAL LAW AND IPC

Unit-I

Concept of Criminal liability: Its history, nature and scope in Ancient, medieval and modern context codification of criminal law in India and of Indian Penal Code of 1860,

Unit-II

Sections relating to General exception and punishment (sec 1-75 IPC) General explanation (sec 76-106 IPC) and Abatement (sec 107-120 IPC) Criminal conspiracy (sec 120A-120B IPC) Offences against the state and public tranquility sedition (sec 124A IPC) Unlawful assembly, Rioting and Affray (Sec 141,146 & 159)

Unit-III

Giving false evidence, fabricating false evidence and other offences against public justice health safety and morals (Sec 191-229) provisions relating to public nuisance, obscenity (Sec 268-294) offences relating to body: Specially Culpable homicide, murder, Dowry death, Suicide, Miscarriage, Hurt, Grievous hurt, Wrongful restraint and Wrongful confinement, Force, criminal force, Assault, Kidnapping, Abduction (sec 299-374)

Unit-IV

Sexual offences (sec375-377), Offences relating to property especially – Theft (sec 378), Extortion (sec 383), Robbery (sec 390), Dacoit (sec 391), Criminal misappropriation of property (sec 403-404),Criminal Breach of Trust 9sec 405 -409), stolen property (sec 410-414), Cheating, mischief and criminal trespass (sec 415,425,441), House breaking (sec 445), Offence relating to documents (sec 463-477A)

Unit-V

Offences relating to property marks and currency notes (479-489E) Offences relating to marriage (sec 493-498A), Defamation (sec 499-502), Criminal intimidation: Insult and Annoyance (sec 503- 510) and attempt to commit offences (sec 511)

Books Recommended

P.K.sen - Penology old and New

Gillian JL	- Criminology and Penology
Bhattacharya	- Prisons
Flexvor &Baldwani	- Juvenile court and Probation
M.Ponnanian	- Criminology and Penology
J.C.Chaturvedi	- Penology & Criminal Procedure Cod

PAPER – IV (PAPER CODE 116)

LAW OF EVIDENCE

Unit-I

Introduction and History of Evidence, Rule of Evidence in Hindu and Muslim Law, Changes in British period, Interpretation clause of Indian Evidence Act, May Presume, Shall Presume and conclusive proof.

Unit-II

Relevancy of facts in various circumstances (sec 4-16) Admission; its types and provisions relating to it, Provision relating to confession (sec 24-31) and statement by person who cannot be called on witness (sec 32-33) position of statement made under special circumstances and how such of a statement to be proved (sec 34-39) Relevancy of the judgment of the court and opinion of third person (sec 40- 44 & 45-51) and provision relating to character of person (sec 52-55)

Unit-III

Fact which had not be proved; oral and documentary evidence (sec 56- 78) Presumption as the document (sec 79-90) and relating to the exclusion of oral by documentary evidence (sec 91-100)

Unit-IV

Burden of proof relating to death, ownership, legitimacy, suicide and dowry death and their presumptions (Sec 101- 114A) Section relating to dumb and other types of witness (sec 118 – 134)

Unit-V

Sections relating to the examination of witness; Examination in chief, cross and Re –examination, Leading questions and other provision of chapter x and chapter xi (sec 135- 167) of Indian Evidence Act.

Books Recommended

P.K.sen	- Penology old and New
Gillian JL	- Criminology and Penology
Bhattacharya	- Prisons
Flexvor &Baldwani	- Juvenile court and Probation
M.Ponnanian	- Criminology and Penology
J.C.Chaturvedi	- Penology & Criminal Procedure Code

The Books recommended for code No.113 are also relevant and useful.

FOURTH SEMESTER

PAPER – I (PAPER CODE 121)

LAW OF TORTS – GENERAL PRINCIPLES

Unit-I

Law of Torts: Its introduction definition and classification history and development its comparison crime, breach of contract and breach of trust Essential of tarts; Acts and omission and legal damages Damnum sine injury and injury sine damnum

Unit-II

Foundation of tortuous liability: Mental elements Fault as a basis of liability various torts- Test of proximity Directness and test of forcibility principles for awards of damages Position of contributory negligence and intervention of third party nouns acts intervenes.

Unit-III

General defense in action of torts- Private defenses necessity, invisible accident Act of God, Mistake statutory authority and consent. Remedies in action of torts- judicial and extra judicial remedies, Discharge of torts: waiver, accord and satisfaction Release of Acquiescence Re judicator and statute of limitation Assignment of right of action in torts and death of party and its effect on tortuous actions.

Unit-IV

Capacity to sue or be sued in tort: Position of unborn child, Minor Husband and wife, Lunatic, insolvent, convicts, judicial affair, alien enemy Trade union corporation Foreign save reign state and its executed authority, Liability of state for the tortuous liability acts and his servant and foreign tab joint and servant tort feaser. Liability for injury caused by animal (scanter rule)

Unit-V

General principle s for occupiers liability for dangerous land precuns principles relating to product liability (Donough v Stevenson Rule) Strict Liability: Ryland and flexure rule Doctrine of alternative damages.

PAPER –II (PAPER CODE 122)
Specific Torts- Special Topics
Negligence and Vicarious Liability

Unit-I

Injurious to the person and wrongs relating to domestic relations and with reacting to every interracial night. Worship and digenity. International wrong doing- intimidation, conspiracy and urter rorener to the hade or occupation by under fall areas.

Unit-II

Wrongs to movable poverty:- Trespass to goods concerning it kinds detention wrongs of immovable property. Trespars, its types remedies deference and dadoes; Injuries to reversion and waste, slender of goods Maintenance and champerty worngs to incorporeal personal property.

Unit-III

Interference with contractual and business relation Malicious Proceedings: Malicious persecution Abuse of legal process. Misfeasance in public office Noisier.

Unit-IV

Negligence as a Torts- Its definition and nature Agential ingredients for actionable negligence requirement of duty in the case of negligence standard of duty to take care the breach of duty casual relation bettor them. Liability for the negligence of the occupiers of land and prentices to warless various pesson. Negligence of person processing greater skill and spieled rate of profession. Negbgcue by the keepers of diagram anural and dangerous good or chattel contributory Negligence Reach of statutory duty and prudent of proof in action of negligence.

Unit-V

Vicarious liability - liability for the wrongs cancelled by others. Liability by relation and liability by ratification Relationship between mascara and iernal nester and independent contracting and praieipal and augural. Baric of vicarious liability course of reemployment . Lily by for the act of driers Deviation and Detour, Doe rime of Corazon employment libeling of hospital authority for the negligent act of doctor and murex and other staff.

Books Recommended

Ramaswamy Iyar - The Law of Torts

PAPER – III (PAPER CODE 123)

DISSERTATION

Dissertation shall be compulsory for each student Topics of the dissertation shall be allotted by the Head of the Department. This paper contains 100 marks for script writing .

PAPER – IV (PAPER CODE 124)

Viva-Voce

Each student shall also appear for a Viva-Voce examination of 100 marks. This will be held before a Board of three examiners of whom two will be external and one internal. The absence of one external examiner may, however, be condoned by the Kulpati, if it is caused due to unavoidable circumstances, ordinarily, the head of Department of Law will be the Internal examiner.

SCHOOL OF STUDIES IN LAW
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

MASTER OF PHILOSOPHY
M. PHIL (LAW)
(REVISED ORDINANCE-52)

1. The duration of the M.Phil. Course shall consist of two Semesters

2. There shall be three theory papers in the First Semester. In the Second Semester there shall be a paper of Dissertation and Viva-voce The name of the papers, its components, division of marks with awarding scheme is as follows -

Allotment of Marks

Allotment of Marks				
Semester - I				
Sr. No	Theory	Name of Paper	Marks	
			Theory	Internal
i.	Theory-I	Research & Teaching Methodology	80	20
ii.	Theory-II	Human Rights & Constitutional Law	80	20
iii.	Theory-III	Jurisprudence	80	20
Total Marks in Semester-I			300	
Semester - II				
iv	Dissertation	Seminar based on dissertation		50
		Dissertation (Script)	100	
		Viva-voce	50	
Total Marks in Semester-II			200	
Grand Total			500	

6 The internal assessment (20 marks), based on theory papers, shall be carried out by the internal examiners in the form of seminars/ group discussion and/or written class tests.

7 The evaluation of the seminar based on the dissertation of 50 marks shall be done by in presence of Supervisor and other regular faculty member of department.

8 A candidate will be required to submit three typed copies of his/her Dissertation within a month after the completion of theory examination. The dissertation shall be valued by the external valuer, while vivo-voce will be conducted by both internal and external examiner and the HOD shall be the internal examiner.

9 In matter of admission, enrolment, examination and in all other matters not provided for by this scheme of examination, the M. Phil course will be governed by the general provisions of the relevant Ordinances which in enforce.

DETAIL SYLLABUS FOR M. Phil LAW

PAPER – 1
RESEARCH AND TEACHING METHODOLOGY

UNIT – 1

OBJECTIVE OF LEGAL EDUCATION, LECTURE METHOD OF TEACHING-MERITS AND DEMERITS, THE PROBLEM METHOD, DISCUSSION METHOD AND ITS SUITABILITY AT POSTGRADUATE LEGAL TEACHING.

UNIT -2

THE SEMINAR METHOD OF TEACHING, EXAMINATION SYSTEM AND PROBLEMS IN EVALUATION-EXTERNAL AND INTERNAL ASSESSMENT, STUDENTS PARTIPATION IN LAW SCHOOL PROGRAMMES.

UNIT – 3

RESEARCH METHODS – SOCIO LEGAL RESEARCH, DOCTRINAL AND NON DOCTORINAL, INDUCTION AND DEDUCTION.

UNIT – 4

RESEARCH PROBLEM – SURVEY OF AVAILABLE LITERATURE AND BIBLIOGRAPHICAL RESEARCH, LEGISLATIVE MATERIALS INCLUDING SUBORDINATE LEGISLATION, NOTIFICATION AND POLICY STATEMENT, JURISTIC WRITINGS.

UNIT – 5

PREPARATION OF RESEARCH DESIGN – FORMULATION OF RESEARCH PROBLEM, METHODOLOGY OF COLLECTING DATA, USE OF HISTORICAL AND COMPARATIVE RESEARCH MATERIALS, USE OF OBSERVATION STUDIES, USE OF QUESTIONNARIES AND INTERVIEWS, USE OF CASE STUDIES, JURIMETRICS, ANALYSIS OF DATA.

Reference books:

1. Methodology and Techniques – By T.S. Bhandarkars & T.S. Milkinson
2. Methods in Social Research – By William J. Goode & Paul K. Hatt
3. Development of Research Tools - By N.C. Gautam
4. Designs of Social Research - By D.K. Lal Das
5. Doing Quantitative Research in the Social Sciences – By Thomas R. Black
6. Research Methods in behavioral sciences - By S.M. Mosil
7. Legal Research Methodology – By Dr. H.N. Tiwari
8. Legal Research - William P. Statisky
9. Legal Research Methodology - By Shilpa Agrawal
10. Legal Reason-The use of Analogy in legal Argument – By Lloyd L. Weiored
11. Learning the Law – By Granville Williams
12. Legal Education & Profession in India – By T.L. Mehta & Shusma Gupta
13. Social Mission of Law – By V. R. Krishnaayyar
14. Legal Education in a Changing world – By International Legal Centre, NewYork
15. A Guide to Legal Research - By Evwinc surrency
16. Legal Research Methodology – Dr. S.R. Myneli
17. An Introduction to Legal Argument – By Adward Lewi
18 Legal Research Methodology –(In Hindi) By H.N.Giri

PAPER – 2

HUMAN RIGHTS AND CONSTITUTIONAL LAW

UNIT – 1

DEFINITION, NATURE, ORIGIN AND DEVELOPMENT OF HUMAN RIGHTS – SOME BASIC HUMAN RIGHTS ISSUES, EVOLUTION OF THE CONCEPT OF HUMAN RIGHTS, CLASSIFICATION OF HUMAN RIGHTS, THEORIES OF HUMAN RIGHTS.

UNIT – 2

INTERNATIONAL LAW AND HUMAN RIGHTS – HUMAN RIHGTS AND INTERNATIONAL RELATIONS, DECOLONIZATION, SOVEREIGNTY AND HUMAN RIGHTS, UNITED NATIONS AND HUMAN RIGHTS.

UNIT – 3

IMPORTANT WORLD CONFERENCE AND CONVENTIONS ON HUMAN RIGHTS – INSTRUMENTS OF HUMAN RIGHTS AND COVENANTS, GENEVA CONVENTIONS OF 1949, INTERNATIONAL BILL ON HUMAN RIGHTS, GLOBAL CONSTITUTIONAL LIMITATION ON HUMAN RIGHTS.

UNIT – 4

HUMAN RIGHTS AND THE INDIAN CONSTITUTION – KINDS OF RIGHTS IN INDIA, ECOMONIC AND SOCIAL RIGHTS IN INDIA, ROLE OF JUDICIARY.

UNIT – 5

INDIAN CONSTITUTION PART III & IV.

Reference book

1 Human Rights & Legal Remedies - Gokulesh Sharma
2 Human Rights in India- Problems & Prospectives - B.P. Singh Shegal
3 Human Rights in India – Constitutional & Legal Provisions - M. Ibohal Singh
4 Human Rights in India - Nirmal
5 Human Rights & Social Justice - Gokulesh Sharma
6 Human Rights under International & Indian Law - S.K.Kapoor
7 Human Rights – U.N. Initiatives - Rahul Rai
8 Human Rights in India-Implementation & violation – G.S. Bajwa
9 Consitutional Law of India – P.N. Baxi
10 International Law - S.K. Kapoor
11 Constitutional Law of India – Anand
12 Constitutional Law of India – H.M. Seervai
13 Constitution of India – V.N. Shukla
14 Basic Documents on Human Rights – Brownlie Lan
15 Human Rights – International Documents (3 vols) - Joylee J.A.
16 Human Rights in International Law - Meron T.
17 Comparative Federalism - Basu
18 Selected Constitutions - Kapoor A.C.
19 Comparative Study of Six Living Constitutions – Gupta
20 Selected Constitution of the World – Basu
21 Comparative Constitutional Law – Basu
22 Federalism - K.C. Wheeere
23 Indian Constitutional Law(2 Vol.)-Dr. M.P. Jain

PAPER – 3

JURISPRUDENCE

UNIT – 1

CRITICAL SURVEY OF LEGAL THEORIES – NATURAL LAW AND THE SEARCH FOR ABSOLUTE VALUES, THE PROBLEM OF NATURAL LAW, ANCIENT THEORIES, REASONS AND THE LAW OF NATURE, NATURAL LAW AND SOCIAL CONTRACT (GROTIUS, HOBBES, LOCKE, ROUSSEAU), REVIVAL OF NATURAL LAW THEORIES.

UNIT – 2

PHILOSOPHICAL IDEALISM AND THE PROBLEM OF JUSTICE – GERMAN TRANSCEDENTAL IDEALISM, (KANT, FICHTE, HEGAL), NEO KANTIAN PHILOSOPHY AND SCIENTIFIC LEGAL IDEALISM, MODERN VALUE, PHILOSOPHY AND LAW.

UNIT – 3

THE IMPACT OF SOCIAL DEVELOPMENT ON LEGAL THEORIES, HISTORICAL EVOLUTION AS A GUIDE TO LEGAL THOUGHT, BIOLOGY, SOCIETY AND LEGAL EVOLUTION, MODERN SOCIOLOGICAL THEORIES OF LAW.

UNIT – 4

POSITIVISM AND LEGAL THEORIES – KELSON'S PURE THEORY OF LAW, UTILITARIANISM, THE JURISPRUDENCE OF INTERESTS AND LEGAL IDEALISM.

UNIT – 5

LEGAL THEORY AND CONTEMPRORY PROBLEMS – LEGAL THEORY OF MODERN POLITICAL MOMENTS, SOCIOLISTIC AND COMMUNIST THEORIES OF LAW, NEO-SCHOLASTIC DOCTRINE AND MODERN CATHOLIC LEGAL PHILOSOPHY.

Reference book

1. Out lines of Ancient Hindu Jurisprudence – By M.S. Pandit
2. Solmond on Jurisprudence – P.J. Fitzerald
3. Jurisprudence – J.G. Riddall
4. A Text book of Jurisprudence – G.W. Paton.
5. Juriprudence and legal theory – Shambhoo Dayal
6. Jurisprudence – Wayne Morrison
7. Fundamental of Jurisprudence – S.N. Dhyani
8 Jurisprudence- Dias
9 Vidhishashtra Ke Mool Sidhhant (In Hindi)-Dr. Anirudh Prasad
10 Jurisprudence-Edgarboden Heimer
11 Legal Theory –Friedman

PAPER-4
DISSERTATION

This paper is divided into three parts

Part-1.	Seminar based on Dissertation	50 marks
Part-2.	Dissertation (Script)	100 marks
Part-3.	Viva-voce	50 marks
		Total- 200 marks

In Part-I of this paper the student shall participate and give his/her presentation on seminars based on dissertation of 50 marks. . The evaluation of the seminar on the dissertation of 50 marks will be done in presence of the supervisor and other teacher of the department.

In Part-II of this paper the student will be required to write a dissertation on assigned topic under the supervision of the supervisor and give his/her presentation on dissertation (Script) of 100 marks. A supervisor shall not have at any given point of time more than five M.phil students. A candidate will be required to submit three typed copies of his/her dissertation with in a month after the completion of theory examination. The Dissertation shall be valued by external examiner only.

In Part-III of this paper will be viva-voce of 50 marks which shall be valued by internal and external examiners and the Head of the Department shall be the internal examiner.

The total marks of the seminar based on the Dissertation , script writing and viva-voce shall be computed along with the marks of the 3 papers(marks of the theory papers and the marks of the seminar).

SYLLABUS

2015-2016

PT. RAVISHANKAR SHUKLA UNIVERSITY

RAIPUR

CHHATTISGARH

Pt. RAVISHANKAR SHUKLA UNIVERSITY RAIPUR (C.G.)

COURSE WORK FOR Ph.D. IN LAW

2015-16 onwords

PAPER-1	Research Methodology & Computer Application			100
PAPER-2	Part I	Review of concerned Literature	50	100
	Part II	Synopsis framing	25	
	Part III	(a) Seminar	15	
		(b) Project Report	10	
Total (MARKS)				200

PAPER-1 (100 Marks)

Research Methodology and Computer Application (100 Marks)

UNIT-I

Meaning of Research, Need for Legal Research, Criteria for Good Research, Motivation and Approach, Methods for Legal Research- Doctrinal-Non-Doctrinal. Induction and Deduction, Empirical, Sampling and Questionary writing.

UNIT-II

Formulation of Research Problem, Hypothesis, Data Collection**: –** Methods, tools & Techniques, Data Processing and Analysis.

UNIT-III

Preparation of Research Design, Use of Historical and Comparative Research, Use of Observative Studies, Use of Interview and Case studies, Jurimetrics Analysis of Data0

UNIT-IV

Computer Application in Legal Research, Statistical Tools, Statistical Software, Data entry and command for analysis.

UNIT-V

Thesis writing and its pattern.

Reference Books:-

1. Legal Research-William P. Statesky.
2. A Guide to Legal Research-Erwine Sursency.
3. An Introduction to Legal Arguments-By Edward Lewi.
4. Methodology & Techniques- Ts, Bodenkr & MIlinson
5. Methods in Social Research- By William J. Goode & Paul K. Hatt.
6. Development of Research Tools- N.C.Gautewan.
7. Legal Research Methodology- S.R. Myneni Allahabad Law Agency

8. Legal Research Methodology- H.N. Tiwari

PAPER-2 (100 Marks)

PART-I

Review of concerned literature (50 marks)

The candidate shall review minimum Twenty (20) research articles published in standard referred journals of the subject. After reviewing the research articles, the candidates shall submit a summary of his revision in articles with his opinion on the articles within two months from the beginning of the course.

PART-II

The candidate shall prepare a synopsis at the help of concerned literature on the topic in which he/she is writing to do research. The synopsis includes

(I) Research Topic
(II) Review of literature
(III) Gapes in earlier studies
(IV) Objectives
(V) Hypothesis
(VI) Methodology
(VII) Plan of study

PART-III

(a) Seminar-(15 Marks)
The candidate presents a seminar on the basis of Part I before the faculty members.

(b) Project Report-(10 Marks)
The candidate shall submit a report on the basis of seminar

Evaluation procedure:-

The respective DRC will conduct the evaluation at the constitutional / departmental unit. 50% marks in necessary in each paper of pass this course work. Result of the candidates shall be declared by the university after adding the marks of both the papers.

SYLLABUS OF LAW

FOR

(CHOICE BASED CREDIT SYSTEM)

UNIT-I

- **General Introduction of legal system**: History of Indian Legal Institutions in ancient medieval and modern period. Law as a means of social control& welfare of the citizens. It's sources, definition & scope in Dharmashastras & other ancient Indian literature

UNIT-II

- **Jurisprudence & classification of law** : Definition of Laws, their kinds, theories of their origins & views of school & their thinkers such as analytical, historical, philosophical, social, Psychological and Realist School of Laws. What is Jurisprudence, its definition & scope of studies, possession, title ownership rights and other concepts relating to law. Their Universality in Judicial System

UNIT-III

- **Constitutional and Administrative Law:**
  Indian Constitution- Its Preamble, Fundamental Rights, Directive Principles of State Policy, Principle of its interpretation. President & Governors, their appoint, powers & duties. Position and Powers of Legislature, Executive & Judiciary. Parliamentary privileges and distribution of powers amending process & emergency provisions.
  Administrative Law- Principles of Natural Justice, Delegated Legislation & their Constitutionality, Judicial Review of Administrative Action, Ombudsman, Lokayukt & Lokpal

UNIT-IV

- **Law of Crimes & Law of Torts :**
  Law of Crimes- General Principles of Criminal Liability, Classification of Offenses in Indian Penal Code, their Definition and Legislative Punishment, Abatement & Attempts. General Exceptions & Principles of Interpretation.
  Law of Torts- Definition, Nature, General Defense. Various types of Torts and their Ingredients, Remedies of Torts, Liability without Fault, Vicarious Liability & Negligence.

UNIT-V

- **Law of Contract and Mercantile Law:** Nature and Formation of Contract, Conditions for Valid Contract, Void, Voidable, Illegal and Unenforceable Contract. Breach of

Contract, Quasi Contract, Indemnity, Guarantee, Bailment and Agency. Sales of Goods, Partnership and Negotiable Instrument Act 1881 Arbitration and Conciliation Act 1996.

UNIT-VI

- **International Law:** Nature & Definition, Relation between International and Municipal Law, Sovereignty, Recognition, Succession, Neutrality, Treaty, Law of Sea, Extradiction and Asylum. UNO and its Principal Organs, their Powers and Functions

List of Recommended Books

1. Kane's Dharmashastra -Bharat Bhavan, New Delhi/Pune.
2. Jurisprudence – RWM Dias (Indian Rept.) Aditya, New Delhi
3. Indian Constitution- V. N. Shukla (EBC), Lucknow.
4. Principles of Administrative Law- M.P.Jain & M.P.Jain (Tripathy), Bombay
5. Indian Penal Code- Ratanlal Dhirajlal, (Wadhwa) , Nagpur
6. Law of Torts- Ramaswami Aiyer, (Lexus Nexus), Mumbai.
7. The Indian Contract Act 1872
8. The negotiable Instrument Act
9. The Indian Partnership Act 1932
10. The Sales of Goods Act 1930
11. The Arbitration and Conciliation Act 1996.
12. International Law-S.K.Kapoor (EBC), Lucknow.
13. Jurisprudence & Legal Theory-V.P.Mahajan (EBC) Lucknow.
14. Constitutional Law of India- J.N.Pandey (CLA) Allahabad.
15. A Study of Indian Legal Theory, S.N. Dayani (Metro Publication) New Delhi

PT.RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
Bachelor of Library and Information Science
Syllabus: 2017-2018

Paper	Subject	Internal Marks	Examination		Total Marks
			Marks	Duration	
1	Library Organization and Management	20	80	3 Hrs.	100
2	Library Cataloguing and Bibliography	20	80	3 Hrs.	100
3	Reference sources and Services	20	80	3 Hrs.	100
4	Documentation and Information Services	20	80	3 Hrs.	100
5	Computer Application in Libraries	20	80	3 Hrs.	100
6	Library Classification(Theory)	20	80	3 Hrs.	100
7	Library Classification(Practice)	20	80	3 Hrs.	100
8	Library cataloguing (Practice)	20	80	3 Hrs.	100
	Total Marks	160	640		800

PAPER – I LIBRARY ORGANISATION AND MANAGEMENT

Full Marks:100 (Theory: 80, Internal Assessment: 20) Pass Marks 35%

UNIT-I

- Library Organization : Meaning , importance, principles and types
- Library Committee : Definition , types and functions
- Different Library systems- their salient feature and functions
- National Libraries of India, UK and USA
- Role of libraries as Academic and social institution

UNIT -II

- Ranganathan's five laws of library science and their applications
- Library legislation in India
- Library movement in India, UK and USA. NKC
- Library association / Professional organizations: their objectives and functions: UNESCO, IFLA, ALA, IASLIC,ILA

UNIT – III

- Management : Definition, Components, features and principles of management
- Administration versus Organization
- Library rules and regulations.
- Scientific management
- Personnel management

UNIT –IV

- Physical Environment : Basic consideration in planning of library building, furniture, fittings and equipments
- Routine procedures: Acquisition, circulation , serials control, stock verification Vs stock rectification
- Public relation and extension activities.

UNIT -V

- Financial Management
- Budgeting : its concepts , types and methods
- Collection Development : Different types of selection tools and their importance
- Maintenance of library record and statistics
- Annual report
- Resource sharing

PAPER-II LIBRARY CATALOGUING AND BIBLIOGRAPHY

Full Marks:100 (Theory: 80, Internal Assessment: 20) Pass Marks 35%

UNIT-I

- Library Catalogue: Objectives , purpose and functions
- Different between bibliography, catalogue and documentation list
- Canons and normative principles of cataloguing
- Physical and inner forms of library catalogue
- Selective and simplified cataloguing
- Descriptive cataloguing including

UNIT-II

- Entries-their types and functions
- Filling of entries
- Cooperative and centralized cataloguing
- Cataloguing in source and cataloguing in publication
- Comparative study of CCC and AACR-2
- Organization and management of cataloguing department

UNIT-III

- Subject cataloguing – meaning , purpose and objectives
- Subject Headings –Need and basic principles
- Derivation of subject headings-LCSH, Sears list of subject headings
- Chain procedures
- Study of ISBN and ISNN

UNIT-IV

- Bibliography – definitions , aims, need ,functions and types
- Subject bibliography
- National bibliography-need, scope and coverage
- Study of INB and BNB
- Trade bibliography
- Universal bibliography

UNIT-V

- Bibliography control
- Bibliography and documentation activities in U.S.A. and U.K.
- Bibliographical organizations in India and their services.

PAPER-III REFERNCE SOURCES AND SERVICE

Full Marks: 100 (Theory: 80, Internal Assessment: 20) Pass Marks 35%

UNIT-I

- Reference service-concept , definition and importance
- Theories and philosophy of reference service
- Kinds and nature of reference service in different types of libraries
- Short range and long range services
- Orientation of a freshman
- User education

UNIT-II

- Enquiry techniques and methods of answering reference questions
- Classification of reference sources and their evaluation
- Organization and management of reference department
- Non-Documentary Sources of Information, Digital Sources

UNIT-III

- Dictionary –scope , purpose ,types, uses and alternative names
- Glossary, Thesaurus, Lexicon, Concordance etc.
- Checklist for evaluation of dictionaries
  Study of-

  (i) Random House Dictionary of English Language
  (ii) Webster's Third New International Dictionary of English Language
  (iii) Oxford English Dictionary
  (iv) Roget's International Thesaurus

- Encyclopedias-Scope, purpose, types and importance, criteria for evaluation
  Study of-

  (i) New Encyclopedias Britannica
  (ii) Encyclopedia American
  (iii) Encyclopedia of Library and Information Science
  (iv) International Encyclopedia of Social Science and Technology
  (v) McGraw –Hill Encyclopedia of Science and Technology
  (vi) Van Nostrand's Scientific Encyclopedia

UNIT-IV

- Years Books and Almanacs – scope , definition and purpose
  Study of-
  (i) Europa Yearbook
  (ii) Stateman's Yearbook
  (iii) India: a Reference Annual
  (iv) World Almanac and Book of Facts

- Directories –Definition, scope and types
  Study of-

  (i) World of Learning
  (ii) Study Abroad
  (iii) Times of India Directory and Yearbook including Who's Who
  (iv) Universities Handbook, India

- Current reference sources-
  (i) Asian recorder: a weekly digest of Asian events with index
  (ii) Facts on file: weekly world news digests
  (iii) Keesing's contemporary archives

UNIT-V

- Geographical Sources –scope and categories – Gazetteers , guide books , maps ,atlases and globes
  Study of-

  (i) Colombia lipncott gazetteer of the world
  (ii) Gazetteer of India
  (iii) Fodor's India

- Biographical sources –scope , categories , characteristics
  Study of-

  (i) Dictionary of American biography
  (ii) Dictionary of National biography
  (iii) Dictionary of scientific biography
  (iv) India who's who

- Reference questions and their information sources with bibliographical description

PAPER-IV DOCUMENTATION AND INFORMATION SERVICE

Full Marks:100 (Theory: 80, Internal Assessment: 20) Pass Marks 35%

UNIT-I

- Documentation : meaning and definition , its aim, scope and development
- Documentation work and their scope
- Documentation services and their scope
- Documentation lists-their kinds and preparation
- Reprographic and translation service

UNIT-II

- Information science –its definition , aims and scope
- Changing concept of information science
- Information users-their needs and information seeking behavior
- Nature of information needs
- Information services : CAS,SDI

UNIT-III

- Abstracting- definition , aims and scope
- Types of abstracts
- Canons of abstracting
- Characteristics and qualities of good abstracts
- Methods and stages of abstracting
- Study of Chemical abstracts , Biological Abstracts, Physical Abstracts, Mathematical reviews, Psychological Abstracts, Sociological Abstracts, Library and information science abstracts, Indian science abstracts, Indian library science abstracts

UNIT-IV

- Indexing-definition and functions
- Pre-coordinate indexing, chain indexing, PRECIS,POPSI
- Post coordinate indexing-Term entry system , peek-a-boo-system,edgenotched
- Punch card system
- Citation indexing
- Key word indexing

UNIT-V

- Documentation centers and systems-FID,VINITI,
- NISCAIR**,** DESIDOC,NASSDOC,UNISIST AND NISSAT

PAPER-V COMPUTER APPLICATION IN LIBRARIES

Full Marks:100 (Theory: 80, Internal Assessment: 20) Pass Marks 35%

UNIT-I Computer Basics

- Computer: Definition , Development and Computer Generation.
- Types of computers and their use
- Basic components of a computer, Computer Peripherals
- Electronic data processing

UNIT-II Hardware and Software Components

- Computer Hardware: Components and Functions
- Computer Software : Types and Uses
- Operating System, functions and their commands: Window and UNIX/LINUX
- Flow Chart

UNIT-III Software Packages

- Word Processing Packages
- Desktop Publishing
- Library Application Software: CDS/ISIS
- Different types of Library Software

UNIT-IV Library Automation

- Library House Keeping Operations
- Computerized Information Services
- Selection of Library Software Packages
- Use of INTERNET for various library activities, e-journals, e-books

UNIT-V Networking

- Definition, Need, Client Server Architecture
- Types of Network: LAN, WAN, MAN
- Network Topologies: Bus, Star, Ring etc.
- Library Information Network: DELNET, INFLIBNET, CALLIBNET, UGC-Infonet

PAPER-VI LIBRARY CLASSIFICATION (THEORY)

Full Marks:100 (Theory: 80, Internal Assessment: 20) Pass Marks 35%

UNIT-I

- Library classification: Its definition, aims & function 3.
- Species of classification schemes- Enumerative & Faceted : their features, merits & demerits
- Basic subject & their kinds
- Comparative study of colon classification & Decimal classification

UNIT-II

- Knowledge classification & its canons
- Hospitality in array & chain
- Facet analysis
- Five fundamental categories & their postulates
- Principles for facet sequence

UNIT-III

- Types of isolates: common, special
- Devices used in Classification (chronological, geographical, subject, alphabetical Enumeration, superimposition & phase devices)
- System & specials

UNIT-IV

- Notation: definition, need & functions
- Types, structure & qualities of notation
- **Mnemonics: 1its types & canons**
- Indicator digits

UNIT-V

- Book classification: purpose & meaning
- Canons for book classification
- System of book number
- Knowledge classification vs book classification
- Rules for classifying books
- Steps in practical classification

PAPER-VII LIBRARY CLASSIFICATION (PRACTICE)

Full Marks:100 (Practice: 80, Internal Assessment: 20) Pass Marks 35%

Classification of documents by using latest available edition of DDC and colon classification (6 th ed. Reprint).

PAPER-VIII LIBRARY CATALOGUING (PRACTICE)

Full Marks:100 (Practice: 80, Internal Assessment: 20) Pass Marks 35%

Cataloguing of documents and continuing resources according to AACR-II(R)

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
Master of Library and Information Science
Scheme of Exam: 2017 – 18

FIRST SEMESTER

Total Credits - 20

Paper	Subject	Internal Marks	External Marks	Credits
MLI	FOUNDATION OF INFORMATION SCIENCE	20	80	4
MLII	KNOWLEDGE ORGANISATION & INFORMATION PROCESSING	20	80	4
MLIII	RESEARCH METHODS & STATISTICAL TECHNIQUES	20	80	4
MLIV	MANAGEMENT OF LIBRARY & INFORMATION CENTRES/INSTITUTION	20	80	4
MLV	INFORMATION PROCESSING AND RETRIEVAL (PRACTICE-I)	20	80	4
Total		100	400	20

SECOND SEMESTER

Total Credits - 20

Paper	Subject	Internal Marks	External Marks	Credits
ML VI	INFORMATION RETRIVAL	20	80	4
ML VII	INFORMATION SOURCES, PRODUCTS AND SERVICES	20	80	4
ML VIII	INFORMATION TECHNOLOGY : BASICS & APPLICATIONS	20	80	4
ML IX_A	MANAGEMENT INFORMATION SYSTEMS.	20	80	4
ML X	INFORMATION PROCESSING & RETRIVAL (PRACTICE – II)	20	80	4
Total		100	400	20
Total Marks of Semester I & II		**200**	**800**	**40**

Paper-I **FOUNDATION OF INFORMATION SCIENCE**

M.M 80 Pass Marks 36 %

UNIT-1 Information Science-

- Definition, Scope, Objectives, Genesis and development.
- Information Science as a discipline and its relationship with other subject fields.
- Information industry- Generators, Providers and intermediaries.

UNIT-2 Information and communication-

- Information: Characteristics, Nature and use of information.
- Conceptual difference between data,
- Information and Knowledge.
- Communication of Information.
- Information generation and diffusion.
- Communication channels and barriers.

UNIT-3 Information and the state-

- Policies relating to information including science and technology and education.
- International and national programs and policies (NAPLIC)
- IT and library.
- UAP, UBC
- Laws relating to information with special reference to India. Including press and registration act. Delivery of books (public Libraries) Act, Copyright Act.

UNIT-4 Information user & their needs-

- Categories of information users.
- Information needs: definition and models.
- Information seeking behavior.
- Methods and techniques of user studies.
- Evaluation of user studies.

Unit-5 Information products-

- Information products: Nature, concept, types, design and development and marketing.
- Economics of information.
- Information management.
- Knowledge management.

PAPER-II KNOWLEDGE ORGANISATION & INFORMATION PROCESSING

M.M. 80 Pass Marks 36%

UNIT-1 Universe of Knowledge-

- Structure and attributes.
- Modes of formation of subjects,
- Different types of subjects and their modes of formation
- Universe of Knowledge as mapped in different schemes of classification.

UNIT-2 Methods of knowledge organization-

- Canons and normative principles of sayers and Ranganathan of classification.
- Species of Library Classification schemes.
- Standard schemes of library classification; Introduction, features and application-CC, DDC, & UDC.

UNIT-3

- Universal and special schemes of classification.
- Abstract classification.
- Choice of schemes of classification.
- Study of categories postulated by different classificationists for grouping ideas.
- Postulates & Principles for facet sequence,
- Telescoping of facets.

UNIT-4 Notation-

- Notation: Types, Structure & qualities, canons of notation.
- Mnemonics- Types and canons
- Indicator digits.
- Zone analysis and sector notation.
- Canons for book classification.
- Systems of book number.

UNIT-5 Recent Trends & Developments-

- Design and development of a Scheme of library classification.
- Role of DRTC, CRG and FID.
- Contribution of International Conferences towards classification research.
- BSO: Salient features.

PAPER-III RESEARCH METHODS & STATISTICAL TECHNIQUES

M.M. 80 Pass Marks 36%

UNIT-1 Research-

- Research: Concept, Meaning, need and process of research.
- Types of Research- Fundamental and Applied.
- Research Design- Types of research design, Identification and formulation of problem, Hypotheses.

UNIT-2 Research methods-

- Research Methods- Scientific, Historical, Descriptive, Survey and case study methods, Experimental method and Delphi Method.
- Research techniques & Tools- Questionnaire, Schedule interview, Observation and sampling techniques.

UNIT-3 Data analysis and Interpretation-

- Descriptive Statistics- Measures of central tendencies- Mean, Median, Mode.
- Tabulation and generalization.
- Standard Deviation and Correlation.
- Testing of hypotheses.

UNIT-4 Bibliometrics, Informatrics & Scientometrics-

- Bibliometrics, Informatrics & Scientometrics: Concept definition and their scope
- Bibliometrics laws- Bradford, Zipf, Lotka.
- Content analysis,
- Sociometry.
- Citation studies- Citation-nature and definition, Citation-theory and analysis.
- Offset weight age formula of Sengupta.

UNIT-5 Research reporting- Designing research proposal-

- Structure, Style, Contents & Guidelines for Research reporting.
- Standards for citing bibliographical references (Like Chicago manual, MLA & Indian standards)
- Current trends in library and information science research.

PAPER-IV MANAGEMENT OF LIBRARY & INFORMATION CENTRES/INSTITUTION

M.M. 80 Pass Marks 36%

UNIT-1 Management

- Management styles and approaches.
- Management schools of thought.
- Functions and Principles of Scientific Management.
- Human Resource Management- Organization structure, Job analysis and description; Job evaluation, Motivation.

UNIT-2 Financial Management-

- Resource mobilization.
- Budgeting technique & methods: PPBS. Zero based budgeting etc. Budgetary control.
- Cost effectiveness and cost benefit analysis.
- Total Quality Management (TQM)- Definition, Concept & elements of TQM and quality audit.

UNIT-3 System Analysis and Design-

- System- definition, Concept and characteristics.
- Library as a system.
- Project management,
- PERT/CPM.
- Decision tables.
- DFD (Data Flow Diagram).
- Work study: Flow chart, Gantt chart, Block diagrams.

UNIT-4 Planning-

- Concept, Definition, Need, Purpose, Types, Policien and Procedures.
- MBO,MBE
- Strategic management- Definition objectives. Policies process & models of strategic management.
- SWOT analysis.

UNIT-5 Managing Change

- Concept of change: changes in procedures, method.
- Use of new tools and techniques;
- Techniques of managing change.
- Collection development and management- Policies and procedures.
- Time and motion study.

PAPER-V INFORMATION PROCESSING AND RETRIEVAL (PRACTICE-1)

M.M. 80 Pass Marks 36%

- Classification of titles/documents by Colon Classification (6 th Rev. Ed.) and UDC (Medium Edition).

PAPER-VI
INFORMATION RETRIVAL

M.M. 80
Pass Marks 36%

UNIT-ISubject analysis and representation-

- Problems of subject analysis and representation.
- Contributions of cutter, Ranganathan, Farradane and Coates.
- Principles of subject cataloguing- Assigning subject-Headings using library of Congress subject headings and sears list of subject heading etc.

UNIT-II Indexing language and vocabulary control-

- Indexing languages- Types and characteristics.
- Vocabulary control- Tools of vocabulary control.
- Thesaurus- Structure and construction of an IR Thesaurus. Thesaurofacet.
- Trends in automatic indexing.
- Recall and Precision devices in indexing languages.

UNIT-III Indexing systems-

- Pre coordinate and post coordinate indexing system.
- Outline study of the following indexing systems.
- KWIC, KOWC.
- Chain Indexing, PRECIS, POPSI.
- Uniterm indexing, Citation indexing.
- Standards for Bibliographical Description: AACR-2, ISBD, MARC(Format), CCF

UNIT -IV Information Retrieval Systems-

- Definition, Types, Components and operational stages of IRS.
- Information Retrieval- Data Base, Information base and SQL, IR Models.
- Search Process- Principles & methods of searching.
- Search Techniques- Boolean searches On-line searching techniques and retrieval.

UNIT-V Information retrieval systems evaluation.

- Projects and parameters.
- Important test results- Cranfield, Medlars, Smart.
- Information retrieval through optical media and CD-ROM data base.
- IR through OPAC and Internet.

PAPER-VII
INFORMATION SOURCES, PRODUCTS AND SERVICES.

M.M. 80
Pass Marks 36%

UNIT-I Information sources-

- Documentary sources of information.
- Print, Non-print including Electronic Nature.
- Characteristics, Utility and evaluation of different types of information sources.
- Non Documentary Information sources; Human and institutional – Nature, Types, Characteristics and utility.
- Internet as a source of information.

UNIT-II Information services-

- Information services- Concepts, Definition need and trends.
- Techniques and evaluation of alerting services (CAS & SDI).
- Bibliographic, Referral.
- Document delivery and translation services.

UNIT-III Information Products-

- Information products- Nature, Concept, Types, Design and marketing Abstracting,
- Types and guidelines in preparing abstracts.
- Study and evaluation of important abstract periodicals information analysis, Repackaging and consolidation.

UNIT- IV User Educations-

- Goals and objectives, Levels, Technique and methods.
- Reference interview and search techniques.
- Resource sharing and library networking.
- Study of Indonet, Inflibnet, Calibnet, Nicnet, Delnet, Adinet, Malibnet.

UNIT-V

- International information system and network.
- AGRIS, BIOSIS, CAS, DEVSIS, ICSU, INIS, INSPEC, MEDLARS.

PAPER-VIII
INFORMATION TECHNOLIGY: BASICS & APPLICATIONS

M.M. 80
Pass Marks 36%

UNIT-II Information Technology-

- Definition, need, scope and objectives.
- Historical background of computers.
- Generation of computers.
- Architecture CPU, Input/output devices .
- Hardware and software.
- Operating system-Ms-windows, UNIX, MS-DOS.

UNIT-II Networking-

- Types of networks-LAN, WAN, MAN.
- Local Area Networks; LAN Topologies, Network Hardware- Network interface card, hubs/switches.
- Getaways/Bridges, routes, modem.
- Network Protocols- TCP/IP, Net-BUI, IPX.

UNIT-III Internet-Basic features and tools-

- Connectivity- Dialup, Leased lines, Microwave, ISDN.
- Digital Subscriber Lines (DSL).
- E-mail-Protocols- Telnet, FTP, DTTP. Web browsers, Web servers, Search Engines, Keta Search,
- Web design- SGML, HTML, DHTML and XML.

UNIT-IV Data Base Management System-

- Models- Hierarchical, Network, Relational and object oriented.
- Software- CDS/ISIS, SOUL.
- Structure Query Language. Artificial Intelligence.
- Digital libraries- definition, characteristics & attributes,
- Storage media formats- DVD.

UNIT-V Library Automation-

- Planning and implementation of library automation.
- Automation of in- house operations- Acquisitions, Cataloguing, Circulation, OPAC Bar-coding.

PAPER- IX
ELECTIVES; INFORMATION SYSTEMS (Any one o the following)

- IX-A Management Information Systems.
- IX-B Business Information Systems.
- IX-C Biotechnology Information Systems.
- IX-D Health science Information Systems.
- IX-E Agricultural Information Systems.
- IX-F Social Science Information Systems. **(Note- In the initial stage only one information system, i.e. "IX-A; Management information Systems" is being implemented.)**

Paper – IX
ELECTIVES ; Information Systems (Any one of the following)
PAPER- IX-A
MANAGEMENT INFORMATION SYSTEMS.
FM 100(Theory 80 + Internal Assessment 20)

Pass Marks 36%

UNTI-I

- Definition, concepts, elements and objectives of M.I.S.
- Information and management effectiveness.
- Information needs and management levels,
- Features of MIS system approach to MIS.
- Properties of MIS.

UNIT-II

- Structure of MIS.
- MIS and decision making.
- Planning for MIS-Systems analysis; Systems design.
- Techniques of system analysis; Techniques for MIS planning.

UNIT-III Information Support System-

- Management reporting systems (MRS);
- Decision Support Systems (DSS);
- Office Automation Systems (OAS);
- Knowledge Based Systems.

UNIT IV Functional Informational Systems-

- Financial Information Systems; Marketing IS; & Human resource IS.
- Implementation, Evaluation & Maintenance of MIS.

UNIT V

- Role of Computer in MIS.
- Data Base Management.
- Data Base Software-Software needs selection and development.
- Data communication and networking.
- Using Information superhighways- Internet and Intranet.

PAPER- IX-B

Academic Library and Information System
FM 100(Theory 80 + Internal Assessment 20)

Pass Marks 36%

Unit – 1 Academic Library

- History and Development of Libraries with special reference to India
- Role of Academic Library in Education
- Academic Library as a support System for Education

Unit – 2 Development of Academic Library

- Role of UGC in Promoting Academic Libraries, University College and other Institutions
- Role of library authorities of the Institutions in Promoting Library Resources
- Development of Library Services
- Financial Management of Academic Libraries

Unit – 3 Collection Developments

- Collection Development Policy, Weeding policy
- Problems in Collection Organization in an Academic Library
- Collection Development Programmes, Allocation of Funds to Collection Procurement,
- Curriculum and Collection Development
- Library Committees and their Role in Collection Development

Unit – 4 Staffing and Staff Development for Academic Library

- Norms and Patterns for Staffing in University, College and School Libraries
- Continuing Education Programmes for Academic Library Development
- Personal Management in Academic Library

Unit – 5 Resource Sharing Programmes

- Resource Sharing Services – its Objectives, Organization and Development
- INFLIBNET and its Implications to Library Resource Sharing
- Regional and City Network of Libraries and their Importance

PAPER- IX-C

Archival, Museum and Archaeological Information System
FM 100 (Theory 80 + Internal Assessment 20)

Pass Marks 36%

Unit - 1 History and Development

- History and Development and types of Archival Centers
- Kind and identification of Archival material

Unit-2 Organisation and Management of Archival and Manuscripts

- Acquisition, Classification, Cataloguing and Indexing of Archival material
- Source material on Archival , Manuscripts
- Machine Readable and Microfilm of Archival records
- Database and Digitization of Archives
- Role of UNESCO and other agencies

Unit -3 Environment Control

- Building Design
- Planning and furniture and Fillings
- Use of Copy Right to information in relation to archives

Unit - 4 Preservation of Archives

- Objective and Purpose
- Cause of Deterioration
- Environmental Pollution : Physical , Chemical and Atmospheric
- Biological enemies of materials : Mould , Fungi , Insect and Rodents

Unit – 5 Rehabilitation of Documents

- Cleaning, removal of Stains
- Fuming and deacidification
- Repair and restoration techniques
- Lamination
- Standards for Storage Conditions

PAPER- IX-D

Agricultural Information System
FM 100 (Theory 80 + Internal Assessment 20)

Pass Marks 36%

Unit - 1 Agriculture Education and Agriculture Libraries

- Growth and development of Agriculture education and research in India
- Role of Library in Agricultural education, research and Extension
- Development of Agriculture Library in India

Unit – 2 Information Source and Services in Agriculture

- Specialized Collection and Information Sources
- Information Service and products in Agricultural Science and Technology with
- Special reference to India
- Agriculture Information Centers - National and International

Unit-3 Organization and Management of Resources

- General Principle of Information Management
- Information Organization , Processing and Dissemination
- Developing need based and on Demand Specialized Services

Unit – 4 Information Needs

- Identifying special need of Agricultural faculty & research Staff
- User Studies of Local Agriculture Libraries

Unit - 5 Agriculture Information System and Networks

- Current Trends in agricultural System and Networks
- Resource Sharing and Networking in Agricultural Libraries in India
- International Agricultural Database
- Professional Associations.

PAPER- IX-E
Legal Information System
FM 100 (Theory 80 + Internal Assessment 20)

Pass Marks 36%

Unit- 1 Law Librarianship

- Growth and Development of legal Institutional in India
- Nature Principle and Characteristics of legal Information and Law Libraries
- Type of Law Library

Unit – 2 Information Source Collections

- Special Information Sources : Bills , Acts , Books , Serials , Law Court notice ,
- Law case amendments
- Tribunal Report, Law Digests , Legal Judgment, Delegation Legislation
- Rules and orders , Legal information Sources and Lexicons

Unit - 3 Organizations and Management of Resources

- Information Processing : Classification, Cataloguing and Indexing
- Developing special skills and Techniques to handle legal information (personnel)
- Managing finance : Funds & Fund Generation

Unit – 4 Information need and services

- Special needs of lawyers and legal Professionals
- Study of Law Information Centers (Local)
- Special Services, Planning and design
- Preparation of rapports on Law Libraries (Local)
- Dissemination methods and techniques

Unit - 5 Legal Information System & Networks

- Legal information System :National and International
- Structure and their services
- Legal Database and Digital Libraries
- Resource and Networks of Legal Information

PAPER- IX-F

Industrial Information System
FM 100 (Theory 80 + Internal Assessment 20)

Pass Marks 36%

Unit - 1 Growth and Development of Industries & Industrialization Libraries

- Industrial Growth in India
- Type of Industries: Government and Non-Government.
- Role of Libraries and Information Center in Industries
- Categories of Industrial Libraries

Unit – 2 Industrial Information Resource Collections

- Tread Literature
- Patents
- Standards
- Technical Reports Bulletins

Unit – 3 Organizations and Management of Industrial Information

- Special Classification Scheme and Indexing System
- Planning and Designing Specialized information services and Products
- System approach to Planning and Design and Implementation
- Managing personal Skills and Finance

Unit – 4 Information needs and Services of Industrial Libraries

- Special Classification Schemes and Indexing System
- Case Studies and field Experience of local Industries
- Preparation of Report of an Industrial Library Survey (Local)
- Marketing of Information
- Computerized Information Service

Unit – 5 Industrial Information System and Network

- Industrial Information Centers and Networks National and International
- (SENDOC)
- Structure and their services
- Industrial Databases
- Resource Sharing and Networking of Industrial Information Centers in India

PAPER – X
INFORMATION PROCESSING & RETRIVAL (PRACTICE- II)

M.M. 80

Pass Marks 36%

(AACR-2)

Cataloguing of Publications by AACR-2

MASTER OF PHILOSOPHY (M.Phil)

LIBRARY AND INFORMATION SCIENCE

COURSE OF STUDY

S.No.	Subject	Allotment of Marks		Duration	Total Marks
		Annual Exams	Seminar		
1	Research Methods	80	20	3 Hours.	100
2	Any one of the following-				
2(A)	Library Planning & Management	80	20	3 Hours.	100
2(B)	Information Processing & Organization	80	20	4 Hours.	100
2(C)	Information Transfer & Dissertation	80	20	5 Hours.	100
2(D)	Information Need & Users	80	20	6 Hours.	100
2(E)	Information Analysis , Consolidation& Users Study	80	20	7 Hours.	100
3	Information Technology(Practical)	80	20		100
4	Dissertation: Script/ Viva-Voce/ Periodic Assessment of Research tools and Fields etc.	200 60	40		300
	Grand Total				600

COURSE-1
RESEARCH METHODS

1. Research
   - Meaning need and process of research
   - Types of research
   - Nature and role of research in library information science
   - Requirement for research

2 . Research Design
   - Definition
   - Scope
   - Characteristics of a good research design
   - Types of research design
   - Design of a scientific research study

3 Identification and formulation of research problems, Hypothesis
   - Meaning, Importance types and sources of hypothesis
   - Characteristics of useful hypothesis
   - Limitation of hypothesis
   - Difficulties in the formulation of hypothesis
   - Role of hypothesis in theory building
   - Testing of hypothesis

4 Research Method
   - ,Historical, Descriptive , Survey and Case study methods
   - Scientific Experimental Method
   - Delphi method
   - Content analysis
   - Oral history
   - Research method and their application to library and information science

5 Data
   - Meaning and definition of data
   - Types of data
   - Sources of data
   - Techniques of data collection
   - Data processing and analysis
   - Interpretation and presentation of data

6 Descriptive Statistics
   - Measures of central tendency
   - Measure of dispersion
   - Correlation and Regression
   - Test of signification
   - Chi-square test

7 Citation Studies
   - Citation ,nature and definition
   - Citation theory and analysis
   - Bibliometrics and its laws

8 Writing of report including presentation of data. Use of computer in Research

ELECTIVE
(Any one of the following)

COURES-II(A)
LIBRARY PLANNING AND MANAGEMENT

M.M.80

1 Planning Methodology

- Types of Planning
- Steps in Planning of library and information system
- National information Policy and National Information system Planning
- Project Planning
- Strategic Planning Analysis
- Policy Making

2 System Analysis and Design

- Application of systems study techniques to library organization and library situations
- Evaluation of library procedures and Services
- Time and motion studies
- Performance testing SWOT Analysis,DFD(Data Flow Diagram)

3 Financial Management

- Budgeting techniques and methods –PPBS,Zero based budgeting etc.
- Budgetary control
- Cost effectiveness and cost benefit analysis

4 Personal Management

- Human relations in management
- Staffing
- Staff development

5 Total quality Management(TQM)

- Management of Changes in libraries
- TQM Concept, definition , elements , Standards, Benchmarking and Re-engineering , Quality Audit
- TQM of Library and information Services and its implementation , process and Models
- Quality Control

6 Information Management

- Definition, Concept
- Tools and techniques for information management
- Role of information technology in information management

- LAN for information management in a university campus
- Management Information system
- Marketing of Information and Information Products
- Knowledge management
- Data Base Management system in Library uses
- Artificial Intelligence and Expert System

COURSE –II (B)
INFORMATION PROCESSING AND ORGANIZATION

1 Classification- Standard schemes of library classification
- Introduction
- Features and application of CC,DDC and UDC
- Design and development of scheme of Library classification
- Recent trends of library classification

2 Subject Indexing
- Critical Study of library of congress subject Headings
- Sears lists of subject Headings

3 Pre-Coordinate Post –Coordinate systems of subject Indexing
- POPSI ,
- PRECIS ,
- Uniterm indexing
- Citation Indexing
- Keyword Indexing

4 Thesaurus and the Saurofacet Methodology for developing a thesaurus

5 Standards for Bibliographical Description
- ISBDS
- MARC format
- CCF
- Standards codes of Cataloguing- AACR-II & CCC

6 Evaluation of Information System

COURSE –II (C)
INFORMATION TRANSFER AND DISSEMINATION

M.M. 80

1. Role of information in planning, decision, making, management etc.
2. Information communication, media and methods, communication channels, models and barrier. Trends in Communication of Information
3. Information gathering habits of the users.
   Categories of information users. Information needs –definition and models. Information seeking behavior. Use studies – methods, techniques and evaluation
4. Information marketing.
5. Information services – CAS, SDI, Abstracting service, digest, technical notes, state of the art and trend reports, etc and their evaluation.
6. Search strategy. Document delivery system; translation; reprography.

COURCES-II (D)
INFORMATION NEEDS AND USERS

M.M. 80

1. Information its meaning, nature, value and significance properties or qualities of information. Uses of information, types of information , Difference between information , data and knowledge
2. Information generation and the influencing factor. Forms of information generation. Sources of information. Information and its users. Types of users, user function. Services to users
3. Information need- concept, definition and nature of information need, basis and identification of information need. Ascertaining users need. Difference between need and want. Types of information need. Methods of determining information needs. Factors influencing information needs.
4. Information seeking behavior – concept, meaning and process of information seeking, use pattern, factors affecting information seeking behavior. Information needs and information seeking behavior of scientist and social scientists.
5. Information needs and information seeking behavior in business, in management , in planning and decision making
6. Technology transfer- concept, meaning and process of technology transfer. Libraries and technology transfer. Constrains in technology transfer. Quality of life and information
7. User study- Concept, objective and scope, types of user studies. Designing and planning a user study. Methods and techniques of user studies. Data analysis and interpretation
8. Evaluation of some major user studies –INFROSS, Hopkins University study, Voigts study etc.
9. User Education- Need and objectives of user education. Planning user education programmes. Methods of user education. Evaluation of user education programmes.

COURSE-II(E)
INFORMATION ANALYSIS, CONSOLIDATION AND USERS STUDY

M.M. 80

1. Information Analysis and consolidation – definition, need, principles, procedures and products: Methods and techniques. Pre-requisites for information consolidation and steps in the preparing of information consolidation.
2. Information services and products; services corresponding to approach to information nature and characteristics of the approaches and their implications on the services.
3. Information Products- Nature , concept, types and design; development and marketing of information products ; preparation of information products-a feasibility study , standards for information handling
4. Abstracting-Definition , aims and scope; types of abstracts , canons and principles of abstracting , slant in abstracting , characteristics and qualities of good abstracts , methods and stages of abstracting , study of chemical abstracts , biological abstracts, physics abstracts, mathematical review, Indian science abstracts, sociological abstracts, library and information science abstracts.
5. Repackaging and consolidation – meaning of packaging and repackaging advantages of consolidates information; user of information consolidation services; content analysis, packaging of information-conventional and non conventional packages. Current awareness list, method of presentation of information in CA list; preparation of local current awareness list. Designing of a documentation list. Flow of work in SDI services.

COURSE-III(E)
INFORMATION TECHNOLOGY (PRACTICAL)

M.M.80

The practical will be solol based on library packages and jointly conducted by the external and internal examiners.

COURSE-IV
DISSERTATION

M.M. 300

Script	----	200 marks
Viva –Voce	---------	60 marks
Seminar	---------	40 marks

Ph.D. – Course Work in Library & Information Science

Duration: One Semester (Six Months)

S.N.	Title and Paper	F.M.	Pass Marks	Theory
1	Paper – I: Research Methodology	100	60	100
2	Paper – II: ICT and Computer Literacy	100	60	100
3	Paper – III: Seminar	100	60	100
Total		300	180	300

Paper – I
Research Methodology

- **Research:**Characteristics, Types &Steps in research, Identification, Selection and formulation of research problems, Research questions, Review of Literature.
- **Hypothesis:**Definition and Types, Formulation& Testing. Standard Error& Point and Interval estimates.
- **Sampling theory:**Types of Sampling, Steps in Sampling. Methods of Data Collection.
- **Statistical Methods:** basic concepts& its implication in research,Measures of Central Tendency. Dispersion, Skewness and Kurtosis in Research.
- **Writing Proposal&Report:**Introduction of Synopsis & summary writing. Information Presentation, Presentation of Bibliography and citation. Editing the Final Draft, Evaluating the Final Draft.

Paper – II
ICT and Computer Literacy

- **Computer:**Introduction, Computer Architecture and Storage Devices
- **Operating Systems:**Basic introduction to windows& Linux.
- **Internet:**Basics of Internet; Search engine and Meta search engines, Internet search techniques, Internet Security.
- **Electronic Resources:**Web resources, online databases, electronic journals, e-books& on- line indexing and abstracting services, Services Offered by Library Networks.
- **Word Processor Software:**MS Word, MS EXCEL, MS Power Point
- **Statistical Tools:** Statistical software available for analysis and graphical representation: SPSS, etc.

Pt. Ravishankar Shukla University, Raipur
(2017-2018)

Master of Philosophy in Bioscience

The M. Phil. examination shall follow the following patterns:

Allotment of Marks

	Theory/ Lab Course		**Marks**
1.	Theory-I	Research Methodology, Advanced Tools & Techniques, Quantitative Data Analyses and Computer Fundamentals	100
2.	Theory-II	Modern Biology	100
3.	Theory-III		100
	OR		
	Lab Course-I		100
Total Marks			**300**
4.	Seminar	Based on theory	50
5.	Dissertation	Seminar based on dissertation	50
		Script Writing	75
		Viva-voce	25
Total Marks			**200**
Grand Total			**500**

(b) The distribution of 100 marks of practical is as follows:

Practical	60
Viva-voce	20
Practical record	20

(c) The third theory course shall be applicable to the subjects that do not have lab courses.

(d) The assessment of the Seminars shall be done by the internal examiners. The assessment of the practical records, carrying 20 marks shall be done at the time of the annual examination jointly by the internal and external examiners.

(e) The result will be computed by combining the marks of the various courses and the dissertation.

Theory Paper I

Research Methodology, Advanced Tools & Techniques, Quantitative Data Analyses and Computer Fundamentals

Unit-I **Research Methodology**

Types of data, Data collection, Methods and tools of data collection
Introduction to research methodology: Scope
Research problem: Identification, Selection, Formulation of research objectives
Research design: Components, Importance, Typology
Research ethics, Institutional ethics committee for human and animal research
Plagiarism - Pitfall
Patents and IPR: Patent laws, process of patenting a research finding, Copy right, Cyber laws

Unit-II **Advanced Tools & Techniques**

Microscopic techniques –Electron microscopy and Confocal microscopy
Principle, protocol and application of Chromatography – GLC & HPLC, Electrophoresis and its application
PCR, Real time PCR, DNA microarray, DNA sequencing
Protein microarray and Protein sequencing

Unit-III **Quantitative Data Analyses**

Hypothesis testing
Normal and Binomial distributions and their property
Tests of significance: Student *t*-test, *F*-test, *Chi-square* test
Correlation and Regression
ANOVA – One-way and Two-way, Multiple-range test

Unit-IV **Computer Fundamentals**

Introduction to spreadsheet application, features and functions,
Using formulas and functions, Data storing, Generating charts/ graph and other features. Tools used may be Microsoft Excel or any other comparable/similar tool.
Introduction to presentation tool, features and functions,
Creating presentation, Customizing presentation, Showing presentation. Tools used may be Microsoft Power Point or any other comparable/similar tool.
ICT: meaning, advantages and uses; Basics of internet, e-mailing, Search engine, like Google, Yahoo, MSN, Entrez including Pub med, Literature search techniques. Web of Science, Citation Index: Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF)
Features for Statistical data analysis using computers and software, Microsoft Excel Data Analysis Tool Pak, SPSS

Lab Course:

1. Construction of frequency distribution curves
2. Effect of size of class interval on the pattern of frequency distribution
3. Construction of cumulative frequency distributions
4. Computation of measures of central tendency and dispersion based upon grouped data and ungrouped data
5. Hypothesis testing: Exercises on *t*-test, *F*-test & χ^2-test

6. Computation of correlation coefficient and regression constants
7. Data analyses using MS Excel ToolPak: Descriptive statistics, ANOVA, Correlation and Regression, *t*-test
8. Computation of correlation coefficient and regression constants using SPSS
9. Internet application with special reference to literature search
10. Performance of SDS-PAGE analysis
11. Study of isoenzyme pattern
12. Performance of RAPD analysis

Recommended Books:

Campbell RC	Statistics for biologists
Zar JH	Biostatistical Analysis
Wardlaw AC	Practical Statistics for Experimental Biologists
Snedecor GW & Cochran WG	Statistical Methods
Sokal RR & Rohlf FJ	Introduction to Biostatistics
Sumner M	Computers: Concepts & Uses
White R	How Computers Work
Cassel P *et al.*	Inside Microsoft Office Professional
Coleman P and Dyson P	Mastering Internets
Gralla P	How the Internet Works
Shelly GB, Vermaat ME, Cashman TJ	Microsoft® 2007: Introductory Concepts and Techniques
Habraken J	Microsoft® Office 2003 All in One Microsoft® Office 2010 In Depth
Gilmore B	Plagiarism: Why it happens, How to prevent it?
Buranen L and Roy AM	Perspectives on Plagiarism and Intellectual Property in a Post-Modern World
Kumar Anupa P	Cyber Law
Sood V	Cyber Law Simplified
Campbell RC	Statistics for biologists
Zar JH	Biostatistical Analysis
Wardlaw AC	Practical Statistics for Experimental Biologists
CR Kothari	Research Methodology: Methods & techniques, 2008
G Daigaku *et al.*	Molecular mechanism of biosignal transduction

Theory Paper II
Modern Biology

Unit-I Biosignaling

Molecular mechanism of signal transduction, Gated ion channels
Receptors enzymes; Insulin receptor, Guanyl cyclase
G- protein- coupled receptor and second messengers
Phosphorylation as a regulatory mechanism
Regulation of cell cycle by protein kinase
Quorum Sensing

Unit-II Immunotechnology

Organization of Immunoglobulin genes: Light & Heavy chain, variable & constant region.
Generation of antibody diversity: Light and heavy chain gene recombination, Heavy chain constant region genes, Class switching.
Membranous and secreted immunoglobulin.
Synthesis and production of immunoglobulin: Monoclonal antibody, Designer

antibody.
Antigens and antegenicity. Antigen-antibody interaction.
Immunodiagnostics: Precipitation reactions, Haemagglutination, Immunofluorescence, Radio and Enzyme immuno assays, Immunoblotting.
Immunoprophylaxis: vaccines and vaccination.

Unit-III Plant Tissue Culture

Laboratory requirement and general techniques of plant tissue culture
Tissue culture media
Cell culture
Cellular totipotency, morphogenesis.
Somatic embryogenesis
Haploid production.
Protoplast isolation, culture and fusion.
Clonal propagation

Unit-IV Seed Technology

Seed storage: biochemical and molecular basis of viability and vigour tests
Testing Techniques for Seed storage behaviour: orthodox and non-orthodox
Seed age & ageing markers: Telomeres and telomerase. Seed priming technology.
Cryogenic storage biotechnology
Seed quality improvement: Seed Protein, Carbohydrate and Oil quality.
Seed Germination: Biochemical and molecular basis of germination methods, germination specific markers
Seed dormancy: Biochemical & molecular markers and hormonal control.
Seed testing: GM crops, Plant molecular farming.

Lab Course (8-10 exercises out of the list given below):

1. Determination of percent and rate of germination of seed
2. Determination of seed viability
3. Determination of level of electrolytic leakage in fresh and aged Moong seed
4. Determination of the rate of lipid peroxidation in fresh and aged seeds
5. Determination of Ag-Ab reaction through double diffusion technique
6. Determination of Ag-Ab reaction through counter current immunoelectrophoresis (CIEP)
7. Demonstration of Ag-Ab reaction through immunoelectrophoresis technique
8. Demonstration of the technique of radial immunodiffusion (RID)
9. Performance of sandwich DOT ELISA test for antigen
10. Study of Haemagglutination with the help of commercial kit
11. Preparation of Murashige and Skoog (MS) media
12. Performance of shoot-bud culture by an explants in MS media
13. Multiplication of shoot induction in MS solid media
14. Multiplication of shoot induction in MS liquid media
15. Study of somatic embryogenesis using zygotic embryo of a given plant

Recommended Books:

MK Razdan	Introduction to Plant Tissue Culture, 2nd Edition, Oxford & IBH Publishing Co. Pvt Ltd, 2010
IK Vasil	Plant Cell and Tissue Culture; Springer Publication, 1994
SS Bhojwani and MK Razdan	Plant Tissue Culture; Elsevier
TJ Fu, G Singh and WR Curtis	Plant Cell and Tissue Culture for the production of Food Ingredients. Kluwer Academic/ Plenum Press, 1999
MK Razdan	Introduction to Plant Tissue Culture, 2nd Edition, Oxford & IBH Publishing Co. Pvt Ltd, 2010

Leigninzer	Biochemistry
SS Bhojwani and MK Razdan	Plant Tissue Culture: Theory and Practice (1996)
JD Bewley & M Black	Physiology & Biochemistry of Seeds, Vol. I & II
JD Bewley & M Black	Seeds : Physiology of Development & Germination
Black *et al*.	Desiccation and Survival of Plants : Dying without Drying
PK Agrawal & M Dadlani	Techniques in Seed Science & Technology
FAO Report 113	Ex-situ storage of seeds, pollen & *in vitro* cultures
Copeland & McDonald	Seed Science & Technology
RL Agrawal	Seed Technology
J Kigel & G Galili	Seed Development & Germination
RA Goldsby *et al.*	Kuby's Immunology
E Benjamini *et al.*	Immunology-A short Course
Roitt, Brostoff and Male	Immunology
William Paul	Fundamentals of Immunology
Stewart Snell	Immunology, Immunopathology and Immunity
Elgert	Understanding Immune System
R Panneerselvam	Research Methodology
CR Kothari	Research Methodology: Methods & techniques, 2008
G Daigaku *et al.*	Molecular mechanism of biosignal transduction
M Kasai	Biosignal transduction mechanism

Pt. Ravishankar Shukla University, Raipur

M. Sc. BIOCHEMISTRY

Scheme and Syllabi of Examination for SESSION 2017-19

July 2017-December 2017				
	First Semester	**Marks**		
Paper	**Title of Paper**	**(External)**	**(Internal)***	**Credit**
I	Cell Biology	80	20	4
II	Biomolecules	80	20	4
III	Microbiology	80	20	4
IV	Biology of Immune System	80	20	4
LC-I	Lab Course I (Based on paper I & II)	80	20	2
LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	**600**	**20**
January 2018-June 2018				
	Second Semester	**Marks**		
Paper	**Title of Paper**	**(External)**	**(Internal)***	**Credit**
I	Genetics and Molecular Biology	80	20	4
II	Bioenergetics & Metabolism	80	20	4
III	Instrumentation and Molecular Techniques	80	20	4
IV	Biometry, Computer and Scientometry	80	20	4
LC-I	Lab Course I (Based on paper I & II)	80	20	2
LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	**600**	**20**
July 2018-December 2018				
	Third Semester	**Marks**		
Paper No.	**Title of Paper**	**(External)**	**(Internal)***	**Credit**
I	Genetic Engineering	80	20	4
II	Plant Physiology and Biochemistry	80	20	4
III	Nutritional and Environmental Biochemistry	80	20	4
IV	Enzymology	80	20	4
LC-I	Lab Course I (Based on paper I & II)	80	20	2
LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	**600**	**20**
January 2019-June 2019				
	Fourth Semester	**Marks**		
Paper No.	**Title of Paper**	**(External)**	**(Internal)***	**Credit**
I	Plant Biotechnology	80	20	4
II	Seed Science Technology	80	20	4
III	**Special Paper-A:** Clinical Biochemistry and Endocrinology **Special Paper-B:** Nutraceuticals and Functional Foods	80	20	4
IV	**Special Paper-A:** Advanced Immunology, diagnostics and prophylaxis **Special Paper-B:** Bioinformatics	80	20	4
LC-I	Lab Course I (Based on paper I & II)	80	20	2
LC-II	Lab Course I (Based on paper III & IV)	80	20	2

			Total	**600**	**20**
	OR				
	Project Work**	Dissertation	240	60	11
		Seminar based on Projects	160	40	6
		Viva-voce	80	20	3
		Total		**600**	**20**
		Grand Total		2400	**Credit**: 80

Important Note:

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

Continuous evaluation of Performance*

Each student will be evaluated continuously throughout the semester. There will be a class test based on each theory paper. The full marks will be 10 for each paper. There will be a poster/oral presentation based on each theory paper. The full marks will be 10 for each presentation. Each student will be required to submit a brief write-up (not more than 15-20 pages) on his/her poster/oral presentation.

Project Work**

A student of IV semester will have the choice to opt for project work in lieu of four theory papers and two lab courses provided he/she secure at least **75%** or more marks in aggregate in semester I and II. The project has to be carried out in recognized national laboratories or UGC-recognized universities. No student will be allowed to carry out project work in private laboratories/ college/ institutions, excluding the colleges recognized as research centers by the RDC of Pt. Ravishankar Shukla University, Raipur. The valuation of all the projects will be carried out by an external examiner and HoD of UTD or its nominee at the UTD Centre.

Scheme for Lab Course (for each Semester)	**Maximum Marks 100**
1- Major exercise based on paper I	20
2- Minor exercise based on paper I	10
3- Major exercise based on paper II	20
4- Minor exercise based on paper II	10
5- Spotting/ Interpretation*	10
6- Viva-voce	10
7- Sessional [Internal]	20
Total	100

* A student will be required to interpret on the displayed item/material

M. Sc. Biochemistry

FIRST SEMESTER (July 2017 – December 2017)

PAPER - I: CELL BIOLOGY **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Molecular organization of membranes - asymmetrical organization of lipids, proteins and carbohydrates. Osmosis, ion channels, membrane pumps and electrical properties of membranes. Active transport by ATP-powered pumps: types, properties and mechanisms.

UNIT-II Transport of proteins into mitochondria, chloroplast and endoplasmic reticulum. Transport of proteins into and out of nucleus. Transport by vesicle formation: exocytosis, endocytosis and its molecular mechanism.

UNIT-III Cell signaling: Signaling via G-protein linked and enzyme linked cell surface receptors, MAP kinase pathways. Eukaryotic cell division cycle: different phases and molecular events, regulation and control of cell cycle. Apoptosis. Oncogenes and tumor suppressor genes: viral and cellular Oncogenes, retinoblastoma, E2F and p53 proteins.

UNIT-IV Organization of chromosomes: Structure of chromosomes, centromere and telomere. States of chromosomes during cell cycle. Mitotic chromosome. Organization of genes in chromosomes. Banding pattern of chromosomes. Lampbrush and Polytene chromosomes. Chromatin, nucleosomes, DNA packaging, heterochromatin and euchromatin.

Lab Course:

1. Study of chromosome behaviour during Mitosis and meiosis (Onion / Garlic root tips, Onion buds, human lymphocytes, rat or bird testis /grass hopper testis or any other materials).
2. Calculation of mitotic index in growing Onion / Garlic root tips
3. Squash preparation: Polytene chromosome (in chironomus / Drosophila or other insect salivary gland) and Barr body (in buccal epithelial cells).
4. Demonstration of secretory granules in the salivary gland cells of insect.
5. Demonstration of mitochondria by vital staining.
6. Study of permanent slides.
7. Estimation of DNA
8. Estimation of RNA
9. Sub-cellular fractionation and marker enzymes
10. Identification of biomolecules in different tissues by histochemical techniques
11. Preparation of mitotic plate by carmine squashing method and phase identification.
12. Demonstration of the nuclear matrix networks in onion cells.

13. Study of the effect of chemical agents on chromosomes plant cells.
14. Isolation of protoplast, measurement of cell density plating efficiency.
15. Preparation of Karyotype of metaphase plate.
16. Preparation of Meiotic plate and determination of phases.
17. Computation of Chaisma frequency and Terminalization of phases.
18. Micrometry and Camera Lucida drawings.

Books Recommended:

H. Lodish, A. Berk, S L Zipursky, P. Matsudaira D. Baltimore, and James Darnell.	Molecular Cell Biology
B. Alberts, D. Bray, K. Hopkin, A. Johnson	Essential of Cell Biology
H. Lodish, A. Berk, C. A. Kaiser & M. Krieger	Molecular cell Biology
B. Alberts, A. Johnson, J. Lewis and M. Raff	Molecular Biology of the Cell
Gerald Karp	Cell and Molecular Biology Concepts and experiments

M. Sc. Biochemistry

FIRST SEMESTER (July 2017 – December 2017)

PAPER – II: Biomolecules **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Carbohydrates: Structure, classification, properties and function; derivatives of monosaccharides, homo and hetero-polysaccharides, Peptidoglycan glycoproteins and liposaccharide.
Lipids: - Classification, structure and function.
Nucleic Acid: - Structure of purine and pyrimidine bases, nucleoside and nucleotide; DNA- structure and conformation; RNA - Structure, types and functions.

UNIT-II Amino acids; - structure, classification and functions; Synthesis of peptides and protein sequencing; Proteins- properties, covalent structure; secondary, tertiary and quaternary structure of proteins, Ramchandran plot

UNIT-III Enzyme classification, coenzymes, active site of enzyme, factors contributing to the catalytic efficiency of enzyme; enzyme kinetics- Michaelis-Menten equation, determination of Km, enzyme inhibition, allosteric enzymes, isoenzymes, ribozyme, multienzyme complexes

UNIT-IV Chemistry of porphyrins: Importance of porphyrins in biology; structure of hemoglobin and chlorophyll porphyrins, structure and biological role of animal hormones, structure and biological role of water soluble and fat soluble vitamins.

Lab Course:

1. Specific tests for sugars, amino acids and lipids
2. Formal titration of amino acids

3. Estimation of proteins using ninhydrin and biuret method
4. Estimation of sugar by anthrone and Folin-Wu method.
5. Saponification value and iodine number of fat.
6. Estimation of ascorbic acid.
7. Achromic point determination using salivary amylase
8. Effect of ions on salivary amylase activity.
9. Enzyme assay and kinetics (ex. Amylase, Protease)

Books Recommended:

Nelson, Cox and Lehninger	Principles of Biochemistry
G. Zubay	Biochemistry
Stryer	Biochemistry
Garrett and Grosham	Biochemistry
West, Tood, Mason & Bbruglen	Text book of biochemistry
White, Handler & Smith	Biochemistry-clinical application
D. Voet and J C Voet	Biochemistry

M. Sc. Biochemistry

FIRST SEMESTER (July 2017 – December 2017)

PAPER – III: Microbiology **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I General characteristics of fungi, classification of fungi, life cycle of selected fungal genus (Aspergillus, Pencillium, Fusarium and Mucor). Economic importance of fungi.
Fungi and bioremediation, parasitism, mutualism and symbiosis with plants and animals. Heterothallism, sex hormone in fungi, Mycorrhiza, VAM.
Algae: Distribution, classification, reproduction, ecology and importance.

UNIT-II Morphology and ultra structure of bacteria, morphological types, cell wall of archaebacteria, gram negative, gram positive eubacteria, eukaryotes.
Cell membranes – structure, composition and properties. Structure and function of flagella, cilia, pili, gas vesicles. Cyanobacteria, protozoa, mycoplasma and Rickettsia.
Gene transfer mechanisms, transformation, transduction, conjugation and transfection. Plasmids F: factors colicins and col factors, plasmids as a vector for gene cloning.

UNIT-III Nutritional types (autotrophs, heterotrophs, phototrophs, chemotrophs), growth curves, measurement of growth, factors affecting growth, generation time, growth kinetics. Batch and continuous culture, asynchronous, synchronous culture.
Basis of microbial classification, classification and salient feature of bacteria according to Bergey's manual of determinative bacteriology, cyanobacteria, prochlorons and cyanelles.

UNIT-IV Viruses: Structure and classification of viruses; morphology and ultra structure; capsids and their arrangements, types of envelopes, viral genome, their types and structure, virus related agents (viroids, prions).

General feature of virus reproductions, early events in virus multiplication, virus restriction and modification of host, virus mRNA.

General overview of bacterial viruses, RNA and DNA bacteriophages (MS2, ϕX174, M13, T3, T4). Lysogeny and Lytic phase.

General account of plant and animal viruses (TMV, HIV and other oncogenic virus, Hepatitis virus).

Lab Course:

1. Glassware preparation and sterilization techniques- wet heat- dry heat- filter types- laminar flow chamber types- CDC- safety levels.
2. Preparation of liquid & solid media, plating, pouring, inoculation and incubation for growth of microorganism
3. Methods of obtaining pure culture of microorganisms (a) streak plate (b) Pour plate, and (c) spread plate methods
4. Microscopic examination of the microorganisms, identification and staining methods
5. Micrometery and camera lucida drawings
6. Study of bacterial growth by turbiditimetry/ spectrophotometry
7. Biomass measurement for fungi
8. Isolation and enumeration of microorganisms from soil by serial dilution agar plating method.
9. Enumeration of viruses by plaque assay technique.
10. Motility of bacteria by hanging drop technique.

Books Recommended:

Microbiology	L.M. Prescott, J.P. Harley and D.A. Klein
General Microbiology	RY Stanier, J L Ingrahamana, ML Wheelis & P. R. Painter
Principles of Microbiology	R.M. Atlas
Microbiology	Peleczar, Chan & Krieg.
General Virology	Luria, Darnell, Baltimore and Campell.
Introduction to Mycology	CJ Alexopoulos and CW Mims

M. Sc. Biochemistry

FIRST SEMESTER (July 2017 – December 2017)

PAPER – IV: Biology of Immune System **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Innate immune mechanism and characteristics of adaptive immune response. Cells of immune system: Hematopoisis and differentiation, mononuclear cells and granulocytes. Antigen presenting cells. Primary and Secondary lymphoid organs and tissues. Ontogeny and phylogeny of lymphocytes. Lymphocyte traffic.

UNIT-II Antigen receptor molecules: B-cell receptor complex, Immunoglobulin- structure, types and function. T-cell receptor complex. Major Histocompatibility Complex- types, structural organization, function and distribution. Transplantation and Rejection. Complements in immune function.

UNIT-III Antigens: nature of antigens, factor affecting immunogenicity, Haptens and super antigens. Antigenic determinants. Recognition of antigens by T and B cell. Antigen processing. Role of MHC molecules in antigen presentation and co-stimulatory signals. Antigen and antibody interaction.

UNIT-IV Cell mediated immune response. Cytokines and interleukins- structure and function. Immunity to infections. Hypersensitive reactions and their types. Immunodeficiency disorders. Autoimmunity

Lab Course:

1. Identification of cells of immune system
2. Separation of mononuclear cells by Ficoll-Hypaque
3. Identification of Lymphocytes and their subsets
4. Lymphoid organs and their microscopic organization
5. Isolation and purification of Antigens
6. Purification of IgG from serum
7. Estimation of Levels of gamma globulins and A/G ratio in blood
8. Antigen antibody interaction

Books Recommended:

Kuby's Immunology	R.A. Goldsby, T. J Kindt and B. A. Osborne
Immunology- A short Course	E. Benjamini, R. Coico and G. Sunshine
Immunology	Roitt, Brostoff and Male
Fundamentals of Immunology	William Paul
Immunology	Tizard
Immunology	Abbas et al

M. Sc. Biochemistry

SECOND SEMESTER (January 2018 – June 2018)

PAPER – I: Genetics and Molecular Biology [Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT- I Mendelian principles: Dominance, segregation, independent assortment.
Concept of gene: Allele, multiple alleles, pseudoallele, complementation tests
Extensions of Mendelian principles: Codominance, incomplete dominance, gene interactions.
Gene mapping methods: Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants
Mutation: Types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis

UNIT-II DNA replication, repair and recombination: Mechanism of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extrachromosomal replicons, DNA damage and repair mechanisms; Repair of Base-excision, Nucleotide excisions, Mismatch and Double Strand. Guardian of DNA; p_{53} and p_{21}. Homologous and site-specific recombination.

UNIT-III RNA synthesis and processing: transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, elongation, and termination, RNA processing, capping, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport.

UNIT-IV Protein synthesis and processing: Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post Translational modification of proteins. Protein targeting.

Lab Course:

1. Isolation, purification and estimation of RNA
2. Isolation, purification and estimation of DNA
3. Determination of Tm of nucleic acid
4. Fraction of poly (A) RNA
5. Restriction Mapping
6. Restriction Digestion
7. Ligation
8. DNA molecular size determination

Books Recommended:

Molecular Cell Biology	H. Lodish, A. Berk, SL Zipursky, P. Matsudaira, D. Baltimore, and James Darnell.
Essential Cell Biology	B. Alberts, D. Bray, K. Hopkin and A. Johnson
Molecular Biology of the Cell	B. Alberts, A. Johnson, J. Lewis and M. Raff
Cell and Molecular Biology : Concepts and experiments	Gerald Karp
Molecular Biology of the Gene	JD Watson et al.
Molecular Biology of the Cell The Problems	John Wilson, Tim Hunt
Molecular Biology of the Cell	Bruce Albert's, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter
Genes VIII	Benjamin Lewin

M. Sc. Biochemistry

SECOND SEMESTER (January 2018 – June 2018)

PAPER – II: Bioenergetics & Metabolism **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit,

of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I First and second laws of thermodynamics. Concept of free energy. High – energy compounds, ATP cycle, structural basis of free energy change during hydrolysis of ATP. Other high- energy biological compounds

UNIT-II Basic concepts of intermediary metabolism. Carbohydrate metabolism: Glycolysis, Kreb's cycle, glycogenolysis, glycogenesis, pentose phosphate pathway, gluconeogenesis, and glyoxylate pathway, inborn errors of carbohydrate metabolism. Regulation of carbohydrate metabolism

UNIT-III Electron transport and oxidation phosphorylation: electron carriers, complexes I to IV, substrate level phosphorylation, mechanism of oxidative phosphorylation. Shuttle system for entry of electron.
Biosynthesis and degradation of Lipids. Regulation of lipid metabolism

UNIT-IV Nitrogen Assimilation
Biosynthesis of amino acids
Degradation of amino acids
Regulation of amino acid metabolism
Biosynthesis and degradation of purine and pyrimidine nucleotides

Lab Course:

1. Protein estimation by Lowry, Bradford and Spectrophotometric method
2. Estimation blood cholesterol
3. Estimation of sugar by Nelson- Somagy and Benedict's reagent
4. Isolation and estimation of lipid from seeds and egg.
5. Estimation of inorganic and total phosphorus by Fiske-Subba Rao method
6. Assay of phosphatases in blood and seeds
7. Urease estimation in plant tissues

Books Recommended:

Principles of Biochemistry	Nelson, Cox and Lehninger
Biochemistry	G. Zubay
Biochemistry	Stryer
Biochemistry	Garrett and Grosham
Text book of biochemistry	West, Tood, Mason & Bbruglen
Biochemistry	White,Handler & Smith
Biochemistry with clinical application	D. Voet and J C Voet
Enzymes	Dixon and Webb
Fundamentals of Enzymology	Price and Steven
Practical biochemistry	Plummer
Enzyme biotechnology	G. Tripathi
Enzyme Reaction Mechanism	Walsh
Enzyme catalysis and regulation	Hammes

M. Sc. Biochemistry

SECOND SEMESTER (January 2018 – June 2018)

PAPER- III: Instrumentation and Molecular Techniques

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Centrifugation: Principle, techniques. Preparative, analytical and ultracentrifuges, sedimentation coefficient and factors affecting sedimentation coefficient. Application of centrifugation.
Photometry: Basic principles of colorimetry, UV- visible spectrophotometry & IR-spectrophotometry. Spectroflurometry
Atomic absorption spectroscopy: Principle, Instrumentation and applications
Electrophoresis: Paper electrophoresis, Starch gel, agarose, PAGE-type, 2D-E.

UNIT-II Microscopic techniques: light microscopy, microscopy of living cells, scanning and transmission microscopes, different fixation and staining techniques for EM, freeze-etch and freeze-fracture methods for EM, image processing methods in microscopy
Microtomy: types, principle and applications
Lyophilization: Principle, instrumentation and applications

UNIT-III Chromatography: Paper and Thin Layer Chromatography. Gel filtration, Ion exchange chromatography and Affinity chromatography. Gas-liquid chromatography and HPLC.
Histochemical and immunotechniques: Antibody generation, detection of molecules using ELISA, RIA, western blot, immunoprecipitation, flow cytometry and immunofluorescence microscopy, detection of molecules in living cells, *In situ* localization; FISH and GISH.
Radioactivity: GM counter, liquid Scintillation counter, solid Scintillation counter, gamma counters

UNIT-IV Molecular techniques: Isolation and purification of RNA, DNA (genomic and plasmid) and proteins, separation methods; RNA, DNA and proteins; 1-D and 2-D, isoelectric focusing gels; Molecular cloning of DNA and RNA fragments in bacterial systems; Expression of recombinant DNA; DNA sequencing. Gene expression; mRNA, cDNA using PCR and qRT-PCR. Micro array based techniques.
Molecular Markers for diversity analysis: RFLP, RAPD, AFLP, VNTR, SSR, ISSR, SNP, DArT.

Lab Course:

- Verification of Beers Law
- Determination of absorption maxima
- Quantitative determination, Enzyme kinetics
- Amino acid and carbohydrate separation by paper and TLC
- Ion exchange and gel filtration chromatography
- SDS Polyacralamide Gel Electrophoresis

- DNA electrophoresis
- Isoenzymes
- Separation of sub-cellular organelles by differential centrifugation.
- Isolation of DNA and Agarose gel Electrophoresis
- Amplification of RAPD and AFLP markers.
- Isolation of RNA and Electrophoresis of RNA on denaturing gels.
- cDNA synthesis and cloning
- Isolation of Protein and SDS-PAGE
- In vitro DNA ligation, transformation of E. coli
- Characterization of transformants: DNA gel electrophoresis, Restriction map analysis

Books Recommended:

• K Wilson and John Walker	Practical Biochemistry: Principles & Techniques
• RF Boyer	Biochemistry Laboratory: Modern Theory & Techniques
• S Carson, H Miller and D Scott	Molecular Biology Techniques: A Classroom Laboratory Manual
• TC Ford and J. M. Graham	An Introduction to Centrifugation
• R Baserga and D Malamud	Autoradiography: techniques and application
• T Chard	An Introduction to Radioimmunoassay and Related Techniques , Volume 6
• MD Bruch	NMR Spectroscopy Techniques
• BA Wallace and R William	Modern Techniques for Circular Dichroism and Synchrotron Radiation, Volume 1
• J Sambrook, EF Rritsch and I Maniatis	Molecular cloning: A Laboratory Manual
• PD Dabre	Introduction to Practical Molecular Biology
• JD Watson, NH Hopkins, JW Roberts, JA Steitz and AM Weiner	Molecular Biology of Gene (4th Edition)
• J Darnell, H Lodish and D Baltimore	Molecular Cell Biology (2nd Edition)
• B Alberts, D Bray, J Lewis, M Raff, K Roberts and JD Watson	Molecular Biology of the Cell (2nd Edition)
• Benjamin Lewin	Gene VII
• JM Walker and R Rapley	Molecular Biology and Biotechnology
• SB Primrose	Molecular Biotechnology

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SECOND SEMESTER (January 2018 – June 2018)

PAPER- IV: BIOMETRY, COMPUTER AND SCIENTOMETRY

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

Unit-I Introduction to biostatistics. Types of biological data: data on different scales. Frequency distributions. Cumulative frequency distributions. Random sampling. Parameters and statistics. Measures of central tendency and dispersion: Mean, Median, Mode, Range, Variance and Standard deviation. Coefficient of variation.

The effects of coding data. Data transformations: Log-transformation, Square-root transformation and Arcsine transformation. Distribution: normal & binomial.
Probability: Basic laws of probability, addition law, multiplication law. Probability and frequency.

Unit-II Statistical errors in hypothesis testing. Testing goodness of fit: Chi-square goodness of fit. Heterogeneity Chi-square. The 2 x 2 contingency table. One sample hypothesis. Two-sample hypothesis. Testing for difference between two means (t-test). Testing for difference between two variances (F-test). The paired sample t-test. Multiple-sample hypothesis (ANOVA): Single factor and two factors ANOVA. Multiple comparisons: Duncan's multiple-range tests. Simple linear regression. Regression vs. Correlation. Regression equation. Interpretations of regression functions. Simple linear correlation. The correlation coefficient.

Unit-III Introduction to MS-Office software: Word processing; creating new document, editing documents, adding graphics to documents, Word tables. Management of Workbook & Worksheets; Applications, Features, Using formulas and functions, Features for Statistical data analysis, Generating charts/ graph. Presentation software; Working in PowerPoint, Creating new presentation, working with slides.

Unit-IV Introduction to Internet and Applications. Basics of internet, e-mailing, Search engine – Google and Yahoo; Pub med, Scopus, Web of Science, Google Scholar, Indian Citation Index, Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF). Introduction to Plagiarism and Cyber laws.

Lab Course:

1. Exercises for data distribution
2. Exercises for computation of measures of central tendency
3. Exercises for computation of measures of variability
4. Computation of correlation coefficient, r, and regression constants
5. Data analysis by ANOVA and multiple-range tests
6. Hypothesis testing by t-test, F-test, and Chi-square test
7. Graphical presentation of data using a suitable package
8. Statistical analysis of a data using a suitable package
9. Preparation of document using a suitable package
10. Preparation of slides using a suitable package

Books Recommended:

Campbell RC	Statistics for biologists
Zar JH	Biostatistical Analysis
Wardlaw AC	Practical Statistics for Experimental Biologists
Snedecor GW & Cochran WG	Statistical Methods
Sokal RR & Rohlf FJ	Introduction to Biostatistics
Sumner M	Computers: Concepts & Uses
White R	How Computers Work
Cassel P et al.	Inside Microsoft Office Professional
Coleman P and Dyson P	Mastering Internets
Gralla P	How the Internet Works
Shelly GB, Vermaat ME, Cashman TJ	Microsoft 2007: Introductory Concepts & Techniques
Habraken J	Microsoft Office 2003 All in One

	Microsoft Office 2010 In Depth
Gilmore B	Plagiarism: Why it happens, How to prevent it?
Buranen L & Roy AM	Perspectives on Plagiarism & Intellectual Property in a Post-Modern World
Kumar Anupa P	Cyber Law
Sood V	Cyber Law Simplified

M. Sc. Biochemistry

THIRD SEMESTER (July 2018 – December 2018)

PAPER – I: Genetic Engineering [Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT- I Milestones of genetic engineering: isolation of enzymes, DNA sequencing, synthesis and mutation, detection and separation of clones, cloning and patenting of life forms, genetic engineering guide lines.

Molecular tools and their applications: restriction enzymes, modification enzymes.

Molecular techniques: gel electrophoresis, polymerase chain reaction, DNA sequencing, DNA microarray.

UNIT-II Gene cloning vectors: plasmids and transformation, bacteriophages and in vitro packaging, cosmids, artificial chromosomes.

Genomic library: strategies of genomic DNA library construction, transformation, construction of eukaryotic genomic library, screening methods.

cDNA library: isolation and purification of mRNA, first strand synthesis, second strand synthesis, cDNA library construction.

Study of gene regulation: reporter assays

Expression strategies for heterologous genes: vector engineering and codon optimization, host engineering, in vitro transcription and translation.

UNIT-III Processing of recombinant proteins: recombinant proteins purification, refolding, characterization and stabilization

Site directed mutagenesis, protein engineering

Gene knockout technique

UNIT-IV Plant transformation technology: basis of tumor formation, hairy root, features of Ti and Ri plasmids, mechanism of DNA transfer, role of virulence genes, use Ti and Ri as vectors, binary vectors, use of 35S and other promoters, genetic markers, use of reporter genes.

Vector-less or direct DNA transfer: particle bombardment, electroporation, microinjection.

Application of plant transformation for productivity and performance, herbicide resistance, insect resistance, virus resistance, long shelf-life of fruits

Lab Course:

1. Bacterial culture and antibiotic selection media. Preparation of competent cells
2. Isolation of plasmid DNA.
3. Isolation of Lambda phage DNA.
4. Quantitation of nucleic acids.
5. Agarose gel electrophoresis and restriction mapping of DNA.
6. Construction of restriction map of plasmid DNA.
7. Cloning in plasmid/phagemid vectors.
8. Isolation of RNA.
9. Synthesis of cDNA.
10. RAPD analysis by PCR.

Books Recommended:

Genes VIII	Benjamin Lewin
An Introduction to Genetic Engineering	DST Nicholl
Principles of Gene Manipulation and Genomics	SB Primrose and Richard
Gene Cloning and Manipulation	CJ Howe
Genetic Engineering (Genetics and Evolution)	R Hodge
Introduction to Biotechnology & Genetic Engineering	AJ Nair
Genetic Engineering	A Kumar & N Garg
Biotechnology & Genetic Engineering	L Yount
DNA Microarrays & Gene Expression: from Experiments to Data Analysis and Modeling	P Baldi & G Wesley
DNA Sequencing (Intro. to Biotechniques)	L Alphey
Plant transformation Technologies	CN Stewart, A Touraev, V Citovsky & T Tzfira
Application of Plant Biotechnology: In vitro Propagation, Pant Transformation and Secondary Metabolite Production	A Kumar and SK Sopory
Genetic Transformation of Plants	JF Jackson & HF Linskens
Transgenic Plants: Methods & Protocols	L Pena

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THIRD SEMESTER (July 2018 – December 2018)

PAPER- II: Plant Physiology and Biochemistry **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT- I Membrane transport: Pumps; F-type H^+ -ATPase mitochondria, P-type PM H^+ - ATPase, V-Type

H^+ -ATPase, and ABC type. Ion Channels; Voltage gated channels of K and Ca. Water transport through Aquaporins.

Physiology of Mineral Nutrition: Molecular mechanism and regulation of K, Fe and Zn transport. Phosphorous nutrition and transport. Phytoremediation. Mineral toxicity

UNIT-II Photosynthesis: Light absorption and energy conversion, photosystems I and II, ATP synthesis, Assimilation of carbon in C_3, C_4 and CAM pathways, Photorespiration

UNIT-III Phytohormones: Structure, biosynthesis, molecular mechanisms of Auxin, Gibberellins, Cytokinin, Abscisic acid and Ethylene, Brassinosteroids.

UNIT-IV Senescence and Programmed cell death: Senescence; Metabolism and regulation of pigment and nucleic acid, PGR regulation, SAG. PCD; Formation of TE and mobilization of cereal endosperm, Formation of aerenchyma. Signal transduction and PCD

Lab Course:

1. Spectrophotometric determination of chlorophyll-a, chlorophyll-b and total chlorophyll in young, mature and senescent leaves.
2. Kinetin estimation by cucumber cotyledons expansion bioassay.
3. Auxin bioassay using wheat coleoptiles.
4. GA bioassay by inducing *de-novo* synthesis of Amylase in de-embryonated seeds of wheat.
5. Estimation of mono, di and total phenols in the young and aged leaves.
6. Estimation of Guaiacol peroxidase activity in fresh and aged seeds.
7. Determination of Superoxide dismutase levels in the healthy and deteriorated seeds.
8. Estimation of metal toxicity induced changes in the AOS levels in leaf tissues.
9. Determination of Nitrate reductase activity in leaf tissues.
10. Separation of isozymes of SOD and GPX.

Books Recommended:

Fosket DF	Plant Growth & Development
Foyer CH	Photosynthesis
Bacon KE	Photosynthesis: Photobiochem. & Photobiophysics
Leopold AC & Kriedemann PE	Plant Growth & Development
Moore TC	Biochemistry & Physiology of Hormones
L Taiz & E Zeiger	Plant Physiology
BB Buchanan, W Gruissem & RL Jones	Biochemistry and Molecular Biology of Plants
MB Wilkins	Advanced Plant Physiology
JA Hopkins	Introduction to Plant Physiology
FB Salisburry & CW Ross	Plant Physiology
Hans-Walter Heldt	Plant Biochemistry & Molecular Biology

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THIRD SEMESTER (July 2018 – December 2018)

PAPER- III: Nutritional and Environmental Biochemistry

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Composition of balanced vegetarian and non-vegetarian diets; recommended dietary allowance (RDA) for different categories of the human beings.
Food preservation standards, food adulterations and precautions, government regulations on preservation and quality of food.
Food processing and loss of nutrients during processing and cooking.
Basal metabolism and methods of measuring basal metabolic rate (BMR); energy requirements during growth, pregnancy, lactation and various physical activities.

UNIT- II Nutritional aspects of the carbohydrates, lipids and protein: nutritive value, requirements, and functions.
Nutritional aspects of the vitamins and minerals: requirement and functions
Malnutrition, its implications, relationship with dietary habits and prevention.
Disorders related to the nutrition: Protein energy malnutrition, Starvation, Obesity.

UNIT- III

Environmental Pollution: Types, Outdoor and indoor Air pollution, sources, structure and control strategies. Water and Soil Pollution.
Eco–toxicology and its environmental significance.
Xenobiotic metabolism, Phase I reaction – oxidation – reduction, hydrolysis and hydration. Phase II reaction – conjugation and methylation.

UNIT- IV

Pesticide toxicity – insecticides, fungicides, herbicides and biopesticides.
Toxicology of food additives.
Metal toxicity – arsenic, mercury, lead and cadmium.
Toxicity testing – Test control, genetic toxicity testing.
Occupational toxicology: Occupational hazards and their assessment.

Lab Course:

1. Separation and purification of sub-cellular organelles and assay of marker enzymes.
2. Protein fractionation - salt, solvent and isoelectric precipitation.
3. Identification and assay of certain toxicants.
4. Effect of various toxicants on serum enzymes and proteins
5. Effect of various toxicants on liver and kidney metabolism
6. Estimation of carbohydrate, protein and fat in food materials.
7. Titrimetric method of ascorbic acid estimation in fruit.
8. Separation of casein protein from milk

Books Recommended:

LG Corkerhem and BSS Shane	Basic Environmental Toxicology
T Shibamato & L F Bzeidanes	Introduction to Food Technology
M. Stipanuk	Biochemical, Phys. & Mol. Aspects of Human Nutrition
Tom Brody	Nutritional Biochemistry
DA Bender	Nutritional Biochemistry of the Vitamins
R.L. Pike and M.L. Brown	Nutrition: An integrated approach -
G.P. Talwar	Text book of Biochemistry and Human Biology
DWS Wong	Mechanism and theory in food chemistry
M.S. Banji N P. Rao & V. Reddy	Text book of Human Nutrition
Linten	Nutritional Biochemistry and Metabolism

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THIRD SEMESTER (July 2018 – December 2018)

PAPER - IV: Enzymology [Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Isolation and purification of enzymes. General properties and effects of pH, substrate and temperature on enzyme catalyzed reactions.
Kinetics of catalyzed reaction: Single substrate reactions, bisubstrate reactions, concept of Michaelis - Menten, Briggs Haldane relationship, Determination and significance of kinetic constants, Limitations of Michaelis-Menten Kinetics,
Concept of convergent and divergent evolution of enzyme.
Methods of examining enzyme – substrate complexes

UNIT-II Enzyme Turnover and methods employed to measure turnover of enzymes, significance of enzyme turnover.
Protein – ligand binding, including measurement, analysis of binding isotherms, cooperativity phenomenon, Hill and Scatchard plots.
Multienzyme system : occurrence , isolation & their properties , mechanism of action & regulation;Pyruvate dehydrogenase complex, fatty acid synthetase complexes.
Mechanism of action of lysozyme, chymotrypsin, carboxypeptidase and DNA polymease

UNIT-III General mechanisms of enzyme regulation
Allosteric enzymes, sigmoidal kinetics and their physiological significance, symmetrical and sequential modes for action of allosteric enzymes and their significance.
Water soluble enzymes and their coenzymes. Metallo enzymes.
Immobilized enzymes and their industrial applications.
Enzyme modeling; WHATIF, Verify3d, PROSA and DOPE score

UNIT-IV Enzymes of Industrial Importance; their source, characteristic properties, functions and uses.
Enzymes used in leather, paper, textile industries.
Enzymes in baking, brewing, Alcohol products; enzymes in detergents, starch and animal feeds.
Amylases, cellulases, catalase, pectinase, lipase, protease, xylanase, laccase, beta glucanase

Lab Course:

1. Estimation of enzymes
2. Separation, purification of sub-cellular organelles & assay of marker enzymes.
3. Methods of purification of an enzyme - ion-exchange, gel filtration
4. Test of homogeneity by SDS-PAG E
5. Kinetics of an enzymatic reaction

6. Effect of various toxicants on serum enzymes and proteins
7. Enzyme modeling: Validation Criteria by WHATIF, Verify3d, PROSA and DOPE score
8. Verification of Ramachandran Plot: Estimation of interaction energy per residue by PROSA and Verify3D.
9. Enzyme packing quality: Assessed by WHATIF.

Books Recommended:

Brandon and Tooze	Introduction to Protein Structure
Campell	Discovering Genomics, Proteomics and Bioinformatics,
Dan Gusfield	Algorithms on Strings Trees and Sequences
Lesk, A.M	Introduction to Protein Architecture
Mcpherson, A.	Introduction of Molecular Crystallography
Pennington	Proteomics from Protein Sequence to Function
Durbin, Eddy, Anders & Graeme	Biological Seq. Analysis: Probabilistic Models of Proteins & Nucleic Acids
S.A. Bbernhard	The structure and function of enzymes
J. Palmer	Enzymes: biochemistry, Biotechnology, Clinical chemistry
M Dixon, EC Webb, CJR Thorne & KF Tipton	Enzymes
Alan Fersht	Enzyme structure and Mechanism
Christopher Walsh	Enzymatic reaction mechanism
Eisenthal and Danson	Enzyme Assay: A Practical Approach
M. Stipanuk	Biochemical, Phys. & Mol. Aspects of Human Nutrition
G.P. Talwar	Text book of Biochemistry and Human Biology

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FOURTH SEMESTER (January 2019 – June 2019)

PAPER – I: Plant Biotechnology [Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT- I Introduction to cell and tissue culture, tissue culture as a technique to produce novel plants and hybrids.
Tissue culture media (composition and preparation).
Initiation and maintenance of callus and suspension culture; single cell clones.
Organogenesis; somatic embryogenesis; transfer & establishment of plants in soil.
Shoot tip culture: Rapid clonal propagation and production of virus free plant.

UNIT-II Embryo culture and embryo rescue.
Anther, pollen and ovary culture for production of haploid plants & homozygous lines.
Protoplast isolation, culture and fusion; selection of hybrid cells and regeneration of hybrid plants; symmetric and asymmetric hybrids, cybrids.
Germplasm conservation: Cryopreservation & slow growth cultures.

Chloroplast Transformation: Advantages, vectors, success; tobacco & potato.

UNIT-III Plant transformation technology: Basis of tumor formation, Mechanism of DNA transfer, Features of Ti and Ri plasmids, role of virulence genes, use of Ti and Ri as vectors, binary vectors, markers, use of reporter genes, 35S and other promoters, use of scaffold attachment regions, multiple gene transfers, particle bombardment, electroporation, microinjection.

Applications of plant transformation for productivity and performance: herbicide resistance, insect resistance, Bt genes, Non–Bt like protease inhibitors & amylase inhibitors, virus resistance, nucleocapsid gene, disease resistance, PR (Pathogenesis Related) proteins, nematode resistance, abiotic stress, male sterile lines.

UNIT-IV Metabolic Engineering and Industrial Products: plant secondary metabolites, control mechanisms and manipulation of phenylpropanoid pathway, shikimate pathway, biodegradable plastics, therapeutic proteins, antibodies, edible vaccines.

Molecular Markers– RFLP maps, linkage analysis, RAPD markers, STS (Sequence Tagged Strands), microsatellites, SCAR (Sequence characterized amplified regions), SSCP (Single strand conformational polymorphism), AFLP, map based cloning, molecular marker assisted selection.

Lab Course:

1. Preparation of culture media.
2. To performe meristem/ bud culture, shoot multiplication & rooting phenomenon.
3. To study organogenesis.
4. To perform somatic embryogenesis.
5. To study the process of plantlet acclimatization.
6. To perform embryo culture.
7. To study the process of anther culture development.
8. Study of molecular markers.
9. Extraction of DNA from plant cultures.
10. Estimation & separation of DNA: Agarose gel electrophoresis & spectrophotometer.

Books Recommended:

Razdan MK	Introduction to Plant Tissue Culture
Vasil IK	Plant Cell and Tissue Culture
Bhojwani SS and Razdan MK	Plant Tissue Culture
Fu TJ, Singh G and Curtis WR	Plant Cell & Tissue Culture for the production of Food Ingredients
Hammond, McGarvP & Yusibov	Plant Biotechnology
Singh BD	Biotechnology: Expanding Horizons
RH Smith Plant Tissue Culture	Techniques and Experiments
L Kyte and J Kleyn	Plants from Test Tubes: An Introduction to Micropropagation
M Smith	Plant Propagator's Bible
MR Ahuja	Micropropagation of Woody Plants
YPS Bajaj	Trees III
YPS Bajaj	Trees IV

M. Sc. Biochemistry

FOURTH SEMESTER (January 2019 – June 2019)

PAPER- II: Seed Science Technology **[Credit: 4 and Maximum Marks: 80]**

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT- I Seed development: Phases of development, Maturation; accumulation of desiccation related compounds, ABA regulation. Seed Dormancy: Physiological and molecular basis, Testa, Endosperm, Aleurone layers & Hormonal cross talk in dormancy. Alleviation of dormancy; Protein oxidation. Dormancy breaking chemicals and mechanism.

UNIT-II Seed Germination: Pre-germination, Germination and post germination Metabolism. Reactivation of the metabolic pathway. Cellular repair. Hormonal regulation and metabolism; GA & ABA, ROS metabolism.

UNIT-III Seed Ageing: Seed storage physiology: Orthodox & Recalcitrant; ROS metabolism, Mechanism of desiccation tolerance, dehydrins/LEA/peroxiredoxin, HSPs, Sugars. Longevity markers; β- mercaptopyruvate sulfurtransferase (MST), L –isoaspartyl O-methyltransferase (PIMT).

UNIT-IV Seed Technology: Priming technology; biochemical and molecular aspects. Cryobanks, Cryopreservation of seed and embryo; Cryoprotective molecules, Vitrification, Encapsulation and Drying. Synthetic seeds.

Lab Course:

1. Hydro and chemical priming effect on seed germination.
2. To perform accelerated ageing in seeds and its comparison with the control.
3. Testing seed viability and vigour by:
   (a) germination
   (b) triphenyl tetrazolium test
   (c) Specific conductance of leachates and
   (d) Germination Index
4. Lipid peroxidation in ageing seeds.
5. Extraction and estimation of seed proteins, carbohydrates and lipids.
6. Quantitative and qualitative estimation of antioxidant enzymes in seeds:
   (a) SOD
   (b) Peroxidase and
   (c) catalase
7. Peroxidase assay by tissue printing method.
8. Seed cryopreservation technique and post-cryopreservation recovery.
9. Separation and determination of Molecular weight of seed proteins by SDS-PAGE.

Books Recommended:

J.D. Bewley & M. Black	Physiology & Biochemistry of Seeds
J.D. Bewley & M. Black	Seeds: Physiology of Development & Germination
Black et al.	Desiccation and Survival of Plants: Dying without Drying
P.K. Agrawal & M. Dadlani	Techniques in Seed Science & Technology
FAO Report 113	Ex-situ storage of seeds, pollen & in-vitro cultures
Copeland & McDonald	Seed Science & Technology
R.L. Agrawal	Seed Technology

J. Kigel & G. Galili	Seed Development & Germination
W. Ayad et al.	Molecular Genetic Techniques for Plant Genetic resources
E.E. Benson	Plant Conservation Biotechnology
D. E. Fosket	Plant Growth & Development
R.B. Taylorson	Recent Adv. in the Development & Germination of Seeds
McDonald & Copeland	Seed Technology Laboratory Manual
Khullar & Thapliyal, R.C.	Forest Seed
L. Schmidt	Guide to Handling of Tropical & Sub-tropical Forest Seed

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FOURTH SEMESTER (January 2019 – June 2019)

Special Paper PAPER - III (A): Clinical Biochemistry and Endocrinology

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT-I Plasma proteins – Properties, functions and their variations in diseases, Plasma lipids and lipoproteins, Interrelationship of lipids, lipoproteins and apolipoproteins. Erythropoiesis, abnormalities in blood formation. Anemias. Heamoglobinopathies. Cerebrospinal fluid – composition in health and diseases.

Clinical enzymology - Plasma enzymes in diagnosis and prognosis, Isoenzymes in health and diseases (Liver, cardiac and skeletal muscle enzymes)

UNIT-II Liver function tests, their significance, Liver diseases – Jaundice, hepatitis, gall stones, cirrhosis and fatty liver. Free radical mechanism and role of reactive oxygen species in diseases. Role of liver in metabolic regulation and drug metabolism. Clinical chemistry of new born.

Kidney – Renal hormones –Renin, erythropoietin and angiotensin. Investigations of renal functions, biochemical investigation of renal disorders. Nephritis, nephrotic syndrome and urolithiasis. Compensatory mechanism for acidosis and alkalosis.

Gastrointestinal hormones - Gastrin, secretin and cholecystokinin. Disorders of gastric function, methods of evaluation. Pancreatic exocrine secretions, pancreatic diseases, steatorrhoea. Malabsorption syndrome – tests for their evaluation and significance.

UNIT-III Pancreatic hormones – Biosynthesis of insulin, regulation of secretion of insulin and glucagon, their role in carbohydrate ,lipid and protein metabolism. Endocrine disorders of pancreas – Diabetes mellitus, melliturias, hypoglycemia. Glucose tolerance test.

Thyroidal hormones – Chemistry, function and metabolism. Hypo and hyper thyroidism, tests for thyroid function. Parathyroid hormones – Parathormone and calcitonin, their role in calcium and phosphate metabolism, abnormalities of parathyroid functions and methods of evaluation.

Adrenals - Chemistry and biosynthesis of adrenal medullary and adrenal cortical hormones . Disorders of adrenal cortex and adrenal medulla, tests for the evaluation of adrenal functions. Biochemical effects of tumours.

UNIT-IV Synthesis, secretion, transport and biological actions of hypothalamic, adenohypophysial and neurohypophysial hormones. Hypothalamic disorders. Pituitary - Clinical syndromes and their evaluation. Penial hormones – Melatonin and serotonin. Chemistry, biosynthesis and role of androgens, estrogens and progesterone. Hormonal regulation of menstrual cycle, Hormonal contraception. Placental hormones. Biochemistry of reproductive disorders, pregnancy toxemia, pregnancy tests.

Lab Course:

1. Assay of Alkaline and Acid Phosphates
2. Estimation of blood glucose by GOD and POD method
3. Various types of glucose tolerance tests.
4. Estimation of SGOT, SGPT, LDH and CPK, Serum Amylase enzymes
5. Estimation of HDL- cholesterol, LDL- cholesterol.
6. Estimation of uric acid and creatinine in plasma.
7. Estimation of urine and blood billurubin.
8. Effect of various toxicants on serum enzymes and proteins
9. Effect of various toxicants on liver and kidney metabolism
10. Purification of protein hormones
11. Assay of steroid dehydrogenase
12. Isolation and characterization of steroid
13. Sperm count
14. Demonstration of estrus cycle study by vaginal smear technique
15. Histological / Histochemical / Cytological study of Endocrine gland

Books Recommended:

Experimental Endocrinology: Zarrow, M.X; Yochin, J.M and Machrth, J.I

Essential techniques in reproductive physiology and Endocrinology: Chinoy, N.J, Rao, M.V, Desarai, K.J and High land, H.N

Biochemistry: L. Stryer

Textbook of Biochemistry with Clinical Correlations: T.M. Devlin

Lippincott's Illustrated Reviews in Biochemistry: P.C.Champe, R.A.Harvey and D.R.Ferrier

Harper's Biochemistry: R.K.Murray, D.K.Granner, P.A. Mayes and V.W.Rodwell.

Clinical Laboratory Science Review: Robert R. Harr

Fundamentals of Clinical Chemistry: C.A. Burtis, E.R. Ashwood Tietz

Notes on Clinical Chemistry- Principles of Internal Medicines: Whitby, Smith, Beckett, Walker, Harrison

The structure and function of enzymes: S.A. Bbernhard

Enzymes- biochemistry, Biotechnology, Clinical chemistry: J. Palmer

Enzymes: Dixon, Webb, Thorne & Tipton

Enzyme structure and Mechanism: Alan Fersht

Enzymatic reaction mechanism: C. Walsh, F. Pub

Basic Environmental Toxicology: Basic Environmental Toxicology: L. G Corkerhem and B.SS Shane

Introduction to Food Technology: T. Shibamato & L F Bzeidanes

Enzyme Assay: A Practical Approach: Eisenthal and Danson

Biochemical, Physiological & Molecular Aspects of Human Nutrition: M. Stipa

M. Sc. Biochemistry

FOURTH SEMESTER (January 2019 – June 2019)

Special Paper: PAPER- III (B): Nutraceutical Biochemistry and Functional Foods

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

Unit-I: Introduction to Nutraceuticals as Science:

Historical perspective, classification, scope and future prospects. Scrutinising the term 'nutraceutical', Regulation of various countries. Medicinal Plants: Ethnomedicine in India, Applied aspects of the Nutraceutical Science. Sources of Nutraceuticals. Relation of Nutraceutical Science with other Sciences: Medicine, Human physiology, genetics, food technology, chemistry and nutrition

Unit-II: Properties, structure and functions of various Nutraceuticals:

Glucosamine, Octacosanol, Lycopene, Falvanoids, Carnitine, Melatonin and Ornithine alpha, ketoglutarate. Use of proanthocyanidins, grape products, flaxseed oil as Nutraceuticals.

Nutraceutical Industry and Market Information, New technologies in development of Nutraceuticals and functional foods

Functional Foods, Scope of Genetic engineering, Nutritional Genomics

Unit-III: Food as remedies

Nutraceuticals bridging the gap between food and drug, Special Dietary Needs, Disease and Nutrition; Nutraceuticals in treatment for cognitive decline, Nutraceutical remedies for common disorders like Arthritis, Bronchitis, circulatory problems, hypoglycemia, Nephrological disorders, Liver disorders, Osteoporosis,

Psoriasis and Ulcers etc. Brief idea about some Nutraceutical rich supplements e.g. Bee pollen, Caffeine, Green tea, Lecithin, Mushroom extract, Chlorophyll, Kelp and Spirulina etc.

Unit-IV: Anti-nutritional Factors present in Foods

Types of inhibitors present in various foods and how they can be inactivated. General idea about role of Probiotics and Prebiotics as nutraceuticals. Recent advances in techniques & feeding of substrates. Assessment of nutritional status and Recommended Daily allowances.

Lab Course:

- Identification using characteristic features of nutracuetically important plants like; *Phyllanthus emblica, Curcuma longa, Zinziber officinalis*, Solanaceae (*Withania somnifera)*, *Aloe vera*, Lilliaceae (*Alium sativum*), Lamiaceae (*Ocimum sanctum*), Apiaceae (*Coriandrum sps*) and Liliaceae (*Asparagus sps.*), *Centella asiatica*.

- Study of following Parasites/ Vectors/ pests: Identification, Habits and control measures (museum Specimens / slides): *Entamoeba histolytica, Taenia sps, Ascaris lumbricoides, Ancylostoma dueodenaei, Trichinella spiralis, Trichura trichuris,* Mosquito (*Culex and Anopheles*), House fly, Green bottle fly, Head Louse, Cockroach (*Periplanata & Blatta*), bed bug, *Mus* sps. (Mouse) and *Rattus* sps. (House rat)
- Reactions of mono, di and polysaccharides and their identification in unknown mixtures
- Determination of Acid value, Saponification and Iodine number of natural fats & oils.
- Estimation of proteins with Bradford's and other methods.
- Extraction and estimation of total sugars from food products (dairy product, fruit juices, bread).
- TLC separation of Plant pigments – Curcumin and carotene.
- To isolate DNA and RNA from given plant/ animal material and estimate DNA by Diphenylamine (DPA) method and RNA by Orcinol reagent
- Extraction, purification and evaluation of activity of any one digestive enzyme (e.g. Beta amylase from sweet potato)
- Estimation of ascorbic acid from lemon & amla juice by titration method
- Estimation of crude fat contents of foods by Soxhlet's method (Butter, Margarine, edible oil).
- Estimation of total Nitrogen of foods by Kjeldahl and Micro Kjeldahl methods.
- Chromatography: Paper, TLC, adsorption, ion exchange, gel filtration, affinity, GC & HPLC.
- Separation of Milk proteins on Native and SDS gels.
- Preparation of plasmid DNA from given sample and its digestion by restriction enzymes and separation of DNA fragments by gel electrophoresis

Books Recommended:

01. Stryer E.A.,	Biochemistry
02. Zubay, Geoffrey L.	Biochemistry,
03. Greenberg David M.	Metabolic Pathways, Vol 3
04. Todd and others,	Clinical Diagnosis and Management, 17th Ed,
05. Gopalan C., et al	Dietary Allowances for Indians, NIH, Hyderabad.
06. Anita F.P.	Clinical Dietetics and Nutrition, 4th Ed, 1997,
07. Devlin, T.M.	Text Book of Biochemistry with Clinical Correlation,
08. Mahan, L.K. & Ecott- Stump, S. [Ed.]	Krause's Food, Nutrition and Diet Therapy
09. Lehninger	Nutrition Concepts & Controversies,
10. Davidson, S. Passmore, & Turswell	Nutrition and dietetics by
10. Goodhearth R., S. Shills	Modern Nutrition in health and disease by.
12. Nelson and Cox, 2000,	Lehninger's Principles of Biochemistry,
13. Robert E.C. Wildman,	Handbook of Nutraceuticals and Functional Foods
16. Rapport and B. Lockwood	Nutraceuticals
15. W. Jeffrey, Hursts	Methods of Analysis for Functional Foods and Nutraceuticals
16. M. Maffei (Ed.)	Dietary Supplements of Plant Origin
17. Gunzler and Williams	Handbook of Analytical Techniques Vol. I,II ,
18. Thomson	Herbal Medicines PDR 3rd ed. -
19. Gary, M & Giintert, E.	Active Compounds in Foods Chemistry and Sensory Properties - l
20. Israel Goldberg	Functional foods, designer foods, pharma foods,

Nutraceuticals,
21. P.D. Dabre — Introduction to Practical Molecular Biology,
22. Ellyn Daugherty — Biotechnology Science for the new Millennium,
23. T K Attwood, D J PSmith — Bioinformatics Introduction -.
24. Primrose and RM Twyman — Principals of Gene Manipulation and Genomics.
25. Massimo Maffei — Dietary Supplements of Plant origin: a nutrition and health approach
27. CCRUM — Herbal Drugs: Potential Antimalarial Herbal Drugs from South Asia.

M. Sc. Biochemistry

FOURTH SEMESTER (January 2019 – June 2019)

Special Paper: PAPER- IV (A): Advanced Immunology, diagnostics and prophylaxis

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

UNIT- I Clonal selection theory- concept of antigen specific receptor. Organization and expression of immunoglobulin genes. Generation of antibody diversity. Light and heavy chain gene recombination. Recombination Signal Sequences. Heavy chain constant region genes. Class switching. T-cell receptor diversity.

UNIT-II Membrane and secreted immunoglobulins. Production of polyclonal and monoclonal antibodies- principle, technique and applications. Antibody engineering. Regulation of immune response by antigen, antibody, immune complex, MHC and cytokines. Immune response to infectious diseases: viral, bacterial and protozoal. Cancer and immune system. Nutrition and Immune response.

UNIT-III Principles of Immunodiagnosis. Antigen-antibody interactions. Precipitation reactions. Haemagglutination. Complement fixation test. Immunofluorescence assay: Fluorescence activated cell sorter (FACS) technique. Radio Immuno and Enzyme Immuno assays. Immunoblotting. Isolation of pure antibodies. Isolation of leucocyte population on density gradient. Effector cell assays. Plaque forming cell assay, ELISPOT assay, leucocyte migration inhibition technique, cytotoxicity assay.

UNIT-IV Active immunization (immunoprophylaxis): Principles of vaccination. Immunization practices. Passive immunization (immunotherapy). Role of vaccine in prevention of diseases: vaccines against important viral, bacterial, protozoan and parasitic diseases. DNA vaccines; Antiviral, antibacterial agents.

Lab Course:

1. Preparation of Parasite Antigen and analysis by PAGE
2. Immunizations and production of antibody
3. Antigen antibody reaction by Double Diffusion, Counter current and IEP, RID & EIA

4. Western Blot Analysis
5. Immunodiagnosis using commercial kits

Books Recommended:

R.A. Goldsby, T.J Kindt & B. A. Osborne	Kuby's Immunology:
E. Benjamini, R. Coico and G. Sunshine	Immunology-A short Course
Roitt, Brostoff and Male	Immunology
William Paul	Fundamentals of Immunology
Stewart Snell	Immunology, Immunopathology and Immunity
Elgert	Understanding Immune System

M. Sc. Biochemistry

FOURTH SEMESTER (January 2019 – June 2019)

Special Paper: PAPER- IV (B): Bioinformatics

[Credit: 4 and Maximum Marks: 80]

(Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words).

Unit I Introduction to bioinformatics and data generation

Bioinformatics and its relation with molecular biology. Examples of related tools (FASTA, BLAST, BLAT, RASMOL), databases (GENBANK, Pub med, PDB) and software (RASMOL, Ligand Explorer).

Data generation; Generation of large scale molecular biology data. (Through Genome sequencing, Protein sequencing, Gel electrophoresis, NMR Spectroscopy, X-Ray Diffraction, and microarray). Applications of Bioinformatics.

Unit II Biological Database and its Types

Introduction to data types and Source. Population and sample. Classification and Presentation of Data. Quality of data, private and public data sources. General Introduction of Biological Databases; Nucleic acid databases (NCBI, DDBJ, and EMBL). Protein databases (Primary, Composite, and Secondary). Specialized Genome databases: (SGD, TIGR, and ACeDB). Structure databases (CATH, SCOP, and PDB sum)

Unit III Data storage and retrieval and Interoperability

Flat files, relational, object oriented databases and controlled vocabularies. File Format

(Genbank, DDBJ, FASTA, PDB, SwissProt). Introduction to Metadata and search; Indices, Boolean, Fuzzy, Neighboring search. Data exchange and integration. Ontologies, interchange languages and standardization efforts.

General Introduction to XML, UMLS, CORBA, PYTHON and OMG/LIFESCIENCE.

Unit IV Gene Expression and Representation of patterns and relationship

General introduction to Gene expression in prokaryotes and eukaryotes, transcription factors binding sites. SNP, EST, STS.

Regular Expression, Hierarchies, and Graphical models (including Marcov chain and Bayes notes). Genetic variability and connections to clinical data.

Lab Course:

01. Retrieval of sequences from NCBI, EBI and EMBL databases.
02. Retrieval of sequences from NBRF-PIR, SWISSPROT and P databases.
03. Transition and Translation of sequences.
04. Retrieval of genome from genome databases.
05. Exploring DIP and PPI.
06. Exploring BIND and PIM.
07. Exploring MINT and GRID.
08. Analysis of phylogenetic tree
09. Exploring PDB file.
10. Analysis of active site by pymol

Books Recommended:

BAXEVANIS, AD & OUELLETTE, BFF : Bioinformatics: a practical guide to the analysis of genes and proteins. 2nd Ed.. 2002.

BAXEVANIS, AD, DAVISON, DB, PAGE RDM & PETSKO, GA: Current protocols in bioinformatics. 2004.

ORENGO, C, JONES, D & THORNTON, J : Bioinformatics: genes, proteins and computers. 2003

Ingvar Eidhammer, Inge Jonassen, William R Taylor : Protein Bioinformatics. 2003

HIGGINS, D & TAYLOR, W : Bioinformatics: sequence, structure, and databank. 2000.

David Mount : Bioinformatics: sequence and genome analysis. 2004

Scheme of Semester Examination & Syllabus, 2017-2019

M. Sc. Bioscience (Semester I to IV)

Pt. Ravishankar Shukla University, Raipur

First Semester [July 2017 – December 2017]

Paper	Title of Paper	Marks		
		(External)	(Internal*)	Credit
I	Cell Biology	80	20	4
II	Biomolecules	80	20	4
III	Microbiology	80	20	4
IV	Biology of Immune System	80	20	4
LC-I	Lab Course I (Based on Theory papers I & II)	80	20	2
LC-II	Lab Course II (Based on Theory papers III & IV)	80	20	2
	Total		600	20

Second Semester [January 2018 – June 2018]

Paper	Title of Paper	(External)	(Internal)	Credit
I	Genetics and Molecular Biology	80	20	4
II	Bioenergetics & Metabolism	80	20	4
III	Instrumentation and Molecular Techniques	80	20	4
IV	Biometry, Computer and Scientometry	80	20	4
LC-I	Lab Course I (Based on Theory papers I & II)	80	20	2
LC-II	Lab Course II (Based on Theory papers III & IV)	80	20	2
	Total		600	20

Third Semester [July 2018 – December 2018]

Paper	Title of Paper	(External)	(Internal)	Credit
I	Molecular Plant Physiology	80	20	4
II	Ecology and Environmental Biology	80	20	4
III	Animal Physiology	80	20	4
IV	Developmental Biology and Evolution	80	20	4
LC-I	Lab Course I (Based on Theory papers I & II)	80	20	2
LC-II	Lab Course I (Based on Theory papers III & IV)	80	20	2
			600	20

Fourth Semester [January 2019 – June 2019]

Paper	Title of Paper	(External)	(Internal)	Credit
I	Seed Science	80	20	4
II	Plant Biotechnology	80	20	4
III	Special Paper A: Parasitology/ Special Paper B: Basic Chronobiology	80	20	4
IV	Special Paper A: Immunology/ Special Paper B: Applied Chronobiology	80	20	4
LC-I	Lab Course I (Based on Theory papers I & II)	80	20	2
LC-II	Lab Course II (Based on Theory papers III & IV)	80	20	2

	Total			**600**	**20**
	OR				
	Project Work**			**600**	
	Distribution of Marks	Dissertation	**240**	**60**	**11**
		Seminar based on project	**160**	**40**	**6**
		Viva-voce	**80**	**20**	**3**
				600	**20**
Grand total [Semester I + II + III + IV]				**2400**	**80**

Important Note:

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

Continuous evaluation of Performance*

Each student will be evaluated continuously throughout the semester.

There will be a class test based on each theory paper. The full marks will be 10 for each paper.

There will be a poster/oral presentation based on each theory paper. The full marks will be 10 for each presentation.

Each student will be required to submit a brief write-up (not more than 15-20 pages) on his/her poster/oral presentation.

Project Work**

A student of IV semester will have the choice to opt for project work in lieu of four theory papers and two lab courses provided he/she secures at least **75%** or more marks in aggregate in semester I and II.

The project has to be carried out in recognized national Institutes/Laboratories or UGC-recognized universities. No student will be allowed to carry out project work in private laboratories/ college/ institutions, excluding the colleges recognized as research centers by the RDC of Pt. Ravishankar Shukla University, Raipur.

The valuation of all the projects will be carried out by an external examiner and HoD of UTD or its nominee at the UTD Centre.

Scheme for Lab Course (LC) Examination (Applicable for each LC in each Semester)

1.	Major exercise based on paper I	**20**
2.	Minor exercise based on paper I	**10**
3.	Major exercise based on paper II	**20**
4.	Minor exercise based on paper II	**10**
5.	Spotting/ Interpretation***	**10**
6.	Viva-voce	**10**
7.	Sessional [Internal]	**20**
	Total	**100**

***A student will be required to interpret on the displayed item/

	material

July 2017 – December 2017

M.Sc. Bioscience

First Semester

Paper I: Cell Biology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

Unit-I	Molecular organization of membranes- asymmetrical organization of lipids, proteins and carbohydrates. Osmosis, ion channels, membrane pumps and electrical properties of membranes. Active transport by ATP-powered pumps: types, properties and mechanisms.
Unit-II	Transport of proteins into mitochondria, chloroplast and endoplasmic reticulum. Transport of proteins into and out of nucleus. Transport by vesicle formation: exocytosis, endocytosis and its molecular mechanism.
Unit-III	Cell signaling: Signaling via G-protein linked and enzyme linked cell surface receptors, MAP kinase pathways. Eukaryotic cell division cycle: different phases and molecular events, regulation and control of cell cycle. Apoptosis. Oncogenes and tumor suppressor genes: viral and cellular Oncogenes, retinoblastoma, E2F and p53 proteins.
Unit-IV	Organization of chromosomes: Structure of chromosomes, centromere and telomere. States of chromosomes during cell cycle. Mitotic chromosome. Organization of genes in chromosomes Banding pattern of chromosomes. Lampbrush and Polytene chromosomes. Chromatin, nucleosomes, DNA packaging, heterochromatin and euchromatin.
Lab Course:	
	1. Study of chromosome behaviour during Mitosis and meiosis (Onion / Garlic root tips, Onion buds, human lymphocytes, rat or bird testis /grass hopper testis or any other materials). 2. Calculation of mitotic index in growing Onion / Garlic root tips 3. Squash preparation: Polytene chromosome (in chironomus / Drosophila or other insect salivary gland) and Barr body (in buccal epithelial cells). 4. Demonstration of secretory granules in the salivary gland cells of insect. 5. Demonstration of mitochondria by vital staining. 6. Study of permanent slides. 7. Estimation of DNA 8. Estimation of RNA 9. Sub-cellular fractionation and marker enzymes 10. Identification of biomolecules in different tissues by histochemical techniques 11. Preparation of mitotic plate by carmine squashing method and phase identification. 12. Demonstration of the nuclear matrix networks in onion cells. 13. Study of the effect of chemical agents on chromosomes plant cells. 14. Isolation of protoplast, measurement of cell density plating efficiency. 15. Preparation of Karyotype of metaphase plate.

	16. Preparation of Meiotic plate and determination of phases. 17. Computation of Chaisma frequency and Terminalization of phases. 18. Micrometry and Camera Lucida drawings.
Recommended Books	
H Lodish *et al.*	Molecular Cell Biology
B Alberts *et al.*	Essential Cell Biology
H Lodish *et al.*	Molecular Cell Biology (Lodish, Molecular Cell Biology)
B Alberts *et al.*	Molecular Biology of the Cell
G Karp	Cell and Molecular Biology: Concepts and experiments

July 2017 – December 2017	
M.Sc. Bioscience	
First Semester	
Paper II: Biomolecules	
Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.	
Unit-I	Carbohydrates: Structure, classification, properties and function; derivatives of monosaccharides, homo and hetero-polysaccharides, Peptidoglycan glycoproteins and liposaccharide Lipids: Classification, structure and function Nucleic Acid: Structure of purine and pyrimidine bases, nucleoside and nucleotide; DNA- structure and conformation; RNA - Structure, types and functions
Unit-II	Amino acids: Structure, classification and functions; Synthesis of peptides and protein sequencing; Proteins- properties, covalent structure; secondary, tertiary and quaternary structure of proteins, Ramchandran plot
Unit-III	Enzyme classification, coenzymes, active site of enzyme, factors contributing to the catalytic efficiency of enzyme; enzyme kinetics- Michaelis-Menten equation, determination of Km, enzyme inhibition, allosteric enzymes, isoenzymes, ribozyme, multienzyme complexes
Unit-IV	Chemistry of porphyrins: Importance of porphyrins in biology; structure of hemoglobin and chlorophyll porphyrins, structure and biological role of animal hormones, structure and biological role of water soluble and fat soluble vitamins.
Lab Course:	
1.	Specific tests for sugars, amino acids and lipids
2.	Formal titration of amino acids
3.	Estimation of proteins using ninhydrin and biuret method
4.	Estimation of sugar by Anthrone and Folin-Wu method
5.	Saponification value and iodine number of fat.
6.	Estimation of ascorbic acid
7.	Achromic point determination using salivary amylase
8.	Effect of ions on salivary amylase activity

9.	Enzyme assay and kinetics (ex. Amylase, Protease)

Recommended Books:	
Nelson, Cox and Lehninger	Principles of Biochemistry
G Zubay	Biochemistry
Stryer	Biochemistry
Garrett and Grosham	Biochemistry
West, Tood, Mason and Bbruglen	Text book of biochemistry
White, Handler and Smith	Biochemistry
D Voet and JC Voet	Biochemistry

July 2017 – December 2017

M.Sc. Bioscience

First Semester

Paper III: Microbiology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

Unit-I	General characteristics of fungi, classification of fungi, life cycle of selected fungal genus (Aspergillus, Pencillium, Fusarium and Mucor). Economic importance of fungi. Fungi and bioremediation, parasitism, mutualism and symbiosis with plants and animals. Heterothallism, sex hormone in fungi, Mycorrhiza, VAM. Algae: Distribution, classification, reproduction, ecology and importance.
Unit-II	Morphology and ultra structure of bacteria, morphological types, cell wall of archaebacteria, gram negative, gram positive eubacteria, eukaryotes. Cell membranes – structure, composition and properties. Structure and function of flagella, cilia, pili, gas vesicles. Cyanobacteria, protozoa, mycoplasma and Rickettsia Gene transfer mechanisms, transformation, transduction, conjugation and transfection. Plasmids F: factors colicins and col factors, plasmids as a vector for gene cloning.
Unit-III	Nutritional types (autotrophs, heterotrophs, phototrophs, chemotrophs), growth curves, measurement of growth, factors affecting growth, generation time, growth kinetics. Batch and continuous culture, asynchronous, synchronous culture. Basis of microbial classification, classification and salient feature of bacteria according to Bergey's manual of determinative bacteriology, cyanobacteria, prochlorons and cyanelles.
Unit-IV	Viruses: Structure and classification of viruses; morphology and ultra structure; capsids and their arrangements, types of envelopes, viral genome, their types and structure, virus related agents (viroids, prions). General feature of virus reproductions, early events in virus multiplication, virus restriction and modification of host, virus mRNA.

	General overview of bacterial viruses, RNA and DNA bacteriophages (MS2, ϕX174, M13, T3, T4). Lysogeny and Lytic phase. General account of plant and animal viruses (TMV, HIV and other oncogenic virus, Hepatitis virus).
Lab Course:	
1.	Glassware preparation and sterilization techniques- wet heat- dry heat- filter types- laminar flow chamber types- CDC- safety levels
2.	Preparation of liquid & solid media, plating, pouring, inoculation and incubation for growth of microorganism
3.	Methods of obtaining pure culture of microorganisms (a) streak plate (b) Pour plate, and (c) spread plate methods
4.	Microscopic examination of the microorganisms, identification and staining methods
5.	Micrometery and camera lucida drawings
6.	Study of bacterial growth by turbiditimetry/ spectrophotometry
7.	Biomass measurement for fungi
8.	Isolation and enumeration of microorganisms from soil by serial dilution agar plating method
9.	Enumeration of viruses by plaque assay technique
10.	Motility of bacteria by hanging drop technique

Recommended Books:

LM Prescott, JP Harley and DA Klein	Microbiology, McGraw Hill Publication
RY Stanier et al.	General Microbiology, Mac Millian Press
RM Atlas	Principles of Microbiology
Peleczar, Chan and Krieg	Microbiology
Luria, Darnell, Baltimore and Campbell	General Virology
CJ Alexopoulos and CW Mims	Introduction to Mycology, Wiley Eastern Ltd, New Delhi

July 2017 – December 2017

M.Sc. Bioscience

First Semester

Paper IV: Biology of Immune System

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

Unit-I	Innate immune mechanism and characteristics of adaptive immune response; Cells of immune system: Hematopoiesis and differentiation, mononuclear cells and granulocytes; Antigen presenting cells; Primary and Secondary lymphoid organs and tissues; Ontogeny and phylogeny of lymphocytes; Lymphocyte traffic
Unit-II	Antigen receptor molecules: B-cell receptor complex, Immunoglobulin - structure, types and function; T-cell receptor complex; Major Histocompatibility Complex- types, structural organization, function and distribution; Transplantation and Rejection; Complements in immune function
Unit-III	Antigens: nature of antigens, factor affecting immunogenicity, Haptens and super antigens; Antigenic determinants; Recognition of antigens by T and B

	cell; Antigen processing; Role of MHC molecules in antigen presentation and co-stimulatory signals; Antigen and antibody interaction.
Unit-IV	Cell mediated immune response; Cytokines and interleukins- structure and function; Immunity to infections; Hypersensitive reactions and their types; Immunodeficiency disorders; Autoimmunity

Lab Course:	
1.	Identification of cells of immune system
2.	Separation of mononuclear cells by Ficoll-Hypaque
3.	Identification of Lymphocytes and their subsets
4.	Lymphoid organs and their microscopic organization
5.	Isolation and purification of Antigens
6.	Purification of IgG from serum
7.	Estimation of Levels of gamma globulins and A/G ratio in blood
8.	Antigen antibody interaction

Recommended Books:	
RA Goldsby *et al.*	Kuby's Immunology
E Benjamini, R Coico and G Sunshine	Immunology- A short Course
Roitt, Brostoff and Male	Immunology
William Paul	Fundamentals of Immunology
Tizard	Immunology
Abbas *et al.*	Immunology

January 2018 – June 2018

M.Sc. Bioscience

Second Semester

Paper I: Genetics and Molecular Biology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

Unit-I	Mendelian principles: Dominance, segregation, independent assortment. Concept of gene : Allele, multiple alleles, pseudoallele, complementation tests Extensions of Mendelian principles: Codominance, incomplete dominance, gene interactions. Gene mapping methods: Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants Mutation: Types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis
Unit-II	DNA replication, repair and recombination: Mechanism of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extrachromosomal replicons, DNA damage and repair mechanisms; Repair of

	Base-excision, Nucleotide excisions, Mismatch and Double Strand. Guardian of DNA; p_{53} and p_{21}. Homologous and site-specific recombination.
Unit-III	RNA synthesis and processing: transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, elongation, and termination, RNA processing, capping, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport.
Unit-IV	Protein synthesis and processing: Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post Translational modification of proteins. Protein targeting.
Lab Course:	
	1. Isolation, purification and estimation of RNA 2. Isolation, purification and estimation of DNA 3. Determination of Tm of nucleic acid 4. Fraction of poly (A) RNA 5. Restriction Mapping 6. Restriction Digestion 7. Ligation 8. DNA molecular size determination

Recommended Books	
H Lodish *et al.*	Molecular Cell Biology
B Alberts *et al.*	Essential Cell Biology
B Alberts *et al.*	Molecular Biology of the Cell
G Karp	Cell and Molecular Biology: Concepts and experiments
JD Watson *et al.*	Molecular Biology of the Gene
J Wilson and T Hunt	Molecular Biology of the Cell: The Problems
B Lewin	Genes VIII
JE Krebs *et al.* (Ed.)	Genes X (Lewin's), Jones and Bartlett Publishers, Sudbury, Massachusetts, (2011)

January 2018 – June 2018

M.Sc. Bioscience

Second Semester

Paper II: Bioenergetics and Metabolism

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Energy transformation and laws of thermodynamics; Concept of free energy, Determination of free energy change by different methods; Structural basis of free energy change during hydrolysis of ATP; High energy compounds, Other high energy biological compounds; ATP cycle
Unit-II	Basic concepts of intermediary metabolism: Carbohydrate metabolism -

	Glycolysis, Kreb's cycle, glycogenolysis, glycogenesis, pentose phosphate pathway, gluconeogenesis, and glyoxylate pathway, inborn errors of carbohydrate metabolism; Regulation of carbohydrate metabolism
Unit-III	Electron transport and oxidative phosphorylation: electron carriers, Complexes I to IV, Shuttle system for entry of electron substrate level phosphorylation, mechanism of oxidative phosphorylation; Biosynthesis and degradation of Lipids; Regulation of lipid metabolism, inborn errors of lipid metabolism
Unit-IV	Nitrogen Assimilation; Biosynthesis and degradation of amino acids; Regulation of amino acid metabolism; Biosynthesis and degradation of purine and pyrimidine nucleotides

Lab Course:	
1.	Protein estimation by Lowry, Bradford and Spectrophotometric method
2.	Estimation blood cholesterol
3.	Estimation of sugar by Nelson-Sompgy and Benedict's reagent
4.	Isolation and estimation of lipid from seeds and egg
5.	Estimation of inorganic and total phosphorus by Fiske-Subba Rao method
6.	Assay of phosphatases in blood and seeds
7.	Urease estimation in plant tissues

Recommended Books:	
Nelson, Cox and Lehninger	Principles of Biochemistry
G Zubay	Biochemistry
Stryer	Biochemistry
Garrett and Grosham	Biochemistry
West, Tood, Mason and Bbruglen	Text book of biochemistry
White, Handler and Smith	Biochemistry
D.Voet and J C Voet	Biochemistry
Dixon and Webb	Enzymes
Price and Steven	Fundamentals of Enzymology
Plummer	Practical biochemistry
G Tripathi	Enzyme biotechnology
Walsh	Enzyme Reaction Mechanism
Hammes	Enzyme catalysis and regulation

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Second Semester

Paper III: Instrumentation and Molecular Techniques

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Centrifugation: Principle, techniques. Preparative, analytical and ultracentrifuges, sedimentation coefficient and factors affecting sedimentation coefficient. Application of centrifugation. Photometry: Basic principles of colorimetry, UV- visible spectrophotometry &

	IR- spectrophotometry. Spectroflurometry Atomic absorption spectroscopy: Principle, Instrumentation and applications Electrophoresis: Paper electrophoresis, Starch gel, agarose, PAGE-type, 2D-E.
Unit-II	Microscopic techniques: light microscopy, microscopy of living cells, scanning and transmission microscopes, different fixation and staining techniques for EM, freeze-etch and freeze-fracture methods for EM, image processing methods in microscopy Microtomy: types, principle and applications *Lyophilization*: Principle, instrumentation and applications
Unit-III	Chromatography: Paper and Thin Layer Chromatography. Gel filtration, Ion exchange chromatography and Affinity chromatography. Gas-liquid chromatography and HPLC. Histochemical and immunotechniques: Antibody generation, detection of molecules using ELISA, RIA, western blot, immunoprecipitation, flow cytometry and immunofluorescence microscopy, detection of molecules in living cells, *In situ* localization; FISH and GISH. Radioactivity: GM counter, liquid Scintillation counter, solid Scintillation counter, gamma counters
Unit-IV	Molecular techniques: Isolation and purification of RNA, DNA (genomic and plasmid) and proteins, separation methods; RNA, DNA and proteins; 1-D and 2-D, isoelectric focusing gels; Molecular cloning of DNA and RNA fragments in bacterial systems; Expression of recombinant DNA; DNA sequencing. Gene expression; mRNA, cDNA using PCR and qRT-PCR. Micro array based techniques. Molecular Markers for diversity analysis: RFLP, RAPD, AFLP, VNTR, SSR, ISSR, SNP, DArT.
Lab Course:	
	• Verification of Beers Law • Determination of absorption maxima • Quantitative determination, Enzyme kinetics • Amino acid and carbohydrate separation by paper and TLC • Ion exchange and gel filtration chromatography • SDS Polyacralamide Gel Electrophoresis • DNA electrophoresis • Isoenzymes • Separation of sub-cellular organelles by differential centrifugation. • Isolation of DNA and Agarose gel Electrophoresis • Amplification of RAPD and AFLP markers. • Isolation of RNA and Electrophoresis of RNA on denaturing gels. • cDNA synthesis and cloning • Isolation of Protein and SDS-PAGE • In vitro DNA ligation, transformation of E. coli • Characterization of transformants: DNA gel electrophoresis, Restriction map analysis

Recommended Books:

• K Wilson and John Walker	Practical Biochemistry: Principles & Techniques
• RF Boyer	Biochemistry Laboratory: Modern Theory & Techniques
• S Carson, H Miller and D Scott	Molecular Biology Techniques: A Classroom Laboratory Manual
• TC Ford and J. M. Graham	An Introduction to Centrifugation
• R Baserga and D Malamud	Autoradiography: techniques and application
• T Chard	An Introduction to Radioimmunoassay and Related Techniques , Volume 6
• MD Bruch	NMR Spectroscopy Techniques
• BA Wallace and R William	Modern Techniques for Circular Dichroism and Synchrotron Radiation, Volume 1
• J Sambrook, EF Rritsch and I Maniatis	Molecular cloning: A Laboratory Manual
• PD Dabre	Introduction to Practical Molecular Biology
• JD Watson, NH Hopkins, JW Roberts, JA Steitz and AM Weiner	Molecular Biology of Gene (4th Edition)
• J Darnell, H Lodish and D Baltimore	Molecular Cell Biology (2nd Edition)
• B Alberts, D Bray, J Lewis, M Raff, K Roberts and JD Watson	Molecular Biology of the Cell (2nd Edition)
• Benjamin Lewin	Gene VII
• JM Walker and R Rapley	Molecular Biology and Biotechnology
• SB Primrose	Molecular Biotechnology

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Second Semester

PAPER IV: BIOMETRY, COMPUTER AND SCIENTOMETRY

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Introduction to biostatistics. Types of biological data: data on different scales. Frequency distributions. Cumulative frequency distributions. Random sampling. Parameters and statistics. Measures of central tendency and dispersion: Mean, Median, Mode, Range, Variance and Standard deviation. Coefficient of variation. The effects of coding data. Data transformations: Log-transformation, Square-root transformation and Arcsine transformation. Distribution: normal and binomial. Probability: Basic laws of probability, addition law, multiplication law. Probability and frequency.
Unit-II	Statistical errors in hypothesis testing. Testing goodness of fit: Chi-square goodness of fit. Heterogeneity Chi-square. The 2 x 2 contingency table. One sample hypothesis. Two-sample hypothesis. Testing for difference between two means (*t*-test). Testing for difference between two variances (*F*-test). The paired sample *t*-test. Multiple-sample hypothesis (ANOVA): Single factor and two factors ANOVA. Multiple comparisons: Duncan's multiple-range tests. Simple linear regression. Regression *vs.* Correlation. Regression equation. Interpretations of regression functions. Simple linear correlation. The

	correlation coefficient.
Unit-III	Introduction to MS-Office software: Word processing; Creating new document, Editing documents, Adding graphics to documents, Word tables. Management of Workbook & Worksheets; Applications, Features, Using formulas and functions, Features for Statistical data analysis, Generating charts/ graph. Presentation software; Working in PowerPoint, Creating new presentation, Working with slides.
Unit-IV	Introduction to Internet and Applications. Basics of internet, e-mailing, Search engine – Google and Yahoo; Pubmed, Scopus, Web of Science, Google Scholar, Indian Citation Index, Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF). Introduction to Plagiarism and Cyber laws.

Lab Course

1.	Exercises for data distribution
2.	Exercises for computation of measures of central tendency
3.	Exercises for computation of measures of variability
4.	Computation of correlation coefficient, r, and regression constants
5.	Data analysis by ANOVA and multiple-range tests
6.	Hypothesis testing by *t*-test, F-test, and Chi-square test
7.	Graphical presentation of data using a suitable package
8.	Statistical analysis of a data using a suitable package
9.	Preparation of document using a suitable package
10.	Preparation of slides using a suitable package

Books Recommended

Campbell RC	Statistics for biologists
Zar JH	Biostatistical Analysis
Wardlaw AC	Practical Statistics for Experimental Biologists
Snedecor GW & Cochran WG	Statistical Methods
Sokal RR & Rohlf FJ	Introduction to Biostatistics
Sumner M	Computers: Concepts & Uses
White R	How Computers Work
Cassel P *et al.*	Inside Microsoft Office Professional
Coleman P and Dyson P	Mastering Internets
Gralla P	How the Internet Works
Shelly GB, Vermaat ME, Cashman TJ	Microsoft® 2007: Introductory Concepts and Techniques
Habraken J	Microsoft® Office 2003 All in One
	Microsoft® Office 2010 In Depth
Gilmore B	Plagiarism: Why it happens, How to prevent it?
Buranen L and Roy AM	Perspectives on Plagiarism and Intellectual Property in a Post-Modern World
Kumar Anupa P	Cyber Law
Sood V	Cyber Law Simplified

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Third Semester

Paper I: Molecular Plant Physiology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be

answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words	
Unit-I	Membrane transport : Pumps; F-type H^+ -ATPase mitochondria, P-type PM H^+ -ATPase, V Type H^+ -ATPase, and ABC type. Ion Channels; Voltage gated channels of K and Ca. Water transport through Aquaporins. Physiology of Mineral Nutrition: Molecular mechanism and regulation of K, Fe and Zn transport. Phosphorous nutrition and transport. Phytoremediation. Mineral toxicity
Unit-II	Photosynthesis: Light absorption and energy conversion, photosystems I and II, ATP synthesis, Assimilation of carbon in C_3, C_4 and CAM pathways, Photorespiration
Unit-III	Phytohormones: Structure, biosynthesis, molecular mechanisms of Auxin, Gibberellins, Cytokinin, Abscisic acid and Ethylene, Brassinosteroids
Unit-IV	Senescence and Programmed cell death: Senescence; Metabolism and regulation of pigment and nucleic acid, PGR regulation, SAG. PCD; Formation of TE and mobilization of cereal endosperm, Formation of aerenchyma. Signal transduction and PCD

Lab Course:

1.	Spectrophotometric determination of chlorophyll-a, chlorophyll-b and total chlorophyll in young, mature and senescent leaves
2.	Kinetin estimation by cucumber cotyledons expansion bioassay
3.	Auxin bioassay using wheat coleoptiles
4.	GA bioassay by inducing *de-novo* synthesis of Amylase in de-embryonated seeds of wheat
5.	Estimation of mono, di and total phenols in the young and aged leaves
6.	Estimation of Guaiacol peroxidase activity in fresh and aged seeds
7.	Determination of Superoxide dismutase levels in the healthy and deteriorated seeds
8.	Estimation of metal toxicity induced changes in the AOS levels in leaf tissues
9.	Determination of Nitrate reductase activity in leaf tissues
10.	Separation of isozymes of SOD and GPX

Recommended Books:

Fosket DF	Plant Growth & Development
Foyer CH	Photosynthesis
Bacon Ke	Photosynthesis: Photobiochemistry & Photobiophysics
Leopold AC & Kriedemann PE	Plant Growth & Development
Moore TC	Biochemistry & Physiology of Hormones
L Taiz & E Zeiger	Plant Physiology
BB Buchanan, W Gruissem & RL Jones	Biochemistry & Molecular Biology of Plants
MB Wilkins	Advanced Plant Physiology
JA Hopkins	Introduction to Plant Physiology
FB Salisburry & CW Ross	Plant Physiology
Hans-Walter Heldt	Plant biochemistry & Molecular Biology

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Third Semester

Paper II: Ecology and Environmental Biology	
Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words	
Unit-I	Ecosystem: Concept, Components and types. Productivity, Ecological energetics, Energy flow in ecosystem, Energy flow models, Ecological pyramids, Food chain, Food web. Ecological succession, Ecological niche.
Unit-II	Aquatic ecosystem: Biotic and abiotic components, lentic and lotic ecosystems, wetlands. Terrestrial ecosystems: Forest types of India with special reference to Chhattisgarh. Natural and plantation (artificial) forests, Agroforestry, Social forestry, National parks and Sanctuaries in Chhattisgarh.
Unit-III	Environmental pollution: Definition, types (air, water, soil, noise, thermal & radioactive), causes, effects and control. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Disaster management: Floods, earthquake, cyclone and landslides.
Unit-IV	Biodiversity, ex-situ and in- situ conservation. Intellectual property right (IPR) with special reference to India. Natural resources: Water, Forest and Medicinal plants.
Lab Course:	
1.	To determine the minimum size of the quadrate by 'Specis –Area-Curve' method
2.	To study the community by quadrate method by determining frequency, density and abundance of different species present in the community
3.	Chromatographic separation of chlorophyll pigments in leaf
4.	Measurement of pH and Total alkalinity in water
5.	Measurement of Free carbon dioxide and dissolved oxygen in given water
6.	Identification and drawing of at least 15 medicinal plants

Recommended Books:	
A Beattie and PR Ehrlich	Biodiversity, 2001
EP Odum	Fundamentals of Ecology, 2nd ed., 494-496
EP Odum	Basic Ecology (Philadelphia: Saunders, 1983), 518.
PD Sharma	Ecology and Environment, 2009, Rastogi Publications
M Calver	Environmental Biology, Murdoch University, Western Australia
Aggarwal	Concept of Ecology
NS Subrahmanyam	Ecology, Narosa Publications

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Paper III: Animal Physiology
Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be

answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words	
Unit-I	**Circulation**: Composition of blood, Cell types, Hemopoiesis, Structure and function of hemoglobin - Oxygen and carbon dioxide transport, Cardiac cycle and its regulation. Blood pressure, Blood Coagulation, **Respiration**: Mechanism and regulation of breathing, Factors influencing oxygen uptake, Diving and high altitude adaptations. Measurement of metabolic rate and Q_{10}
Unit-II	**Nervous system**: Mechanisms of conduction along axon and across synapses, Nernst equation and measurement of action potential, Neurotransmitters, Types and physiology of reflexes. **Myology**: Types of muscles, Ultrastructure, mechanism and regulation of contraction of skeletal muscle.
Unit-III	**Endocrinology**: Communication (autocrine, paracrine, neuroendocrine and endocrine) between cells and within the cells, Classification of hormones, General principles of nature of hormone action, Hormone receptors, Structure and physiology of following endocrine glands: hypothalamus, pituitary, thyroid and parathyroid, pancreas, adrenal, and pineal.
Unit-IV	**Hormones, Reproduction and Pheromones**: Hormones in reproduction, Structure and function of testis and ovary, sexual cycles, Mechanism of action of gonadotropins; Types of pheromones, primer pheromone, releaser pheromone, imprinting pheromone, Lee-Boot effect, Bruce effect, Whitten effect, Human pheromones, Sex pheromones in insect control.

Lab Course (8-10 out of the following):

1.	Examination of RBC in Piscine/Avian/Human blood.
2.	Examination of WBC in Piscine/Avian/Human blood.
3.	Differential leukocyte counts in Human blood.
4.	Determination of Hb/Hct/ Absolute values in Piscine/Avian/Human blood.
5.	To determine prevalence of different types of polymorphs in human blood (Based on Arneth's classification).
6.	Demonstration of hemin crystal.
7.	Determination of osmotic resistance in Piscine/Avian/Human blood.
8.	Determination of specific gravity of Piscine/Avian/Human blood
9.	Study of histological preparation of endocrine glands & Microtomy
10.	ELISA/ RIA for T4, T3 & TSH
11.	ELISA/ RIA for Cortisol and Melatonin
12.	Androgen bioassay (chick comb method).
13.	Study of vaginal smears in rat/mouse.
14.	Effects of surfacing prevention on opercular activity in *C. batrachus*/ *H. fossilis*
15.	Determination of rate of oxygen consumption (Whole body and tissue)

Books Recommended:

PJ Bentley	Comparative vertebrate endocrinology
WF Ganong	Review of medical physiology
A Gorbman & HA Bern	A textbook of endocrinology
AC Guyton	Textbook of medical physiology
WS Hoar & DJ Randall	Fish physiology [Series]

CR Martin	Endocrine physiology
D McFarland	Animal behaviour, psychobiology, ethology & evolution
CL Prosser	Adaptational biology: molecules to organisms
CL Prosser & FA Brown	Comparative animal physiology
K Schmidt-Nielsen	Animal physiology: Adaptation & environment
CD Turner & JT Bagnara	General endocrinology
JD Wilson & DW Foster	Textbook of endocrinology
D Randall, W Burggren & K French	Animal Physiology: Mechanisms and adaptations
TD Wyatt	Pheromones and animal behavior: Communication by smell and taste
G Litwack	Pheromones

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Third Semester	
Paper IV: Developmental Biology and Evolution	
Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words	
Unit-I	Gametogenesis in animals. Molecular events during fertilization. Activation of egg metabolism. Cleavage patterns and fat maps. Regulation of Cleavage cycle. Cleavage and nuclear activity.
Unit-II	Concepts of determination, competence, induction and differentiation. Determination in *Caenorhabditis elegans*. Germ cell determination, migration and differentiation. Totipotency and nuclear transfer experiments. Embryonic induction. Formation of vulva in *C. elegans*. Mechanism of differentiation in *Dictyostelium*.
Unit-III	Morphogenetic determinants in egg cytoplasm. Role of maternal contributions in early embryonic development. Genetic regulation of early embryonic development in Drosophila. Homeotic genes. Genetic interaction during differentiation. Hox genes and limb patterning.
Unit-IV	Concepts and theories of organic evolution. The processes of Evolutionary change-Genetic drift, Natural selection and the Hardy-Weinberg equilibrium. Speciation. Molecular evolution and origin of life. Evolution of Prokaryotes and Eukaryotes. A brief outline of the evolutionary history of Metazoans including-Evolution of tissue grade, coelomic body plans and Chordates. Evolution of Mankind.
Lab Course:	
1.	Study of developmental stages in Snail/Amphibian/Chick
2.	Study on Drosophila development
3.	Role of hormones in metamorphosis and development
4.	Effect of Vitamin A on tail regeneration in frog
5.	Biochemical estimations in developing embryos
6.	Structure of hen's egg and its vital staining
7.	Demonstration of cell death by vital staining
8.	Study of permanent slides of chick embryos

9.	Histological studies of Gametogenesis
10.	Induced breeding in fishes

Recommended Books	
Alberts *et al*.	Molecular Biology of the Cell
SF Gilbert	Developmental Biology
Lewin Benjamin	Gene VIII
	Developmental Genetics
PO Moody	Introduction to Evolution, 1970, Harper and Row
Dobzhansky et al.	Evolution, W. H. Freeman. New York
SW Fox and K Dose	Molecular Evolution and the Origin of Life, 1972, W.H. Freeman & Co Ltd.
FJ Ayala and JW Valentine	Evolving: The theory and processes of Organic evolution, 1979, Benjamin/Cummings Pub. Co.
EO Dodson	Evolution: Process and Product
MW Strickberger	Evolution, 1979, James and Barlett International

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Fourth Semester

Paper I: Seed Science

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Seed development: Phases of development, Maturation; accumulation of desiccation related compounds, ABA regulation. Seed Dormancy: Physiological and molecular basis, Testa, Endosperm, Aleurone layers & Hormonal cross talk in dormancy. Alleviation of dormancy; Protein oxidation. Dormancy breaking chemicals and mechanism.
Unit-II	Seed Germination: Pre-germination, Germination and post germination Metabolism. Reactivation of the metabolic pathway. Cellular repair. Hormonal regulation and metabolism; GA & ABA, ROS metabolism.
Unit-III	Seed Ageing: Seed storage physiology: Orthodox & Recalcitrant; ROS metabolism, Mechanism of desiccation tolerance, dehydrins/LEA/peroxiredoxin, HSPs, Sugars. Longevity markers; β- mercaptopyruvate sulfurtransferase (MST), L –isoaspartyl O-methyltransferase (PIMT).
Unit-IV	Seed Technology: Priming technology; biochemical and molecular aspects. Cryobanks, Cryopreservation of seed and embryo; Cryoprotective molecules, Vitrification, Encapsulation and Drying. Synthetic seeds.

Lab Course:	
1.	Hydro and chemical priming effect on seed germination.
2.	To perform accelerated ageing in seeds and its comparison with the control.
3.	Testing seed viability and vigour by :
	(a) germination

	(b) triphenyl tetrazolium test
	(c) Specific conductance of leachates and
	(d) Germination Index
4.	Lipid peroxidation in ageing seeds.
5.	Extraction and estimation of seed proteins, carbohydrates and lipids.
6.	Quantitative and qualitative estimation of antioxidant enzymes in seeds:
	(a) SOD
	(b) Peroxidase and
	(c) catalase
7.	Peroxidase assay by tissue printing method.
8.	Seed cryopreservation technique and post-cryopreservation recovery.
9.	Separation and determination of Molecular weight of seed proteins by SDS-PAGE.

Recommended Books

JD Bewley & M Black	Physiology & Biochemistry of Seeds, Vol. I & II
JD Bewley & M Black	Seeds : Physiology of Development & Germination
Black *et al*.	Desiccation and Survival of Plants : Dying without Drying
PK Agrawal & M Dadlani	Techniques in Seed Science & Technology
FAO Report 113	Ex-situ storage of seeds, pollen & *in vitro* cultures
Copeland & McDonald	Seed Science & Technology
RL Agrawal	Seed Technology
J Kigel & G Galili	Seed Development & Germination
W Ayad *et al*.	Molecular Genetic Techniques for Plant Genetic resources
EE Benson	Plant Conservation Biotechnology
DE Fosket	Plant Growth & Development
RB Taylorson	Recent Advances in the Development & Germination of Seeds
McDonald & Copeland	Seed Technology Laboratory Manual
Khullar & RC Thapliyal	Forest Seed
L Schmidt	Guide to Handling of Tropical & Sub-tropical Forest Seed

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Fourth Semester

Paper II: Plant Biotechnology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Introduction to cell and tissue culture, tissue culture as a technique to produce novel plants and hybrids Tissue culture media (composition and preparation) Initiation and maintenance of callus and suspension culture; single cell clones Organogenesis; somatic embryogenesis; transfer and establishment of whole plants in soil Shoot tip culture: Rapid clonal propagation and production of virus free plant
Unit-II	Embryo culture and embryo rescue Anther, pollen and ovary culture for production of haploid plants and homozygous lines Protoplast isolation, culture and fusion; selection of hybrid cells and

	regeneration of hybrid plants; symmetric and asymmetric hybrids, cybrids Germplasm conservation: Cryopreservation and slow growth cultures Chloroplast Transformation: Advantages, vectors, success with tobacco and potato
Unit-III	Plant transformation technology: Basis of tumor formation, Mechanism of DNA transfer, Features of Ti and Ri plasmids, role of virulence genes, use of Ti and Ri as vectors, binary vectors, markers, use of reporter genes, 35S and other promoters, use of scaffold attachment regions, multiple gene transfers, particle bombardment, electroporation, microinjection Applications of plant transformation for productivity and performance: herbicide resistance, insect resistance, Bt genes, Non–Bt like protease inhibitors & amylase inhibitors, virus resistance, nucleocapsid gene, disease resistance, PR (Pathogenesis Related) proteins, nematode resistance, abiotic stress, male sterile lines
Unit-IV	Metabolic Engineering and Industrial Products: plant secondary metabolites, control mechanisms and manipulation of phenylpropanoid pathway, shikimate pathway, biodegradable plastics, therapeutic proteins, antibodies, edible vaccines Molecular Markers– RFLP maps, linkage analysis, RAPD markers, STS (Sequence Tagged Strands), microsatellites, SCAR (Sequence characterized amplified regions), SSCP (Single strand conformational polymorphism), AFLP, map based cloning, molecular marker assisted selection

Lab Course:	
1.	Preparation of culture media
2.	To performe meristem/ bud culture, shoot multiplication & rooting phenomenon
3.	To study organogenesis
4.	To perform somatic embryogenesis
5.	To study the process of plantlet acclimatization
6.	To perform embryo culture
7.	To study the process of anther culture development
8.	Study of molecular markers
9.	Extraction of DNA from plant cultures
10.	Estimation and separation of DNA using agarose gel electrophoresis and spectrophotometer

Recommended Books:

MK Razdan	Introduction to Plant Tissue Culture, 2nd Edition, Oxford & IBH Publishing Co. Pvt Ltd, 2010
IK Vasil	Plant Cell and Tissue Culture; Springer Publication, 1994
SS Bhojwani and MK Razdan	Plant Tissue Culture; Elsevier
TJ Fu, G Singh and WR Curtis	Plant Cell and Tissue Culture for the production of Food Ingredients. Kluwer Academic/ Plenum Press, 1999
J Hammond, P McGarvey and V Yusibov	Plant Biotechnology, Springer Verlag, 2000
HS Chawla	Biotechnology in Crop Improvement, International Book Distributing Co., 1998
HS Chawla	Introduction to plant biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd., 2000
BD Singh	Biotechnology- Expending Horizons. 1st Edition, Kalyani Publisher, Ludhiana,

	2004
Roberta H Smith	Plant Tissue Culture: Techniques and Experiments, 2nd Edition: Academic Press, 2000
Kyte L and Kleyn J	Plants from Test Tubes: An Introduction to Micropropagation, 3rd Edition, Timber Press, 1996
M Smith	Plant Propagator's Bible, 1st Edition, Rodale Books, 2007
MR Ahuja	Micropropagation of Woody Plants, Springer, 1993
YPS Bajaj	Trees III, Springer, 1991
YPS Bajaj	Trees IV, Springer, 1996

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Fourth Semester	
Paper III (Special Paper-A) Parasitology	
Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words	
Unit-I	Parasites and parasitism. The Infection process: Modes of Parasite transmission, invasion, migration within host, maintaining station, obtaining nutrients and resisting host attack. Concept of Disease: Inflammation and Repair, Degeneration, Necrosis. Mechanism of Disease transmission with particular reference to vectors. Vector control measures.
Unit-II	General organization and life cycle patterns of Protozoa; Epidemiology, pathogenesis, diagnosis and control of major human diseases, such as- Malaria, Leishmaniasis and Trypanosomiasis.
Unit-III	General organization and life cycle patterns of Trematodes and Cestodes; Epidemiology, pathogenesis, diagnosis and control of major human diseases, such as- Schistosomiasis and Hydatidosis. Arthopod- related ectoparasitic diseases: Ticks, mites and flies.
Unit-IV	General Organization and life cycle patterns of Acanthocephala and Nematoda; Epidemiology, pathogenesis, diagnosis and control of major nematode diseases, such as- Ascariasis, Ancylostomiasis and Filariasis. Biology of plant parasitic nematodes.
Lab Course:	
1.	Identification and comments on permanent mounts of parasitic organisms
2.	Host examination for parasites; preparation of permanent slides and identification
3.	Histology/Histopathology/Histochemistry by routine and differential staining
4.	Biochemistry of parasites and pathophysiology of the hosts
5.	Root knot nematodes: Extraction and isolation (Cobb's sieving and decantation method and Baerman's Funnel technique), preparation of perennial pattern mounts
6.	Detection of blood parasites: Malarial parasite
7.	Macroscopic and microscopic examination of stool samples, concentration methods
Recommended Books:	

KD Chatterjee	Parasitology (Protozoology and Helminthology) in Relation to Clinical Medicine. 9th Ed. KD Chatterjee, 236 pages, 1973
TC Cheng	General Parasitology. Second Ed., Academic Press College Division, University of California, 827 pages, 1986
CKJ Panicker	Textbook of Medical Parasitology. Jaypee Brothers, Medical Publishers, 248 pages, 2007
TV Rajan	Textbook of Medical Parasitology. BI Publications, New Delhi, 2009
D Rollinson, and SI Hay, Ed.	Advances in Parasitology; Volumes 1 to 78, Elsevier, 1963-2012.
JD Smyth and DW Halton	The Physiology of Trematodes. Academic Press, Second Edition, 446 pages, 1983
DJ Wyler, Ed.	Modern Parasite Biology: Cellular, Immunological and Molecular Aspects. WH Freeman and Company, New York, 2003

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Fourth Semester

Paper III (Special Paper-B) Basic Chronobiology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Historical developments in chronobiology. Different types of geophysical and biological cycles with examples of circadian rhythms. Quantification of biological rhythms - Average, amplitude, phase, and period. Brief introduction to time series analysis. Methods of time series analyses: COSINOR, AUTOCORRELATION, FOURIER, MESA, CHI-SQUARE PERIODOGRAM.
Unit-II	Characteristics of circadian rhythm: Free-run, Temperature and nutrition compensation, and Entrainment. Zeitgeber Time (ZT) and Circadian Time (CT). After-effects and Aschoff's rule. Aging and circadian clocks. Photoperiodism.
Unit-III	Synchronization (=Entrainment) and masking. Entrainment by single light pulse, complete and skeleton photoperiods. Zeitgebers for circadian clocks. Key properties of a Zeitgeber. Photic and non-photic zeitgebers. Mechanisms of entrainment. Phase response curves (PRC), phase transition curves, strong and weak PRC.
Unit-IV	Circadian pacemakers in insects with special reference to *Drosophila*. Suprachaismatic nucleus as mammalian circadian clock. Multi-oscillatory organization: master and slave oscillators, morning and evening oscillators, pacemaker and peripheral oscillators. Adaptive significance of circadian rhythms. Social consequence of circadian rhythms.

Lab Course:

1.	Study of locomotor activity rhythm in suitable animal models
2.	Actogram construction of locomotor activity of suitable animal models
3.	Study of phase shift in circadian rhythm

4.	Computation of period (τ), phase angle (Ψ), Mesor (M), amplitude (A) and acrophase/ peak (∅) of circadian, and other low and high frequency rhythms
5.	Circadian changes in volume of nuclei in onion peel (*Allium cepa*) cells (microscopic observation)
6.	Periodogram, amount of activity and spectral analysis of rhythm data

Recommended Books:

MJ Berridge	Biochemical oscillations and cellular rhythms. The molecular bases of periodic and chaotic behaviour
E Bunning	The physiological clock
FH Columbus	Trends in chronobiology
G Cornelissen & F Halberg	Introduction to chronobiology
JC Dunlap, JJ Loros & PJ DeCoursey	Chronobiology: Biological timekeeping
JC Hall	Genetics and molecular biology of rhythms in *Drosophila* and other insects
PJ Lumsden & AJ Millar	Biological rhythms and photoperiodism in plants
JD Palmer	The living clock
AK Pati	Chronobiology: The dimension of time in biology and medicine; PINSA (Biological Sciences), December 2001
AK Pati (Ed.)	Chronobiology
DS Saunders	An introduction to biological rhythms
B Thomas & D Vince-Prue	Photoperiodism in plants
V Kumar (Ed.)	Biological rhythms
MK Chandrashekaran	Time in the Living World
AT Winfree	The Geometry of Biological Time
MC Moore-Ede, FM Sulzman, & CA Fuller	The clocks that time us, Harvard University Press,1982
DS Saunders	Insect clocks, Pergamon, 2002

January 2019 – June 2019

M.Sc. Bioscience

Fourth Semester

Paper IV (Special Paper-A) Immunology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Generation of diversity in BCR and TCR. Light and heavy chain gene recombination. Recombination Signal sequences. Heavy chain constant region genes. Class switching. Membrane and secreted immunoglobulins. Organization and arrangement of T-cell receptor genes.
Unit-II	Synthesis and production of immunoglobulins. Monoclonal antibody. Designer antibody. Regulation of immune response by antigen, antibody, immune complex, MHC and cytokines. Immunity to infections. Immunological tolerance. Nutrition and Immune response.
Unit-III	Principles of Immunodiagnosis. Antigen-antibody interactions. Precipitation reactions. Haemagglutination. Complement fixation test. Direct and Indirect immunofluorescence. Radio labeled and Enzyme linked assays. Immunoblotting.

	Isolation of pure antibodies. Assay for complement. Isolation of lymphocyte population. Effector cell assays. Flow cytometry. Plaque forming cell assay, ELISPOT assay, lymphocyte stimulation test, migration inhibition assays, cytotoxic assay. Immunodiagnosis of parasitic diseases.
Unit-IV	Immunoprophylaxis: Principles of vaccination. Immunization practices. Vaccines against important bacterial, protozoan and parasitic diseases. DNA vaccines; passive prophylactic measures. Viral vaccines and antiviral agents. Parasite vaccines.

Lab Course:	
1.	Preparation of Parasite Antigen and analysis by PAGE
2.	Immunizations and production of antibody
3.	Antigen antibody reaction by Double Diffusion, Counter current and IEP, RID and EIA
4.	Western Blot Analysis
5.	Immunodiagnosis using commercial kits

Recommended Books:	
RA Goldsby, TJ Kindt and BA Osborne	Kuby's Immunology
E Benjamini, R Coico and G Sunshine	Immunology-A short Course
Roitt, Brostoff and Male	Immunology
William Paul	Fundamentals of Immunology
Stewart Snell	Immunology, Immunopathology and Immunity
Elgert	Understanding Immune System

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Fourth Semester

Paper IV (Special Paper-B) Applied Chronobiology

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words

Unit-I	Molecular mechanisms underlying clock functions in organisms: Autoregulatory transcriptional feedback loops; Circadian clock mutant types in *Drosophila* (*per*, *tim*, *dbt*, *dclock*, *cycle*, *vrille*, *pdf*, *lark*, *takeout*), *Neurospora*, cyanobacteria, mouse, and humans. Temporal expression pattern of clock genes, Regulation of expression of clock genes, Expression patterns under constant light and darkness; Autonomous functions of clock genes in peripheral tissues.
Unit-II	Human circadian organization: Methods to study human circadian rhythm; Free-running rhythms in humans, Constant routine protocol, and Forced desynchronization protocol. Circadian pacemaker in humans. Marker rhythms in humans: Core body temperature (CBT), melatonin, and cortisol. Sleep-wake alertness and performance rhythms in humans.

Unit-III	Circadian rhythms and human health: Chronopharmacology; Basics of chronopharmacology – clinical chronopharmacology – circadian dependence of drug pharmacokinetics. Chronotherapy; Application of chronotherapy in treatment of cancer, cardiovascular diseases, allergies, asthma, and circadian rhythm sleep disorders (for example, DSPS and ASPS) & mood disorders (SAD).
Unit-IV	Circadian rhythms in occupational and travel stresses: Shift work; Types of shift system, direction and frequency of shift rotation, Effect on rhythm parameters, Desynchronization of circadian rhythm, Consequences on sleep, Psychosocial problems, Clinical and non-clinical problems. Shift work tolerance/ intolerance. Shift optimization: Nap, Bright light therapy, Melatonin therapy. Jet lag: Consequences of jet lag; direction asymmetry & variable asymmetry; Approaches to jet lag alleviation.
Lab Course:	
1.	Study of circadian rhythms in objective/subjective variables in human subjects.
2.	Chronotyping in human population.
3.	Study of circadian rhythm in the rest-activity of humans by using wrist actigraphy.
4.	Study of circadian rhythm in blood pressure of humans by using Ambulatory Blood Pressure Monitor.
5.	Circadian variations in RBC and WBC in suitable animal models.
6.	Circadian rhythm in cortisol and melatonin by ELISA

Recommended Books:	
JC Dunlap, JJ Loros & PJ DeCoursey	Chronobiology: Biological timekeeping
JC Hall	Genetics and molecular biology of rhythms in *Drosophila* and other insects
WJM Hrushesky	Circadian cancer therapy
BG Katzung	Basic and clinical pharmacology
G Klein and P Becker	Farewell to the internal clock: a contribution in the field of Chronobiology
AK Pati	Chronobiology: The dimension of time in biology and medicine; PINSA (Biological Sciences), December 2001
AK Pati, Ed.	Chronobiology
TT Postolache	Sports Chronobiology: An issue of clinics in sports medicine
D Purves *et al.*	Molecular mechanisms of biological clocks
PH Redfern and B Lemmer	Physiology and pharmacology of biological rhythms
R Refinetti	Circadian Physiology
A Reinberg	Clinical chronopharmacology: Concepts, kinetics, applications
A Sehgal	Molecular biology of circadian rhythms
LE Scheving	Chronobiotechnology and chronobiological engineering
Y Touitou *et al.*	Handbook of medical chronobiology

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR M. SC. MICROBIOLOGY Scheme of Examination and Syllabus					
July 2017 – December 2017					
	Paper No.	Title of Paper	Marks		Credit
			(External)	(Internal)**	
FIRST Semester	I*	Cell Biology	80	20	4
	II	Biomolecules	80	20	4
	III	Microbiology	80	20	4
	IV	Biology of Immune System	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	600		
January 2018 – June 2018					
	Paper No.	Title of Paper	Marks		
			(External)	(Internal)	
SECOND Semester	I	Genetics and Molecular Biology	80	20	4
	II	Bioenergetics & Metabolism	80	20	4
	III	Instrumentation and Molecular Techniques	80	20	4
	IV	Biometry, Computer and Scientometry	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	600		
July 2018 – December 2018					
	Paper No.	Title of Paper	Marks		
			(External)	(Internal)	
THIRD Semester	I	Microbial Physiology	80	20	4
	II	Fermentation Technology	80	20	4
	III	Environmental Microbiology	80	20	4
	IV	Medical Microbiology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	600		
January 2019 – June 2019					
	Paper No.	Title of Paper	(External)	(Internal)	
FOURTH Semester	I	Microbial Biotechnology	80	20	4
	II	Advanced Immunology, diagnostics and prophylaxis	80	20	4
	III	**Special Paper-A:** Food Microbiology **Special Paper-B:** Microbial Ecology	80	20	4
	IV	**Special Paper-A:** Agricultural Microbiology **Special Paper-B:** Industrial Microbiology	80	20	4
	LC-I	Lab Course I (Based on paper I & II)	80	20	2
	LC-II	Lab Course II (Based on paper III & IV)	80	20	2
		Total	600		
	OR				
		Project Work* **			
		Dissertation	240	60	11
		Seminar based on project	160	40	06
		Viva-voce	80	20	03
		Total	600		

		Grand Total	**2400**	

* Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

** Each student will be evaluated continuously throughout the semester. There will be a class test based on each theory paper. The full marks will be 10 for each paper. There will be a poster/oral presentation based on each theory paper. The full marks will be 10 for each presentation. Each student will be required to submit a brief write-up (not more than 10 pages) on his/her poster/oral presentation.

***A student of IV semester will have the choice to opt for project work in lieu of four theory papers and two lab courses provided he/she secures at least **75%** or more marks in aggregate in semester I and II. The project has to be carried out in recognized national laboratories or UGC recognized universities. No student will be allowed to carry out project work in private laboratories/ college/ institutions, excluding the colleges recognized as research centers by the RDC of Pt. Ravishankar Shukla University, Raipur. The valuation of all the projects will be carried out by an external examiner and HoD of UTD or its nominee at the UTD Centre.

Scheme for Lab Course (for each Semester)	**Maximum Mark 100**	
1	Major Exercise based on paper 1	20
2	Minor Exercise based on paper 1	10
3	Major Exercise based on paper 2	20
4	Minor Exercise based on paper 2	10
5	Spotting/ Interpretation****	10
6	*Viva- voce*	10
	Sub Total	80
	Sessional (Internal)	20
	Total	100

****A student will be required to interpret on the displayed item/material

M. Sc. Microbiology

FIRST SEMESTER

(July 2017 – December 2017)

PAPER I: CELL BIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

Molecular organization of membranes- asymmetrical organization of lipids, proteins and carbohydrates. Osmosis, ion channels, membrane pumps and electrical properties of membranes. Active transport by ATP-powered pumps: types, properties and mechanisms.

UNIT II

Transport of proteins into mitochondria, chloroplast and endoplasmic reticulum. Transport of proteins into

and out of nucleus. Transport by vesicle formation: exocytosis, endocytosis and its molecular mechanism.

UNIT III

Cell signaling: Signaling via G-protein linked and enzyme linked cell surface receptors, MAP kinase pathways. Eukaryotic cell division cycle: different phases and molecular events, regulation and control of cell cycle. Apoptosis. Oncogenes and tumor suppressor genes: viral and cellular Oncogenes, retinoblastoma, E2F and p53 proteins.

UNIT IV

Organization of chromosomes: Structure of chromosomes, centromere and telomere. States of chromosomes during cell cycle. Mitotic chromosome. Organization of genes in chromosomes Banding. Pattern of chromosomes. Lampbrush and Polytene chromosomes. Chromatin, nucleosomes, DNA packaging, heterochromatin and euchromatin.

Lab Course:

1. Study of chromosome behaviour during Mitosis and meiosis (Onion / Garlic root tips, Onion buds, human lymphocytes, rat or bird testis /grass hopper testis or any other materials).
2. Calculation of mitotic index in growing Onion / Garlic root tips
3. Squash preparation: Polytene chromosome (in chironomus / Drosophila or other insect salivary gland) and Barr body (in buccal epithelial cells).
4. Demonstration of secretory granules in the salivary gland cells of insect.
5. Demonstration of mitochondria by vital staining.
6. Study of permanent slides.
7. Estimation of DNA
8. Estimation of RNA
9. Sub-cellular fractionation and marker enzymes
10. Identification of biomolecules in different tissues by histochemical techniques
11. Preparation of mitotic plate by carmine squashing method and phase identification.
12. Demonstration of the nuclear matrix networks in onion cells.
13. Study of the effect of chemical agents on chromosomes plant cells.
14. Isolation of protoplast, measurement of cell density plating efficiency.
15. Preparation of Karyotype of metaphase plate.
16. Preparation of Meiotic plate and determination of phases.
17. Computation of Chaisma frequency and Terminalization of phases.
18. Micrometry and Camera Lucida drawings.

Books Recommended:

H Lodish *et al.*	Molecular Cell Biology
B Alberts *et al*.	Essential Cell Biology
H Lodish *et al.*	Molecular Cell Biology
B Alberts *et al*.	Molecular Biology of the Cell
G Karp	Cell and Molecular Biology: Concepts and Experiments

M. Sc. Microbiology

FIRST SEMESTER

(July 2017 – December 2017)

PAPER II: BIOMOLECULES

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

Carbohydrates: structure, classification, properties and function; derivatives of monosaccharides, homo and hetero-polysaccharides, Peptidoglycan, glycoproteins and liposaccharide. Lipids: Classification, structure and function. Nucleic Acid: Structure of purine and pyrimidine bases, nucleoside and nucleotide; DNA- structure and conformation; RNA - Structure, types and functions.

UNIT II

Amino acids: structure, classification and functions; Synthesis of peptides and protein sequencing. Proteins- properties, covalent structure; secondary, tertiary and quaternary structure of proteins, Ramchandran plot

UNIT III

Enzyme classification, coenzymes, active site of enzyme, factors contributing to the catalytic efficiency of enzyme; enzyme kinetics- Michaelis-Menten equation, determination of Km, enzyme inhibition, allosteric enzymes, isoenzymes, ribozyme, multienzyme complexes

UNIT IV

Chemistry of porphyrins: Importance of porphyrins in biology; structure of hemoglobin and chlorophyll porphyrins, structure and biological role of animal hormones, structure and biological role of water soluble and fat soluble vitamins.

Lab Course:

1. Specific tests for sugars, amino acids and lipids
2. Formal titration of amino acids
3. Estimation of proteins using ninhydrin and biuret method
4. Estimation of sugar by anthrone and Folin-Wu method.
5. Saponification value and iodine number of fat.
6. Estimation of ascorbic acid.
7. Achromic point determination using salivary amylase
8. Effect of ions on salivary amylase activity.
9. Enzyme assay and kinetics (ex. Amylase, Protease)

Books Recommended:

- Principles of Biochemistry by Nelson, Cox and Lehninger
- Biochemistry by G. Zubay
- Biochemistry by Stryer
- Biochemistry by Garrett and Grosham
- Text book of Biochemistry by West, Tood, Mason & Bruglen
- Biochemistry by White, Handler & Smith
- Biochemistry by D. Voet and J C Voet

M. Sc. Microbiology

FIRST SEMESTER

(July 2017 – December 2017)

PAPER III: MICROBIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

General characteristics of fungi, classification of fungi, life cycle of selected fungal genus (*Aspergillus*, *Pencillium, Fusarium* and *Mucor*). Economic importance of fungi. Fungi and bioremediation, parasitism,

mutualism and symbiosis with plants and animals. Heterothallism, sex hormone in fungi, Mycorrhiza, VAM. Algae: Distribution, classification, reproduction, ecology and importance.

UNIT II

Morphology and ultra structure of bacteria, morphological types, cell wall of archaebacteria, gram negative, gram positive eubacteria, eukaryotes.
Cell membranes – structure, composition and properties. Structure and function of flagella, cilia, pili, gas vesicles. Cyanobacteria, protozoa, mycoplasma and Rickettsia.
Gene transfer mechanisms, transformation, transduction, conjugation and transfection. Plasmids F: factors colicins and col factors, plasmids as a vector for gene cloning.

UNIT III

Nutritional types (autotrophs, heterotrophs, phototrophs, chemotrophs), growth curves, measurement of growth, factors affecting growth, generation time, growth kinetics. Batch and continuous culture, asynchronous and synchronous culture.
Basis of microbial classification, classification and salient feature of bacteria according to Bergey's manual of determinative bacteriology, cyanobacteria, prochlorons and cyanelles.

UNIT IV

Viruses: Structure and classification of viruses; morphology and ultra structure; capsids and their arrangements, types of envelopes, viral genome, their types and structure, virus related agents (viroids, prions). General feature of virus reproductions, early events in virus multiplication, virus restriction and modification of host, virus mRNA. General overview of bacterial viruses, RNA and DNA bacteriophages (MS2, ϕX174, M13, T3, T4). Lysogeny and Lytic phase. General account of plant and animal viruses (TMV, HIV and other oncogenic virus, Hepatitis virus).

Lab Course:

1. Glassware preparation and sterilization techniques- wet heat- dry heat- filter types- laminar flow chamber types- CDC- safety levels.
2. Preparation of liquid & solid media, plating, pouring, inoculation and incubation for growth of microorganism
3. Methods of obtaining pure culture of microorganisms (a) streak plate (b) Pour plate, and (c) spread plate methods
4. Microscopic examination of the microorganisms, identification and staining methods
5. Micrometry and camera lucida drawings
6. Study of bacterial growth by turbiditimetry/ spectrophotometry
7. Biomass measurement for fungi
8. Isolation and enumeration of microorganisms from soil by serial dilution agar plating method.
9. Enumeration of viruses by plaque assay technique.
10. Motility of bacteria by hanging drop technique.

Books Recommended:

- Microbiology: L.M. Prescott, J.P. Harley and D.A. Klein, McGraw Hill Publication.
- General Microbiology: Stanier, Ingrahamana, Wheelis and Painter, Mac Millian Press
- Principles of Microbiology: R.M. Atlas
- Microbiology: Peleczar, Chan & Krieg
- General Virology: Luria, Darnell, Baltimore and Campell
- Introduction to Mycology: CJ Alexopoulos and CW Mims, Wiley Eastern Ltd, New Delhi

M. Sc. Microbiology

FIRST SEMESTER

(July 2017 – December 2017)

PAPER IV: BIOLOGY OF IMMUNE SYSTEM

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

Innate immune mechanism and characteristics of adaptive immune response. Cells of immune system: Hematopoisis and differentiation, mononuclear cells and granulocytes. Antigen presenting cells. Primary and Secondary lymphoid organs and tissues. Ontogeny and phylogeny of lymphocytes. Lymphocyte traffic.

UNIT II

Antigen receptor molecules: B-cell receptor complex, Immunoglobulin- structure, types and function. T-cell receptor complex. Major Histocompatibility Complex- types, structural organization, function and distribution. Transplantation and Rejection. Complements in immune function.

UNIT III

Antigens: nature of antigens, factor affecting immunogenicity, Haptens and super antigens. Antigenic determinants. Recognition of antigens by T and B cell. Antigen processing. Role of MHC molecules in antigen presentation and co-stimulatory signals. Antigen and antibody interaction.

UNIT IV

Cell mediated immune response. Cytokines and interleukins- structure and function. Immunity to infections. Hypersensitive reactions and their types. Immunodeficiency disorders. Autoimmunity

Lab Course:

1. Identification of cells of immune system
2. Separation of mononuclear cells by Ficoll-Hypaque
3. Identification of Lymphocytes and their subsets
4. Lymphoid organs and their microscopic organization
5. Isolation and purification of Antigens
6. Purification of IgG from serum
7. Estimation of Levels of gamma globulins and A/G ratio in blood
8. Antigen antibody interaction

Books Recommended:

- Kuby's Immunology: R.A. Goldsby, Thomas J Kindt and Barbara A. Osborne
- Immunology- A short Course: E. Benjamini, R. Coico and G. Sunshine
- Immunology: Roitt, Brostoff and Male
- Fundamentals of Immunology: William Paul
- Immunology: Tizard
- Immunology: Abbas *et al*

M. Sc. Microbiology

SECOND SEMESTER

(January 2018 – June 2018)

PAPER I: GENETICS AND MOLECULAR BIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT – I:

Mendelian principles: Dominance, segregation, independent assortment.
Concept of gene : Allele, multiple alleles, pseudoallele, complementation tests
Extensions of Mendelian principles: Codominance, incomplete dominance, gene interactions.
Gene mapping methods: Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants
Mutation: Types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis.

UNIT – II:

DNA replication, repair and recombination: Mechanism of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extrachromosomal replicons, DNA damage and repair mechanisms; Repair of Base-excision, Nucleotide excisions, Mismatch and Double Strand. Guardian of DNA; p_{53} and p_{21}. Homologous and site-specific recombination.

UNIT – III:

RNA synthesis and processing: transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, elongation, and termination, RNA processing, capping, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport.

UNIT – IV:

Protein synthesis and processing: Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of tRNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post Translational modification of proteins. Protein targeting.

Lab Course:

1. Isolation, purification and estimation of RNA
2. Isolation, purification and estimation of DNA
3. Determination of Tm of nucleic acid
4. Fraction of poly (A) RNA
5. Restriction Mapping
6. Restriction Digestion
7. Ligation
8. DNA molecular size determination

Books Recommended:

H Lodish *et al.*: Molecular Cell Biology
B Alberts *et al.* : Essential Cell Biology
B Alberts *et al.*: Molecular Biology of the Cell
G Karp : Cell and Molecular Biology: Concepts and experiments
JD Watson *et al.* : Molecular Biology of the Gene
J Wilson and T Hunt : Molecular Biology of the Cell: The Problems

B Lewin : Genes VIII
JE Krebs *et al*. (Ed.) : Genes X (Lewin's), Jones and Bartlett Publishers, Sudbury, Massachusetts, (2011)

M. Sc. Microbiology

SECOND SEMESTER

(January 2018 – June 2018)

PAPER II: BIOENERGETICS AND METABOLISM

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

First and second laws of thermodynamics. Concept of free energy, High – energy compounds, ATP cycle, structural basis of free energy change during hydrolysis of ATP. Other high – energy biological compounds

UNIT II

Basic concepts of intermediary metabolism. Carbohydrate metabolism: Glycolysis, Kreb's cycle, glycogenolysis, glycogenesis, pentose phosphate pathway, gluconeo- genesis, and glyoxylate pathway, inborn errors of carbohydrate metabolism. Regulation of carbohydrate metabolism.

UNIT III

Electron transport and oxidation phosphorylation: electron carriers, Complexes I to IV, substrate level phosphorylation, mechanism of oxidative phosphorylation, Shuttle system for entry of electron, Biosynthesis and degradation of Lipids, Regulation of lipid metabolism.

UNIT IV

Nitrogen Assimilation. Biosynthesis of amino acids. Degradation of amino acids. Regulation of amino acid metabolism. Biosynthesis and degradation of purine and pyrimidine nucleotides.

Lab Course:

1. Protein estimation by Lowry, Bradford and Spectrophotometric method
2. Estimation blood cholesterol
3. Estimation of sugar by Nelson- Somogyi and Benedict's reagent
4. Isolation and estimation of lipid from seeds and egg.
5. Estimation of inorganic and total phosphorus by Fiske-Subba Rao method
6. Assay of phosphatases in blood and seeds
7. Urease estimation in plant tissues

Books Recommended:

- Principles of Biochemistry by Nelson, Cox and Lehninger
- Biochemistry by G. Zubay
- Biochemistry by Stryer
- Biochemistry by Garrett and Grosham
- Text book of Biochemistry by West, Tood, Mason & Bbruglen
- Biochemistry by White, Handler & Smith
- Biochemistry by with clinical application
- Biochemistry by D Voet and J C Voet
- Enzymes by Dixon and Webb
- Fundamentals of Enzymology by Price and Steven

- Practical Biochemistry by Plummer
- Enzyme Biotechnology by G. Tripathi
- Enzyme Reaction Mechanism by Walsh.
- Enzyme Catalysis and Regulation by Hammes

M. Sc. Microbiology

SECOND SEMESTER

(January 2018 – June 2018)

PAPER III: INSTRUMENTATION AND MOLECULAR TECHNIQUES

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

Centrifugation: Principle, techniques. Preparative, analytical and ultracentrifuges, sedimentation coefficient and factors affecting sedimentation coefficient. Application of centrifugation.
Photometry: Basic principles of colorimetry, UV- visible spectrophotometry & IR- spectrophotometry. Spectroflurometry
Atomic absorption spectroscopy: Principle, Instrumentation and applications
Electrophoresis: Paper electrophoresis, Starch gel, agarose, PAGE-type, 2D-E.

UNIT II

Microscopic techniques: light microscopy, microscopy of living cells, scanning and transmission microscopes, different fixation and staining techniques for EM, freeze-etch and freeze-fracture methods for EM, image processing methods in microscopy
Microtomy: types, principle and applications
Lyophilization: Principle, instrumentation and applications

UNIT III

Chromatography: Paper and Thin Layer Chromatography. Gel filtration, Ion exchange chromatography and Affinity chromatography. Gas-liquid chromatography and HPLC.
Histochemical and immunotechniques: Antibody generation, detection of molecules using ELISA, RIA, western blot, immunoprecipitation, flow cytometry and immunofluorescence microscopy, detection of molecules in living cells, *In situ* localization; FISH and GISH.
Radioactivity: GM counter, liquid Scintillation counter, solid Scintillation counter, gamma counters

UNIT IV

Molecular techniques: Isolation and purification of RNA, DNA (genomic and plasmid) and proteins, separation methods; RNA, DNA and proteins; 1-D and 2-D, isoelectric focusing gels; Molecular cloning of DNA and RNA fragments in bacterial systems; Expression of recombinant DNA; DNA sequencing. Gene expression; mRNA, cDNA using PCR and qRT-PCR. Micro array based techniques.
Molecular Markers for diversity analysis: RFLP, RAPD, AFLP, VNTR, SSR, ISSR, SNP, DArT.

Lab Course:

- Verification of Beers Law
- Determination of absorption maxima
- Quantitative determination, Enzyme kinetics
- Amino acid and carbohydrate separation by paper and TLC
- Ion exchange and gel filtration chromatography

- SDS Polyacralamide Gel Electrophoresis
- DNA electrophoresis
- Isoenzymes
- Separation of sub-cellular organelles by differential centrifugation.
- Isolation of DNA and Agarose gel Electrophoresis
- Amplification of RAPD and AFLP markers.
- Isolation of RNA and Electrophoresis of RNA on denaturing gels.
- cDNA synthesis and cloning
- Isolation of Protein and SDS-PAGE
- In vitro DNA ligation, transformation of E. coli
- Characterization of transformants: DNA gel electrophoresis, Restriction map analysis

Books Recommended:

K Wilson and John Walker	Practical Biochemistry: Principles & Techniques
RF Boyer	Biochemistry Laboratory: Modern Theory & Techniques
S Carson, H Miller and D Scott	Molecular Biology Techniques: A Classroom Laboratory Manual
TC Ford and J. M. Graham	An Introduction to Centrifugation
R Baserga and D Malamud	Autoradiography: techniques and application
T Chard	An Introduction to Radioimmunoassay and Related Techniques , Volume 6
MD Bruch	NMR Spectroscopy Techniques
BA Wallace and R William	Modern Techniques for Circular Dichroism and Synchrotron Radiation, Volume 1
J Sambrook, EF Rritsch and I Maniatis	Molecular cloning: A Laboratory Manual
PD Dabre	Introduction to Practical Molecular Biology
JD Watson, NH Hopkins, JW Roberts, JA Steitz and AM Weiner	Molecular Biology of Gene (4th Edition)
J Darnell, H Lodish and D Baltimore	Molecular Cell Biology (2nd Edition)
B Alberts, D Bray, J Lewis, M Raff, K Roberts and JD Watson	Molecular Biology of the Cell (2nd Edition)
Benjamin Lewin	Gene VII
JM Walker and R Rapley	Molecular Biology and Biotechnology
SB Primrose	Molecular Biotechnology

M. Sc. Microbiology

SECOND SEMESTER

(January 2018 – June 2018)

PAPER IV: BIOMETRY, COMPUTER AND SCIENTOMETRY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT I

Introduction to biostatistics. Types of biological data: data on different scales. Frequency distributions. Cumulative frequency distributions. Random sampling. Parameters and statistics. Measures of central tendency and dispersion: Mean, Median, Mode, Range, Variance and Standard deviation. Coefficient of variation. The effects of coding data. Data transformations: Log-transformation, Square-root transformation and Arcsine transformation. Distribution: normal and binomial. Probability: Basic laws of probability, addition law, multiplication law. Probability and frequency.

UNIT II

Statistical errors in hypothesis testing. Testing goodness of fit: Chi-square goodness of fit. Heterogeneity Chi-square. The 2 x 2 contingency table. One sample hypothesis. Two- sample hypothesis. Testing for difference between two means (*t*-test). Testing for difference between two variances (*F*-test). The paired sample *t*-test. Multiple-sample hypothesis (ANOVA): Single factor and two factors ANOVA. Multiple comparisons: Duncan's multiple-range tests. Simple linear regression. Regression *vs.* Correlation. Regression equation. Interpretations of regression functions. Simple linear correlation. The correlation coefficient.

UNIT III

Introduction to MS-Office software: Word processing; Creating new document, Editing documents, Adding graphics to documents, Word tables. Management of Workbook & Worksheets; Applications, Features, Using formulas and functions, Features for Statistical data analysis, Generating charts/ graph. Presentation software; Working in PowerPoint, Creating new presentation, Working with slides.

UNIT IV

Introduction to Internet and Applications. Basics of internet, e-mailing, Search engine – Google and Yahoo; Pubmed, Scopus, Web of Science, Google Scholar, Indian Citation Index, Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF). Introduction to Plagiarism and Cyber laws.

Lab Course:

1. Exercises for data distribution
2. Exercises for computation of measures of central tendency
3. Exercises for computation of measures of variability
4. Computation of correlation coefficient, r, and regression constants
5. Data analysis by ANOVA and multiple-range tests
6. Hypothesis testing by *t*-test, F-test, and Chi-square test
7. Graphical presentation of data using a suitable package
8. Statistical analysis of a data using a suitable package
9. Preparation of document using a suitable package
10. Preparation of slides using a suitable package

Books Recommended:

Campbell RC	Statistics for biologists
Zar JH	Biostatistical Analysis
Wardlaw AC	Practical Statistics for Experimental Biologists
Snedecor GW & Cochran WG	Statistical Methods
Sokal RR & Rohlf FJ	Introduction to Biostatistics
Sumner M	Computers: Concepts & Uses
White R	How Computers Work
Cassel P *et al.*	Inside Microsoft Office Professional
Coleman P and Dyson P	Mastering Internets
Gralla P	How the Internet Works
Shelly GB, Vermaat ME, Cashman TJ	Microsoft 2007: Introductory Concepts and Techniques
Habraken J	Microsoft Office 2003 All in One Microsoft Office 2010 In Depth
Gilmore B	Plagiarism: Why it happens, How to prevent it?

Buranen L and Roy AM	Perspectives on Plagiarism and Intellectual Property in a Post-Modern World
Kumar Anupa P	Cyber Law
Sood V	Cyber Law Simplified

M. Sc. Microbiology

THIRD SEMESTER

(July 2018 – December 2018)

PAPER I: MICROBIAL PHYSIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT - I

Aerobic metabolism of methane and methanol: Methane and methanol users, Oxidation of methane, Formaldehyde and formic acid, assimilation of C-1 compounds.

Anaerobic respiration: Sulphur compounds and nitrate as electron acceptors, electron transport in SO_4 and NO_3 reducers. Anaerobic metabolism of glucose, Fermentation process, modes of glucose fermentation (lactic acid, ethanol, acetic acid, butyric acid, acetone and butanol, formate and propionate). Transport of nutrients across membrane.

UNIT - II

Biosynthesis of peptidoglycan, teichoic acid, lipopolysaccharide, biosynthesis and degradation of essential amino acids, microbial degradation of aromatic, polycyclic and halogenated aromatic compounds. Microbial metabolism of hydrogen.

UNIT - III

Microbial photosynthesis: Historical account, structure of photosynthetic pigments i.e., chlorophylls and bacterio-chlorophylls, carotenoids, phycobilins, primary photochemistry and electron transport (light harvesting, charge-separation and electron transport in anoxygenic photosynthesis), ATP synthesis. Eubacterial photosynthetic microbes, development of photosynthetic apparatus, carbon metabolism. Cynobacterial organization of photosynthetic apparatus. Halobacterial photo-phosphorylation.

UNIT - IV

Nitrogen metabolism: Biological nitrogen fixation, Mechanism of nitrogen fixation, ammonia assimilation, properties and regulation of glutamine synthetase, glutamate synthetase, glutamate dehydrogenase. Biochemistry of methanogenesis; bio-transformation of steroid and non-steroid compounds.

Lab Course:

1. Qualitative of assay of different extra-cellular enzymes
2. Quantitative assay of alkaline and acid phosphatases from microorganisms.
3. Determination of Km value of beta- fructofuranosidase from yeast
4. Antibiotic sensitivity test
5. Measurement of CM-cellulase by viscometric and reducing sugar method.
6. Experiment on production of enzymes and optimizing parameters for enzyme production in shake flask culture using *Aspergillus niger*, *Saccharomyces cerevisiae* for production of amylase, invertase respectively.
7. Experiment on production of citric acid and optimizing parameters for citric acid production in shake flask culture using *Aspergillus niger*.

Books Recommended:

1. Brown TA (1999) Genome. John Wiley & Sons (Asia) PTE. LTD.
2. Goeddel DV (1990) Methods in Enzymology, vol 185, Gene Expression Technology. Academic Press, San Diago.
3. Kaufman PB, Wu W, Kim D and Cseke LJ (1995) Molecular and Cellular Methods in Biology and Medicine. C. Press, Florida.
4. EL-Mansi E.M.T. and Bryce C.F.A. Fermentation Microbiology and Biotechnology. Taylor & Francis.

M. Sc. Microbiology

THIRD SEMESTER

(July 2018 – December 2018)

PAPER-II: FERMENTATION TECHNOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT - I

General Considerations: Fermentation biotechnology – An historical perspective, metabolic pathways and metabolic control mechanisms, primary and secondary metabolites, genetic regulation and catabolite repression, Fermentation kinetics, kinetics of substrate utilization, product formation.

UNIT - II

Types of bio-reactors, their design and instrumentation: Fed batch bio-reactors, continuous stirred tank bio-reactors, plug flow tubular reactors; multiphase reactors, packed bed, bubble column , fluidized bed and trickle bed bio-reactors, animal and plant cell bio-reactors, non-ideal mixing, batch and continuous sterilization, immobilized bio-catalysts, sensors for medium and gases.

UNIT - III

Industrial production of microbial biomass (SCP, and mushrooms), alcohol, organic acid (citric acid, gluconic acid, itaconic acid), amino acids (L- glutamic acid, L- lysine and L-aspartic acid), enzymes and antibiotics (Penicillin), microbial polysaccharides and polyesters.

UNIT - IV

Scale up, instrumentation control, Bio-sensors in bio-process monitoring and control. Downstream processing: Removal of microbial cells and solid matter, precipitation, filtration, centrifugation, disintegration of cells, extraction methods, concentration methods, purification and resolution of mixtures, drying and crystallization.

Lab Course:

1. Experiment on production of alcohol and optimizing parameters for alcohol production in shake flask culture using *Saccharomyces cerevisiae.*
2. Experiment on production and optimizing parameters for SCP in shake flask culture.
3. Experiment on production of enzymes and optimizing parameters for enzyme production in solid-state fermentation using wheat bran and other agricultural solid waste.
4. Protein purification methods: affinity chromatography, ion exchange and gel filtration.
5. Recovery of products from solid state cultures -Recovery of intracellular products: Cell disruption procedures by sonication,
6. Carbohydrate catabolism by microorganisms (oxidation and fermentation of glucose)
7. Fermentation of carbohydrates.

Books Recommended:

- EL-Mansi E.M.T. and Bryce C.F.A. Fermentation Microbiology and Biotechnology. Taylor & Francis.
- Alberghina Lilia. Protein Engineering in Industrial Biotechnology. Harwood Academic Publishers.
- Jogdand S. N. Gene Biotechnology. Himalaya Publishing House.
- Olguin J. Eugenia, Sanchez Gloria & Hernandez Elizabeth. Environmental Biotechnology and Cleaner Bioprocesses. Taylor & Francis.
- Prescott & Dunn's. Industrial Microbiology. 4th ed, CBS publishers & Distributors.
- Bullock John and Kristiansen Bjorn. Basic Biotechnology. Academic Press.
- A.H. Patel. Industrial Microbiology

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THIRD SEMESTER

(July 2018 – December 2018)

PAPER III: ENVIRONMENTAL MICROBIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT - I

Distribution and ecology of microorganism: air spora- concepts and components, indoor and outdoor air spora, aeroallergens, Ecosystem- concept, components, food chains, food webs, and trophic levels. Energy transfer efficiencies between trophic levels. Environmental factors influencing the growth and survival of microorganism. Physical factors- temperature, light, osmotic pressure and hydrostatic pressure. Chemical factors- pH, O_2 and CO_2. Microorganisms of extreme environments: psychrophiles, mesophiles, thermophiles, acidophiles, alkalophiles, halophiles and specific habitats.

UNIT - II

Microbiology of water: aquatic ecosystems-types- fresh water (ponds, lakes, streams) - marine (estuaries, mangroves, deep sea, hydrothermal vent, saltpans, coral reefs). Zonation of water ecosystems– upwelling-eutrophication- food chain. Drinking and potable water, ecology of polluted water, microbiological treatment processes. Waste water disposal and reclamation. Brief account of major water borne diseases and their control measures.

UNIT – III

Soil microbiology: Micro flora of various soil types (bacteria and nematodes): rhizosphere- phyllosphere – brief account of microbial interactions symbiosis, mutualism, commensalism, competition, amensalism, synergism, parasitism, predation, biological N_2 fixing organisms, symbiotic fungi, Phosphate solubilizing organisms, Ecology of litter decomposition; extracellular enzymes (hydrolases), heterotrophic potential decomposers and utilizers relationship.

UNIT -IV

Biodegradation of cellulose lignins and hydrocarbons (superbug). Composting, treatment of solid wastes. Bioaccumulation of metals and detoxification-biopesticides; Biodeterioration: classification of biodeterioration of materials (monuments, paints, rubbers, plastics, fuels, lubricants, metals, stone, cosmetics, toiletries). Gmo and their impact.

Lab Course:

1. BOD & COD estimation in water sample
2. Study of microbial contaminants from water and wastewater.
3. Study of air borne microorganisms using various methods.

4. Assay of anti-fungal and antibacterial properties of agro-chemicals and fungicides.
5. Assessment of quality of oils using saponification value, iodine number, and free fatty acid composition.
6. Study of thermophilic microorganisms.
7. Bacteriological examination of water by multiple-tube fermentation test.
8. Determination of coliforms to determine water purity using membrane filter method.
9. Lipase production test.
10. Isolation of Rhizobium from root nodule.
11. Measurement of spore size using micrometry
12. Isolation of microorganisms from rhizosphere and phylloplane.

Books Recommended:

- Michael, T. Madican; John. M. Mmmartinko and Jack Parker. Brock. Biology of Microorganisms.
- Microbiology of Extreme Environments edited by Clive Edwards
- Olguin J. Eugenia, Sanchez Gloria & Hernandez Elizabeth. Environmental Biotechnology and Cleaner Bioprocesses. Taylor & Francis.
- Michel. R. Introduction to Environmental Microbiology. 1999

M. Sc. Microbiology

THIRD SEMESTER

(July 2018 – December 2018)

PAPER-IV: MEDICAL MICROBIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT - I

Normal microbial flora of human body, role of resident flora, host microbe interactions. Classification of medically important microorganisms. Infection and infectious process - routes of transmission of microbes in the body. Source of infection for man; vehicles or reservoirs of infection. Mode of spread of infection. Pathogenesis: Infectivity and virulence.

UNIT –II

Classification of pathogenic bacteria. *Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium, Bacillus, Clostridium*, Non sporing Anaerobes, Organism belonging to Enterobacteriacea, vibrios, Non fermenting gram negative bacilli *Yersinia; haemophilus; Bordetelia; Brucella*; *Mycobacteria, Spirochaetes, Actinomycetes; Rikettsiae, Chlamdiae.*

UNIT- III

General properties of Viruses; Viruses Host Interactions, Pox viruses, Herpes viruses, Adeno viruses; Picarno viruses; Orthomyxo viruses; Paramyxo viruses; Arboviruses, Rhabdo viruses, Hepatitis viruses; Oncogenic viruses; Human Immuno deficiency viruses.

UNIT- IV

Mycology - Human mycotic infections caused by Dermatophytes, Histoplasma,
Cryptococcus, Candida, opportunistic mycoses. Mycotoxins. Description and classification of pathogenic fungi and their laboratory diagnosis.
Parasitology - Medical importance of Entamoeba, Giardia, Plasmodium, Taenia,
Ascaris, Wucherhiria. Laboratory techniques in parasitology.

Lab Course:

1. Identification of micro flora of mouth, skin and wounds
2. Identification of enteric pathogens by TSIA medium
3. Identification of dermatophytic fungi
4. Identification of important human parasites
5. IMVIC test/other specific tests

Books Recommended:

- Prescott & Dunn's. Microbiology. CBS Publishers & Distributors.
- Anantnarayan R and Panikar CKJ: Text book of Microbiology, Orient Blackswan Pvt. Ltd.
- Broude AI: Medical Microbiology and Infectious Diseases, WB Saunders Co.
- Chapel and Haeney: Essentials of Clinical Immunology, Blackwell Scientific Publications
- Forbes BA, Sahm DF and Weissfeld AS: Bailey & Scott's Diagnostic Microbiology, Mosby

M. Sc. Microbiology

FOURTH SEMESTER

(January 2019 – June 2019)

PAPER-I: MICROBIAL BIOTECHNOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT - I

Techniques of Microbial technology: Scope of genetic engineering, restriction and modification enzymes, ligation and transformation, agarose and polyacrylamide gel electrophoresis, Southern, northern, western blotting, polymerase chain reaction, DNA sequencing, cloning vectors- plasmids, bacteriophages, phagemids, cosmids. YAC, BAC.

UNIT - II

Basics of Genomics, RNA interference, Cloning strategies, cDNA synthesis and cloning, mRNA enrichment, DNA primers, linkers, adaptors and their synthesis, library construction and screening; Cloning interacting genes, two and three hybrid systems, cloning differentially expressed genes, nucleic acid microarrays; Site directed mutagenesis and protein engineering, immobilization techniques.

UNIT - III

Microbial screening, selection and strain improvement, bacterial enterotoxins, peptide hormone, interferons. Biofertilizers, biopesticides, enzyme electrodes, enzyme in pulp and paper industry, Bioremediation.

UNIT - IV

Role of national and international organization in biotechnology, cooperative efforts, government programs for biotechnology development and applications, patenting biotechnological process and products in different fields, regulation for bio-hazardous products.

Lab Course:

1. Bacterial culture and antibiotic selection media. Preparation of competent cells.
2. Isolation of plasmid DNA.
3. Isolation of Lambda phage DNA.
4. Estimation of nucleic acids.

5. Agarose gel electrophoresis and restriction mapping of DNA.
6. Construction of restriction map of plasmid DNA.
7. Cloning in plasmid/phagemid vectors.
8. Preparation of single stranded DNA template.
9. Gene expression in *E. coli* and analysis of gene product
10. PCR

Books Recommended:

1. Bruce A White (1997) PCR Cloning Protocols. Hanuman Press Totowa, New Jersey.
2. Bruce Birren, Eric D Green, Sue Klapholz, Trichard M Myers, Horald Riethman, & Jane Roskenus (1999) Genome Analysis: A Lab Manual vol.1,vol.2,vol.3, Cold Spring Harbor Lab. Press.
3. Daniel L Hartl, Elizabeth & Jones W (1998) Genetics: Principles and Analysis. Jones & Bartlett Publishers.
4. Davies JA & Rez WS (1992) Milestones in Biotechnology Classic papers on Genetic Engineering. Butterworth-Heinemann, Boston.
5. Glick Molecular Biotechnology.
6. Glover DM and Hames BD (1995) DNA Cloning: A practical approach, IRL Press, Oxford.
7. Kaufman PB, Wu W, Kim D and Cseke LJ (1995) Molecular and Cellular Methods in Biology and Medicine. C. Press, Florida.
8. Kingsman SM & Kingsman AJ (1998) Genetic Engineering. An Introduction to gene analysis and exploitation in eukaryotes. Blackwell Scientific Publishers, Oxford.
9. Mickloss DA & Freyer GA (1990) DNA Science. A First Course in Recombinant Technology. Cold Spring Laboratory Press, New York
10. Primrose SB (1994) Molecular Biotechnology (2nd Edition). Blackwell Scientific Publishers, Oxford.
11. Sambrook, Fritsch EF and Maniatis (2000). Molecular Cloning: A Laboratory Manual. Cold Spring Laboratory Press, New York
12. Sambrook & Russell (2001) Molecular Cloning: A lab Manual (3rd Edition). Cold Spring Harbor Lab Press.
13. Strickberger MW (2000) Genetics (3rd Edition), Prentice Hall of India Pvt. Ltd.
14. Walker MR & Rapley R (1997) Route Maps in Gene Technology. Blackwell Scientific Publishers, Oxford.
15. Watson JD, Gilman N, Witkowski, Mark, Zoller . Recombinant DNA , Scientific American Books.
16. John Bulock and Bjorn Kristiansen. Basic Biotechnology Academic Press

M. Sc. Microbiology

FOURTH SEMESTER

(January 2019 – June 2019)

PAPER-II: ADVANCED IMMUNOLOGY, DIAGNOSTICS AND PROPHYLAXIS

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT - I

Generation of diversity in BCR and TCR. Light and heavy chain gene recombination. Recombination Signal sequences. Heavy chain constant region genes. Class switching. Membrane and secreted immunoglobulins. Organization and arrangement of T-cell receptor genes.

UNIT - II

Synthesis and production of immunoglobulins. Monoclonal antibody. Designer antibody.

Regulation of immune response by antigen, antibody, immune complex, MHC and cytokines. Autoimmunity and autoimmune disorders. Immunological tolerance. Immunity to microbial and parasitic infections. Immunodeficiency diseases.

UNIT - III

Principles of antimicrobial action and resistance of antibiotics. Antimicrobial susceptibility testing Anti fungal and anti cancer compounds. Nosocomial infection, common type of hospital infections and their diagnosis and control.

Immunoprophylaxis: Principles of Vaccination. Immunization practices. Vaccines against important bacterial and parasitic diseases. DNA vaccines; passive prophylactic measures. Viral vaccines and antiviral agents

UNIT - IV

Diagnosis of microbial diseases - Collection, transport and preliminary processing of Clinical pathogens. Clinical, microbiological, immunological and molecular diagnosis of microbial diseases. Modern methods of microbial diagnosis.

Principles of immunodiagnostics. Antigen-antibody based immunodiagnosis and the techniques involved – Enzyme, Radio and Fluorescence Immuno assays, Immunoblotting, Flow cytometry. Effector cell assays, Cytotoxic assays. Isolation of pure antibody. Application of monoclonal antibodies in immunodiagnostics.

Lab Course:

- Preparation of Parasite/ microbe Antigen and analysis by PAGE
- Immunizations and Production of Antibody
- Antigen antibody reaction by Double Diffusion, Counter Current and Immunoelectrophoresis, RID and ELISA
- Western Blot Analysis
- Immunodiagnosis using commercial kits
- VDRL and RPR Test.
- Widal test

Books Recommended:

- Prescott and Dunn's. Microbiology. CBS Publishers & Distributors
- Anantnarayan R and Panikar CKJ: Text book of Microbiology, Orient Blackswan Pvt. Ltd.
- Broude AI: Medical Microbiology and Infectious Diseases, WB Saunders Co.
- Chapel and Haeney: Essentials of Clinical Immunology, Blackwell Scientific Publications
- Kuby's Immunology: R.A. Goldsby, Thomas J Kindt and Barbara A. Osborne
- Immunology- A short Course: E. Benjamini, R. Coico and G. Sunshine
- Immunology: Roitt, Brostoff and Male
- Forbes BA, Sahm DF and Weissfeld AS: Bailey & Scott's Diagnostic Microbiology, Mosby

M. Sc. Microbiology

FOURTH SEMESTER

(January 2019 – June 2019)

Special Paper - PAPER-III (A): FOOD MICROBIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question

has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT- I

Microbial flora of fresh food, grains, fruits, vegetables, milk, meat, eggs and fish. Microbiological examination of foods for their infestation by bacteria, fungi & viruses. Chemical preservatives and food additives. Factors influencing microbial growth in food- Extrinsic and intrinsic factors. Food as a substrate for micro-organism.

UNIT- II

Canning, processing for heat treatment - D, Z and F values and working out treatment parameters; microbial spoilage of canned foods, detection of spoilage and characterization. Mold and mycotoxin contamination of food, aflatoxins, ochratoxins, trichothenes, zearalenone, ergot mycotoxins. Role of microorganisms in beverages– beer, wine and vinegar fermentation.

UNIT- III

The roles of microorganisms in the food industry, positive and negative perspectives. Food-borne infections and intoxications: Bacteria and nonbacterial-with examples of infective and toxic types- *Brucella, Bacillus, Clostridium, Escherichia, Salmonella, Shigella, Staphylococcus, Vibrio, Yersinia*; nematodes, protozoa, algae, fungi and viruses. Food borne outbreak- laboratory testing procedures; Sources and transmission of bacteria in foods: human, animal, and environmental reservoirs; cross-contamination.

UNIT- IV

Prevention Measures-Food sanitation in manufacture and retail trade; Plant sanitation- Employee's Health standards-waste treatment-disposal- quality control. Government Agency and Food Safety Policy: Government Branches (FDA, CDC, USDA and how they work to control food safety), HACCP, Risk Assessment.

Lab Course:

1. Isolation and identification of microorganisms from fermented food, fruits, cereal grains and oil seeds.
2. Determination of quality of milk sample by methylene blue reductase test.

Books Recommended:

- M.R. Adams and M.O. Moss: Food Microbiology, Royal Society, Cambridge
- William, C. Frazier and Dennis C. Westhoff: Food Microbiology, Tata McGraw Hill
- Banwart GJ: Food Microbiology CBS Publishers & Distributors, New Delhi.
- Hobbs BC and Roberts D: Food Poisoning and Food Hygiene, Edward Arnold, London

M. Sc. Microbiology

FOURTH SEMESTER

(January 2019 – June 2019)

Special Paper - PAPER-III (B): MICROBIAL ECOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT- I

History, significance and developments in the field of microbial ecology
Contributions of Beijerinck, Winogradsky, Kluyver, Van Niel, Martin Alexander, Selman A. Waksman, Environmental chemistry, Atmosphereic pollutants, Types of wastes, The Atmosphere, Organization of life, Ecosystems.

UNIT- II

Microorganisms & their natural habitats

A. Terrestrial Environment: Soil characteristics, Soil profile, Soil formation, Soil as a natural habitat of microbes, Soil microflora

B. Aquatic Environment: Stratification & Microflora of Freshwater & Marine habitats.

Atmosphere: Stratification of the Atmosphere, Aeromicroflora, Dispersal of Microbes

D. Animal Environment: Microbes in/on human body (Microbiomics) & animal (ruminants) body.

E. Extreme Habitats: Extremophiles: Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity, & low nutrient levels.

UNIT- III

Succession of microbial communities in the decomposition of plant organic matter

Biological Interactions

A. Microbe–Microbe Interactions: Mutualism, Synergism, Commensalism, Competition, Amensalism, Parasitism, Predation, Biocontrol agents

B. Microbe–Plant Interactions: Roots, Aerial Plant surfaces, Biological Nitrogen fixation (symbiotic/nonsymbiotic - biofertilizers)

C. Microbe–Animal Interactions: Role of Microbes in Ruminants, Nematophagus fungi, Luminescent bacteria as symbiont

UNIT- IV

Biogeochemical cycles an introduction

Carbon cycle: Microbial degradation of polysaccharide (cellulose, hemicellulose, lignin, chitin)

Nitrogen cycle: Ammonification, nitrification, denitrification & nitrate reduction. Nitrate pollution.

Phosphorous cycle: Phosphate immobilization and phosphate solubilization

Sulphur Cycle: Microbes involved in sulphur cycle

Lab Course:

Analysis of soil - pH, moisture content, water holding capacity, percolation, capillary action

Isolation of microbes (bacteria & fungi) from soil (28ºC & 45ºC) Isolation of microbes (bacteria & fungi) from rhizosphere and rhizoplane.

Detection (qualitative) of the presence of enzymes (dehydrogenase, amylase, urease) in soil.

Isolation of Rhizobium from root nodules of legumes

Isolation of Azotobacter/Azospirillum from soil

Isolation of phosphate solubilizers from soil

Books Recommended:

- Atlas RM and Bartha R. (2000). Microbial Ecology: Fundamentals & Applications. 4th edition. Benjamin/Cummings Science Publishing, USA.
- Atlas RM. (1989). Microbiology: Fundamentals and Applications. 2nd Edition, MacMillan Publishing Company, New York.
- Madigan MT, Martinko JM and Parker J. (2009). Brock Biology of Microorganisms. 12th edition. Pearson/ Benjamin Cummings.
- Campbell RE. (1983). Microbial Ecology. Blackwell Scientific Publication, Oxford, England.
- Coyne MS. (2001). Soil Microbiology: An Exploratory Approach. Delmar Thomson Learning.
- Lynch JM & Hobbie JE. (1988). Microorganisms in Action: Concepts & Application in Microbial Ecology. Blackwell Scientific Publication, U.K.
- Maier RM, Pepper IL and Gerba CP. (2009). Environmental Microbiology. 2nd edition, Academic Press.
- Martin A. (1977). An Introduction to Soil Microbiology. 2nd edition. John Wiley & Sons Inc. New York & London.
- Stolp H. (1988). Microbial Ecology: Organisms Habitats Activities. Cambridge University Press, Cambridge, England.
- Subba Rao NS. (1999). Soil Microbiology. 4th edition. Oxford & IBH Publishing Co. New Delhi.

M. Sc. Microbiology

FOURTH SEMESTER

(January 2019 – June 2019)

Special Paper - PAPER-IV (A): AGRICULTURE MICROBIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT- I

Structure and characteristic features of the following biofertilizer organisms: Bacteria: Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium and Frankia. Cyanobacteria: Anabaena, Nostoc, Fungi: Glomus, Gigaspora, Sclerocystis, Amanita, Laccaria.

Biofertilization processes - Decomposition of organic matter and soil fertility and vermicomposting. Mechanism of phosphate solubilization and phosphate mobilization.

UNIT- II

Biofertilizers – biological nitrogen fixation – nitrogenase enzyme – symbiotic nitrogen fixation- (Rhizobium, Frankia) – non symbiotic nitrogen fixation (Azotobacter - Azospirillum), VAM- ecto- endo-ectendo mycorrhizae and their importance in agriculture.

UNIT- III

Major biogeochemical cycles and the organisms: carbon – nitrogen - phosphorous and sulphur. Biopesticides: toxin from *Bacillus thuringiensis, Psuedomonas syringae*. Biological control - use of Baculovirus, protozoa and fungi.

UNIT- IV

Microbial diseases of crop plants: symptoms, causal organisms and control. Fungal diseases (Late blight of potato, Tikka disease of groundnut, red rot of sugarcane). Bacterial diseases (bacterial blight of rice, citrus canker, Tundu disease of wheat) and

Viral diseases (Tobacco mosaic, leaf curl of papaya, yellow vein mosaic of bhindi).

Lab Course:

1. Isolation and enumeration of bacteria from different soil type.
2. Isolation and enumeration of fungi from different soil type
3. Preparation of Winogradsky Column to study the various soil microflora.
4. Isolation of Rhizobium from root nodules.
5. Isolation of Azotobacter from soil.
6. Isolation of Cyanobacteria from paddy field.
7. Measurement of pH of soil sample.

Books Recommended:

- Bagyraj and Rangasamy: Agricultural Microbiology

M. Sc. Microbiology

FOURTH SEMESTER

(January 2019 – June 2018)

Special Paper - PAPER-IV (B): INDUSTRIAL MICROBIOLOGY

Max. Mark 80

Each theory paper will have questions divided into four sections, A, B, C & D. Section A will have 20 MCQ of 1 mark each covering whole syllabus. Section B will have 8 very short answer questions, two from each unit, of 2 marks each

to be answered in two to three lines. Section C will have 8 questions, two from each unit, of 3 marks each. The question has to be answered in about 75 words. Section D will have 4 questions, one from each unit with internal choice, of 5 marks each. The question has to be answered in about 150 words.

UNIT- I

Introduction to industrial microbiology
Brief history and developments in industrial microbiology
Fermentation processes
Solid-state and liquid-state (stationary and submerged) fermentations; Batch, fedbatch and continuous fermentations

UNIT- II

Bioreactors/fermenters
Components of a typical bioreactor, types of bioreactors-Laboratory, pilot- scale and production fermenters; constantly stirred tank fermenter, tower fermenter, fixed bed and fluidized bed bioreactors and air-lift fermenter.

UNIT- III

Control parameters, industrially important strains, media ingredients
Measurement and control of fermentation parameters
Control and monitoring of different parameters in a bioreactor; pH, temperature, dissolved oxygen, foaming and aeration
Isolation of industrially important microbial strains
Primary and secondary screening, strain development, preservation and maintenance of industrial strains
Media and ingredients for industrial fermentations
Crude and synthetic media; molasses, corn-steep liquor, sulphite waste liquor, whey and yeast extract.

UNIT- IV

Down-stream Processing
Filtration, centrifugation, cell disruption, solvent extraction, precipitation and ultrafiltration, lyophilization, spray drying

Lab Course:

1. Microbial fermentations for the production and estimation (qualitative and quantitative) of:
(a) Enzyme: Amylase
(b) Amino acid: Glutamic acid
(c) Organic acid: Citric acid
(d) Alcohol: Ethanol
(e) Antibiotic: Penicillin
2. A visit to any educational institute/ industry to see an industrial fermenter, and other downstream processing operations.

Books Recommended:

- Casida LE. (1991). Industrial Microbiology. 1st edition. Wiley Eastern Limited.
- Crueger W and Crueger A. (2000). Biotechnology: A textbook of Industrial Microbiology. 2nd edition. Panima Publishing Co. New Delhi.
- Patel AH. (1996). Industrial Microbiology. 1st edition, Macmillan India Limited.
- Stanbury PF, Whitaker A and Hall SJ. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.

Syllabus for Ph.D. Course Work in Biochemistry (2017-18)

One Semester

There are Two papers; each with 100 maximum marks. The candidate must obtain 50% or more marks in each paper independently to qualify in the course work. The answer papers will be assessed independently by two examiners.

Paper-I: Research Methodology, Advanced Tools & Techniques, Quantitative Data Analyses and Computer Fundamentals

		Lectures	Marks
A	**Research Methodology:**	**20**	**25**
	Introduction and Scope Research problem: Identification, Selection, Formulation of research objectives	2L	
	Research design: Components, Importance, Types	3L	
	Types of data, Data collection - Methods and Tools	2L	
	Research ethics, Institutional ethics committee	2L	
	Plagiarism - Pitfall	2L	
	Patents and IPR: Patent laws, process of patenting a research finding, Copy right, Cyber laws	3L	
	Bibliometrics: Measurement of academic output- Citation Index: Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF); Style of Bibliography, Project, research paper and review writing	6L	
B	**Advanced Tools & Techniques**	**20**	**25**
	Microscopic techniques –Electron microscopy and Confocal microscopy	5L	
	Principle, protocol and application of Chromatography – GLC & HPLC, Electrophoresis and its application	5L	
	PCR, Real time PCR, DNA microarray, DNA sequencing	5L	
	Protein microarray and Protein sequencing	5L	
C	**Quantitative Data Analyses**	**20**	**25**
	Hypothesis testing	2L	
	Normal and Binomial distributions and their property	3L	
	Tests of significance: Student *t*-test, *F*-test, *Chi-square* test	5L	
	Correlation and Regression	4L	
	ANOVA – One-way and Two-way, Multiple-range test	6L	
D	**Computer Fundamentals**	**20**	**25**
	Introduction to MS-Office software: MS-Word (Track change)	2L	
	MS-Excel	2L	
	MS-Power Point	2L	
	MS-Access	2L	
	Literature search technique using SCOPUS, Google Scholar, PUBMED, Web of Science	6L	
	Features for Statistical data analysis using computers and software, Microsoft Excel Data Analysis ToolPak, SPSS	6L	

Paper-II: Review of Literature & Seminar				**100**
A	Review of Literature – Writing review of literature in the area of the proposed Ph.D. work			50.0
B	Seminar – Based on the review of literature			50.0

Recommended Books:

AI Vogel	Analytical chemistry
BK Sharma	Instrumental methods of analysis
Buranen L and Roy AM	Perspectives on Plagiarism and Intellectual Property in a Post-Modern World
Campbell RC	Statistics for biologists
Cassel P *et al.*	Inside Microsoft Office Professional
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Kumar Anupa P	Cyber Law
R Panneerselvam	Research Methodology
Shelly GB, Vermaat ME, Cashman TJ	Microsoft® 2007: Introductory Concepts and Techniques
Snedecor GW & Cochran WG	Statistical Methods
Sokal RR & Rohlf FJ	Introduction to Biostatistics
Sood V	Cyber Law Simplified
Sumner M	Computers: Concepts & Uses
Upadhyaya and Upadhyaya	Instrumentation
Wardlaw AC	Practical Statistics for Experimental Biologists
White R	How Computers Work
Zar JH	Biostatistical Analysis

Syllabus for Ph.D. Course Work in Bioscience (2017-18)

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	Normal and Binomial distributions and their property	3L	
	Tests of significance: Student *t*-test, *F*-test, *Chi-square* test	5L	
	Correlation and Regression	4L	
	ANOVA – One-way and Two-way, Multiple-range test	6L	
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	Introduction to MS-Office software: MS-Word (Track change)	2L	
	MS-Excel	2L	
	MS-Power Point	2L	
	MS-Access	2L	
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Syllabus for Ph.D. Course Work in Microbiology (2017-18)

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Syllabus for Ph.D. Course Work in Zoology (2017-18)

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Upadhyaya and Upadhyaya — Instrumentation
Wardlaw AC — Practical Statistics for Experimental Biologists
White R — How Computers Work
Zar JH — Biostatistical Analysis

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M.A. LINGUISTICS : (SEMESTER SYSTEM)

izFke lseLVj FIRST SEMESTER

iz'u i= Paper	iz'u&i= dk uke Title of the Paper	lS)kafrd Theory	vkarfjd Internal	iw.kkad M.M.
1.	Hkk"kkfoKku dk ifjp; ,oa Hkkjrh; Hkk"kkfparru ijaijk Introduction to Linguistics and Indian Linguistic Tradition	80	20	100
2.	Hkk"kk dh iz;kstuh;rk Functionality of Language	80	20	100
3.	/ofudh ,oa /ofuefo&I Phonetics and Phonemics- I	80	20	100
4.	:ifoKku-I Morphology-I	80	20	100

f}rh; lseLVj SECOND SEMESTER

iz'u i= Paper	iz'u&i= dk uke Title of the Paper	lS)kafrd Theory	vkarfjd Internal	iw.kkad M.M.
5.	vFkZfoKku Semantics	80	20	100
6.	'kSyhfoKku Stylistics	80	20	100
7.	/ofudh ,oa /ofuefo&II Phonetics and Phonemics-II	80	20	100
8.	:ifoKku-II Morphology-II	80	20	100

r`rh; lseLVj THIRD SEMESTER

iz'u i= Paper	iz'u&i= dk uke Title of the Paper	lS)kafrd Theory	vkarfjd Internal	iw.kkad M.M.
9.	okD;foKku Syntax	80	20	100
10.	Hkk"kk ,oa lekt Language and Society	80	20	100
11.	eukHkk"kkfoKku ,oa f}rh; Hkk"kkf'k{k.k Psycholinguistics and Second Language Teaching	80	20	100
12.	{ks=&iz.kkyh Field-Method	80	20	100

prqFkZ lseLVj FOURTH SEMESTER

iz'u i= Paper	iz'u&i= dk uke Title of the Paper	lS)kafrd Theory	vkarfjd Internal	iw.kkad M.M.
13.	vuqokn Translation	80	20	100
14.	fodYi (A) laizs"k.kijd fganh Communicative Hindi fodYi (B) Communicative English	80	20	100
15.	NÙkhlx<h Chhattisgarhi	80	20	100
16.	izkfDr&fo'ys"k.k Discourse- Analysis	80	20	100

lseLVj&A i'ui=&A

SEMESTER - I PAPER - I

Hkk"kkfoKku dk ifjp; ,o Hkkjrh; Hkk"kkfpru ijijk

INTRODUCTION TO LINGUISTICS AND INDIAN LINGUISTIC TRADITION

bdkbl&1 Hkk"kk& ifjHkk"kk ,o fo'k"krk,j] Hkk"kk d vo;o& /ofu] : i] 'kCn] inca/k] miokD; ,okD;] vFkA

UNIT-III Language- Definition and Characteristics, Constituents of Language- Sound, Morph, Word, Phrase, Clause, Sentence, Meaning.

bdkbl&2- ekuo&Hkk"kk ,o ekuo rj Hkk"kk] ekf[kd ,o fyf[kr Hkk"kk] Hkk"kk vkj ckyh] ckyh d Hkk"kk cuu d dkj.k] Hkk"kkbl ifjorlu d dkj.k ,o fn'kk,A

UNIT-II Human Language and Non- human Language, Oral and Written Language, Language and Dialect , Factors causing a dialect to be a language, Factors causing Language Change and Directions of Change.

bdkbl&3- Hkk"kkfoKku& ifjHkk"kk] iÑfr] Hkk"kk&v/;;u dh fofHkUu in/kfr;k&o.kukRed] rqyukRed] ,frgkfld] 0;frjdhA

UNIT-III Linguistics- Definition, Nature, Various Methods of Linguistic Study- Descriptive, Comparative, Historical, Contrastive .

bdkbl&4- Hkk"kkfoKku dh 'kk[kk,j&/ofufoKku] /ofuifØ;k] : ifoKku] okD;foKku] vFkfoKku] lekt Hkk"kkfoKku] Hkk"kkHkxkky] 'kyhfoKku] vuqoknfuKku] eukHkk"kkfoKku] Hkk"kkf'k{k.kA vU; foKkuk l Hkk"kkfoKku dk lca/kA

UNIT-IV Branches of Linguistics- Phonetics, Phonology, Morphology, Syntax, Semantics, Sociolinguistics, Linguistic Geography, Stylistics, Translatology, Psycho-linguistics, Language Teaching. Relation of Linguistics with other Sciences.

bdkbl&5- Hkkjrh; Hkk"kk&fpru&ijijk& on] fu?kVqA ;kLd] ikf.kfu] dkR;k;u] irtfy] d;V] ukx'k] HkV~Vkftnhf{kr] gepnz] vkfn dk ;kxnkuA

UNIT-V Indian Linguistic Tradition-Vedas, Nighantu. Contributions of Yask, Panini, Katyayan, Patanjali, Kaiyat, Nagesh, Bhattojidikshit, Hemchamdra, etc.

fu/kkfjr iqLrd Books Prescribed :

1- Hkk"kkfoKku ,o Hkk"kk'kkL= & dfiyukFk nfoonh
2- Hkk"kkfoKku & Hkkyk ukFk frokjh
3- Hkk"kkfoKku & jktey ckjk ¼lDlsuk½
4- Hkk"kkfoKku & ln/kkfrd fpru & johUnzukFk JhokLro
5- Hkkjrh; Hkk"kkoKkfud fpru & fon ;kfuokl feJ
6- ln/kkfrd Hkk"kkfoKku & Y;l
7. Theoretical Linguistics - John Lyons
8. Introduction to General Linguistics- Robins
9. Linguistics - David Crystal
10. The Study of Language - George Yule

lseLVj&A i'ui=&AA

SEMESTER - I PAPER - II

Hkk"kk dh i;kstuh;rk

FUNCTIONALITY OF LANGUAGE

bdkbZ&1- Hkk"kk dk i;kstu

I Hkk"kk&i;kstu dk vk'k;

II. i;kstueyd Hkk"kk dk Lo:i,0;kfIr,,oa egRo

III. Hkk"kk dk fofo/k :i&dk;ksZ;h,tulapkj,lkfgR;,fof/k,vkfnA

UNIT-I Functions of Language

I Meaning of Functions of Language.

II. Nature, Scope and Importance of Functional Language.

III. Different Forms of Language- Official, Media, Literature, Law, etc.

bdkbZ&2- Hkk"kk vkj dEI;wVj

1- dEI;wVj % ifjp; ,oa mi;ksx

2- bVjusV&ifjp;

3- oSclkbV

4- fgUnh@vaxzsth lk¶Vos;j dk iSdst

UNIT-II Language and Computer

1. Computer - Introduction and Use

2. Internet - Introduction.

3. Website

4. Hindi/ English Software and Packages

bdkbZ&3- tulapkj&dh Hkk"kk

i=dkfjrk

1- i=dkfjrk % Lo:i ,oa izdkj

2- lekpkj&y[ku

3- lk{kRdkj,i=dkj&okRrkZ

4- foKkiu

5- vkdk'kok.kh,njn'kZu dh Hkk"kk dh iÑfr]

UNIT-III Language and Media

Journalism- Nature and Types, News Writing, Editing as an Art Interview, Press-Conference, Advertisement, Language of Radio and Television

bdkbZ&4- ikfjHkkf"kd 'kCnkoyh

1- Lo:i ,oa egRo

2- lkfjHkkf"kd 'kCnkoyh&fuekZ.k dh fln/kkUr

3- Kku&foKku dh fofHkUu {ks=ksa dh ikfjHkkf"kd 'kCnkoyh ¼dksy fu/kkfjr 'kCn½

UNIT-IV Technical Terminology

Nature and Importance, Principles of Formation of Technical Terms, Technical Terms of Various Disciplines of Science and Humanities, (Prescribed Terms only)

bdkbZ&5- lwf{kfIr;k¡ ,oa inuke
1- izÑfr egRo ,oa lhek,¡
2- lwf{kfIr dk fl)kUr
3- fofHkUu fo"k;ksa esa iz;qfDr lwf{kfIr;k¡
4- egRoiw.kZ in&uke

UNIT-V Abbreviations and Designations
Nature, Importance and Limitation
Principles of Abbreviations
Abbreviations Used in Different Disciplines
Important Designations

fu/kkZfjr iqLrdsa
1- iz;kstuewyd fgUnh & ckysUnq 'ks[kj frokjh
2- iz;kstuewyd fgUnh & naxy >kYVs
3- iz;kstuewyd fgUnh & lai;knd nhf{kr ,oa vU;
4- tulapkj ek/;eksa esa fgUnh & pUnzdqekj
5- njn'kZu fgUnh dk iz;kstuewyd fofo/k iz;ksx & Ñ".kdqekj jŸkw
6- dEI;wVj dh Hkkf"kd vuqiz;ksx & fot; eYgks=k
7- fgUnh dEl;fVax & f=Hkqou ukFk 'kqDy
8- iz;kstuewyd fgUnh & iz- fpŸkjatudj ,oa lq/khj 'kekZ
9- dk;kZy;h fgUnh & iz- dS'kjh yky oekZ
10. A Communicative Grammar of English & Leech

leLVj&A i='ui=&AAA

SEMESTER - 1 PAPER - III

/ofudh ,oa /ofueh &A

PHONETICS AND PHONEMICS - I

bdkbZ&1- /ofudh ¼/ofufoKku½& izÑfr ,oa O;kfIr] Hkk"kkfoKku dh vU; 'kk[kkvksa ls lEc/k] /ofudh dh 'kk[kk,¡& mPpkj.k, lEcgu, ,oa Jo.kA
/ofudh ,oa /ofueh esa vrjA

UNIT-I Phonetics- Nature and Scope, Relation with Other Branches of Linguistics, Branches of Phonetics- Articulatory, Acoustic and Auditory.
Differences between Phonetics and Phonology.

bdkbZ&2- okd~ vo;oksa dk ifjp; rFkk /ofu mPpkj.k esa mudh Hkwfedk

UNIT-I Introduction to Organs of Speech and Their Role in production of Sounds.

bdkbZ&3- okX/ofu;ksa dk oxhZdj.k&Loj ,oa O;atu,Lojksa ,oa O;atuksa dh lkekU; fo'ks"krk,¡,Loj ,oa O;atu esa lekurk,¡ ,oa vlekurk,¡

UNIT-III Classification of Speech Sounds- Vowels and Consonants, General Characteristics of Vowels and Consonants, Similarities and Differences between Vowels and Consonants.

bdkbZ&4 Lojksa dk oxhZdj.k&tHkh dh ÅapkbZ, tHkh dk Hkkx,gksBksa dh fLFkfr,dkey rkyq dh fLFkfr,ekSf[kd dh fLFkfr,nh?kZrk dh vk/kkj ijA

UNIT-IV Classification of Vowels- On the Basis of Tongue Height, Parts of Tongue, Position of Soft Palate, Position of Muscles, Length.

bdkbZ&5- O;atu dk oxhZdj.k&LFkku ,oa iz;Ru,ik.kRo,rFkk ?kks"kRo dh vk/kkj ij A

UNIT-V Classification of Consonants- On the Basis of Places and Manners of Articulation, Aspiration and Voicing.

fu/kkfjr iqLrdsa &

Books Prescribed :

1- fganh èofudh v©j èofueh % jes'k pæ egj"=k

2- èofufoKku % xkykd fcgkjh èky

3- LoufoKku % prqosZnh lgk;

4- fganh Òk'kk dh èofu lajpuk % Ò"ykukFk frokjh

5. A Practical Introduction to Phonetics : Catford.

6. A Text Book of English Phonetics for India students : T. Balasubramanian

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SEMESTER - I PAPER - IV

:ifoKku&I

MORPHOLOGY - I

bdkbZ&1- :ifoKku&izd`fr ,oa {ks=,'kk[kk,a 'kCn lk/ku rFkk :i&lk/kuA

UNIT-I Morphology- Nature and Scope, Branches, Derivational and Inflectional.

bdkbZ&2- :i,l :i,,oa :fie & ifjHkk"kk,a ,oa vUrjA

UNIT-I Morphs, Allomorphs and Morphane- Definition and Differences.

bdkbZ&3- :fifed fo'ys"k.k dh fl}kUr ,oa iz;ksxA

UNIT-III Principles and Practices of Morphemic Analysis

bdkbZ&4- :iox ,oa 'kCn oxZA

UNIT-IV Form- Classes and Word- Classes

bdkbZ&5- lKk,loZuke,fo'ks"k.k,,oa fd;k&'kCnksa dk :i&lk/ku A

UNIT-V Inflection of Nouns, Pronouns, Adjectives, and Verbs

fu/kkfjr iqLrdsa

Books Prescribed

1- Hkk"kkfoKku dh :ijs[kk % mn; ukjk;.k frokjh

2- fganh dk :ixkfed v/;;u % egkohj ljuker

3- fganh Hkk"kk dh :i lajpuk % Hkkykukfk frokjh

4- Grammar : F - Palmer

5- Introduction to Linguistics Structure : A Hill

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SEMESTER – II PAPER - V

vFkZfoKku

SEMANTICS

bdkbZ&1- vFkZfoKku dk {ks=,vFkZfoKku vkSj Hkk"kkfoKku dh vU; 'kk[kk,¡A

UNIT-I Scope of Semantics , Semantics and Other Branches of Linguistics.

bdkbZ&2- vFkZ&izdkj&lekukFkZdrk,foyksekFkZdrk,vusdkFkZdrk, leukerk Hkkf"kd vFkZ ,oa lanHkZxr vFkZ esa varj, vfHk/kk,y{k.kk,O;atukA

UNIT-II Meaning – Types: Synonymy, Antonymy, Polysemy, Homonymy, Diffrence between Linguistic Meaning and Contextual Meaning, Abhidha (Literal), Lakshana (Idiomatic), Vyanjana (Suggestive).

bdkbZ&3- Hkkjrh; ,oa ik'pkR; vFkZ&fparu&ijaijk,vFkZ dk fu/kkZj.k,vFkZ&fu/kkZj.k esa lanHkZ dh HkwfedkA

UNIT-III Indian and Western Semantic Tradition, Determination of Meaning, Role of Context in Determination of Meaning

bdkbZ&4- vFkZifjorZu ds dkj.k&,sfrgkfld,jktuhfrd, lkfgfR;d, lkekftd,/kkfeZd,HkkSxkfydA vFkZifjorZu dh fn'kk,¡&foLrkj, ladkp,vkns'kA

UNIT-IV Causes of Semantic Change- Historical, Political, Literary, Social, Religious, Geographical. Directions of Semantic Change- Extension, Contraction, Suppletion,

bdkbZ&5- okD;foKku ,oa vFkZfoKku,izfDr, lUnHkZ ,oa fdz;k dk vkFkhZ vfHky{k.kA

UNIT-IV Syntax and Semantics, Discourse, Semantic Features of Nouns and Verbs.

fu/kkZfjr iqLrdsa

Books Prescribed

1- lan/kkfrd Hkk"kk foKku % Y;ksal
2- fganh Hkk"kk dh vFkZ&lajpuk % HkksykukFk frokjh
3. Semantics : Palmer
4. Semantics : (Vol 1-2) Lyons
5. Semantics : A Coursebook : Hurford & Heasley

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SEMESTER - II PAPER - VI

'kSyhfoKku

STYLISTICS

bdkbZ&1- 'kSyh&izd`fr ,oa {ks=,Hkk"kk ,oa 'kSyh, lanHkZ Hksn ls 'kSyh&Hksn
'kSyh&izdkj&Hkkf"kd ,o lkfgfR;d,vkSipkfjd ,oa vukSipkfjd,HkO; ,oa xzkE;A

UNIT-I Style- Nature and Scope, Language and Style, Differences in Style According to Differences in Context, Style –Types- Linguistic and Literary, Formal and Informal, Grand and Rustic

bdkbZ&2- 'kSyhfoKku&izd`fr,'kSyhfoKku ,oa vU; foKkuksa esa lEcU/k] O;kdj.k ,oa 'kSyhfoKkuA

UNIT-II Stylistics – Nature, Relation between Stylistics and Other Disciplines, Grammar and Stylistics.

bdkbZ&3- 'kSyhoKkfud v/;;u dk izfreku&p;u] fopyu] lekarjrkA

UNIT-III Norms of Stylistic Study- Selection, Deviation, Parallelism.

bdkbZ&4- Hkkjrh; ¼lLÑr½ 'kSyhoKkfud fparru&jl] /ofu] vyadkj] jhfr] odkfDr] vkfpR;A

UNIT-IV Stylistics in Indian (Sanskrit) Poetics- Rasa, Dhwani, Alankar, Riti, Vakrokti, Auchitya.

bdkbZ&5- ik'pkR; 'kSyhoKkfud fparru&jkeu ;kdkscu] ,-fgy] QFk] gfyM] ,fUDoLVA

UNIT-V Western Stylistics- Roman Jakobson, A. Hill, Firth, Halliday, Enkvist,

Books Prescribed

1- ikjfHkd 'kSyhfoKku % fpRrjatu dj
2- 'kSyhfoKku % lanj'k dsekj
3- 'kSyhfoKku % Hkkykukfk frokjh
4- jhfrfoKku % fon;kfuokl feJ
5- Linguo-Stylistics - Olga Akhmanova
6- Linguistic Stylistic - Enkvist
7- Functional Stylistics - V. Prakasham
8- Directions in Applied Linguistics - David Crystal

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SEMESTER - II PAPER - VII

/ofudh ,oa /ofueh &II

PHONLTICS AND PHONEMICS - II

bdkbZ&1- v{kj&ifjHkk"kk ,oa fo'k"krk,a] fgnh@vaxzsth dh vk{kfjd lanjpukA

UNIT-I Syllable- Definition & Characteristics, Syllabic Structure of Hindi/English.

bdkbZ&2- nh?kZrk] cyk?kkr] lanj] rku] vuqrku ¼fgnh@vaxzsth dk mnkgj.k½

UNIT-II Length, Stress, Pitch, Tone, Intonation. (Examples of Hindi/English)

bdkbZ&3- Lofud fyI;aru dh /kkj.kk] lkekU; y{ku ,oa Lofud fyI;aru esa varj] vkbZ-ih-,-

UNIT-III Concept of Phonetic Transcription-, Difference between Usual Writing and Phonetic Transcription, IPA .

bdkbZ&4- Lofufed fo'ys"k.k&fl}kar ,oa i'u

UNIT-IV Phonemic Analysis- Principles and Problems .

bdkbZ&5- fgnh@vaxzsth /ofu&ifjorZ;k

UNIT-V Hindi/English Phonology.

Books Prescribed

1- fgnh /ofudh vkj /ofueh % jes'k pan egjk=k
2- /ofufoKku % xkykd fcgkjh ny
3- LoufoKku % prHkkt lgk;
4- fgnh Hkk"kk dh /ofu lanjpuk % Hkkykukfk frokjh
5- A Practical Introduction to Phonetics : Catford
6- A Textbook of English Phonetics for Indian Students : T. Balasubramanian

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SEMESTER - II PAPER - VIII

:i foKku & II

MORPHOLOGY - II

bdkbZ&1- 'kCnksa dh lksikuc)fed lajpuk

UNIT-I Heirachical Structure of Words.

bdkbZ&2- lfU/k&izdkj &Loj lfU?k] O;atu lfU/k] folxZ lfU?kA

UNIT-II Sandhi- Types- Swara sandhi, Vyanjana Sandhi, Visarga Sandhi,

bdkbZ&3- lekl&izdkj&cgqczhfg] deZ/kkj;] f}xq] }U}] rRiq#"k] vO;;hHkko] u´ lekl A

UNIT-III Compound-Types Karmadharaya, Dwigu, dwandwa, Tatpurusha, Avyayibhava, Najn Samasa.

bdkbZ&4- fgUnh@vaxzsth 'kCn dh lEink&rRle] rn~Hko] vkxr] ns'kt A

UNIT-IV Vocabulary of Hindi/English-Tatsama, Tadbhava, Agata, Deshaja,

bdkbZ&5- fgUnh@vaxzsth dh inc/k&lajpuk&laKkinc/k] fo'ks"k.kinc/k] fdz;k&inc/k] fdz;kfo'ks"k.k inc/k

UNIT-V Phrase-Structure of Hindi/English-Noun Phrase, Adjective Phrase, Verb Phrase, Adverb Phrase.

Books Prescribed

1- Hkk"kkfoKku dh :ijs[kk % mn; ukjk;.k frokjh
2- fgUnh dk :ixzkfed v/;;u % egkohj lju tSu
3- fgUnh Hkk"kk dh :i lajpuk % Hkksyk ukFk frokjh
4- Grammar : F. Palmer
5 Introduction to Linguistic Structure : A. Hill

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SEMESTOR - III PAPER - IX

OkkD;foKku

SYNTAX

bdkbZ&1- Hkk"kkfoKku dh vU; 'kk[kkvksa ls okD;foKku dk lac/k &/ofufoKku] :ifoKku] vFkZfoKku] ;FkkFkZfoKkuA

UNIT-I Relation between Syntax and Other Branches of Linguistics- Phonetics, Morphology, Semantics, Pragmatics .

bdkbZ&2- okD;&lac/kh Hkkjrh; ,oa ik'pkR; er] okD; ds vo;o] okD;&izdkj % jpuk dh n`f"V ls] vFkZ dh n`f"V lsA

UNIT-II Indian and Western Views on Syntax . Components of Sentence, Sentence- Types – Structurally and Semantically.

bdkbZ&3- fudVLFk vo;o&fo'ys"k.k] varZdsfUnzd vkSj cfgdsZfUnzd] inc/k&lajpuk&O;kdj.kA

UNIT-III IC- Analysis, Endocentric and Exocentric Construction , PS- Grammar.

bdkbZ&4- :ikarj.kijd&iztud O;kdj.k] vkarfjd ,oa cká; lajpuk] :ikarj.k&fu;e

UNIT-IV Transformational – Generative Grammar, Deep and Surface Structures, Transformational Rules.

bdkbZ&5- dkjd&0;kdj.k&eyh dkjd& lajpuk vkSj 0;kdjf.kd lajpuk] dkjd& lajpuk vkSj 0;kdjf.kd lajpuk esa lajpuk

UNIT-V Case Grammar- Basic Case Relations and Grammatical Relations Between Case Relations and Grammatical Relations.

Books Prescribed

1- fganh dk uohure cks0;kdj.k % jes'k pUnz egjk=k

2- fganh&ijlxZ % fpÙkjatu dj

3- A Course in modern Linguistics % C.F. Hoekett

4- Transformational Grammar % Radford

5- Syntax : A Minimalist Introduction % Radford

6- Mood and Modality % Palmer

7- Grammatical Roles and Relations % Palmer

lseLVj&III i=k&x

SEMESTER - III PAPER - X

Hkk"kk ,oa lekt

LANGUAGE AND SOCIETY

bdkbZ&1- lekt Hkk"kkfoKku dh izÑfr- Hkk"kk vkSj lekt esa lajpuk] Hkk"kk vkSj laLd`frA

UNIT-I Nature of Sociolinguistics, Relation between Language and Society, Language and Culture.

bdkbZ&2- lkekftd Lrjhdj.k vkSj Hkk"kk] Hkk"kk dk lkekftdhdj.kA

UNIT-II Social Stratification and Language, Socialisation of Language.

BdkbZ&3- Hkk"kk vkSj jk"Vª] Hkk"kk&fu;kstu] jk"Vªhkk"kk] jkt Hkk"kkA

UNIT-III Language and Nation, Language – Planning, National Language , Official Language.

bdkbZ&4- Hkk"kkvksa dk laidz] lekt Hkkf"kd ifjorZu] f}Hkkf"kdrk] cgqHkkf"kdrk] Hkk"kk}Sr] fiftu] fdz;kyA

UNIT-IV Languages in Contact, Sociolinguistic Change, Bilingualism, Multilingualism, Diglossia, Pidgin, Creole.

bdkbZ&5- fj'rs&ukrs dh 'kCn] jx&'kCn] lacks/ku&inA

UNIT-V Terms of Relations (Kinship Terms), Colour Terms, Terms of Address.

Books Prescribed

1- fganh Hkk"kk dk lkekftd lanHkZ % jes ukFk lgk;

2- fganh dk lkekftd lanHkZ % johanukFk JhokLro

3- Sociology of Language % Fishman

4- Sociolinguistics % Trudgill

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SEMESTER - III PAPER - XI

eukHkk"kkfoKku ,o f}rh; Hkk"kkf'k{k.k

PSYCHOLINGUISTICS AND SECOND LANGUAGE TEACHING

bdkbZ&1- eukHkk"kkfoKku& izÑfr ,oa {ks=] Hkk"kk&vtZu dk eukoSKkfud vk/kkjA

UNIT-I Psycholinguistics – Nature & Scope, Psychological Basis For Language- Acquisition,

bdkbZ&2- mPpfjr 'kCnksa dk lKku ,oa Hkk"kk&iz;ksx dh lkekU; 'krsZA

UNIT-II Cognition of Articulated Words and General Conditions of Language Use.

bdkbZ&3- f}rh; Hkk"kk&vf/kxe] vtZu ,oa f'k{k.kA

UNIT-III Second Language- Learning, Acquisition, and Teaching.

bdkbZ&4- Hkk"kk& lkeF;Z vkSj Hkk"kk&O;ogkjA

UNIT-IV Language Competence and Language Performance

bdkbZ&5- ekr`Hkk"kk&f'k{k.k] izFke Hkk"kk] vU;@fons'kh Hkk"kkA

UNIT-V Teaching of Mother Tongue, First Language, Other/Foreign Language.

Books Prescribed

1- fgUnh Hkk"kkf'k{k.k % eukjek xqIrk

2- Hkk"kkfoKku ,oa fgUnh Hkk"kkf'k{k.k dh v/kqukru izo`fr;ka % f'koUnu fd'kksj oekZ

3- vuqiz;qDr Hkk"kkfoKku % Hkksyk ukFk frokjh

4- Second Language Acquisition : Clein

lseLVj–III i'ui=&XII

SEMESTER - III PAPER - XII

{ks=&i).kkyh

FIELD – METHOD

bdkbZ&1- {ks=&losZ{k.k&mn~ns';] iz'ukoyh] lwpd] losZ{kd] {ks=&losZ{k.k ds fy, vk/kkj& lkexhA

UNIT-I Field - Survey – Objectives, Sampling, Questionnaire, Informant, Surveyor, The Base Material for Field Survey.

bdkbZ&2- lkexh&ladyu&i).kkfy;k¡&izFkfed ,oa f}rh;d lzksr] l{e ,oa LFkwy fyI;adu A

UNIT-II Data-Collection- Methods- Primary and Secondary Sources, Narrow and Broad Transcription.

bdkbZ&3- fo'ys"k.k& /ofuizfdz;kRed] :iizfdz;kRed] okD;kRed] vkSj vFkkZRedA

UNIT-III Analysis- Phonological, Morphological, Syntactic, and Senantic.

bdkbZ&4- izLrqrhdj.k] lkjf.k;k¡] fp=] xzkQ] bR;kfnA

UNIT-IV Compilation- Presentation, Tables, Diagrams, Graph, etc.

bdkbZ&5- Hkkf"kd ekufp=koyh& i).kkfy;k¡ ,oa izdkj] egRoA

UNIT-V Linguistic Maps- Methods and Types, Importance.

Books Prescribed

1- Hkk"kk Hkkxksy % dSyk'k pUn HkkfV;k
2- 'kCn Hkkxksy % gjhjk yky 'kDy
3- Hkk"kk& loZs{k.k % ejkjh yky mizsrh
4- A Course in modern Linguistics : C.F.Hockell
5- Descriptive Linguistics : H.A. Gleason
6- Field Linguistics : William J. Samarin
7- Sociolinguistic Questionnaire Bank : CIIL, Mysore

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SEMESTER - IV PAPER - XIII

vuqokn

TRANSLATION

bdkbZ&1- vuqokn& ifjHkk"kk] mn~ns';] egRo] {ks=] Hkk"kkfoKku dh vuqiz;qDr 'kk[kk ds :i esa vuqoknA

UNIT-I Translation- Definition, Aims and Objectives, Importance, Scope . Translation as An Applied Branch of Linguistics.

bdkbZ&2- vuqokn& izfdz;k&ukbMk dk fparu] U;wekdZ dk fparu] ckFkxsV dk fparuA ikB&izdkj ,oa vuqokn&izdkjA

UNIT-II Process of Translation- Views of Nida, Newmark, and Bathgate. Types of Text and Types of Translation.

bdkbZ&3- vuqokn&dk;Z&vuqoknd ds x.k] ,oa lhek,A vuqokn&eqY;kadu&in/kfr;k&'kkfCnd] okD;kRed] vkFkhZ] lkanfHkZdA vPNs vuqoknd dh fo'ks"krk,¡A

UNIT-III Translation-Work- The Translator- His Ability and Limitations, Translating- Evaluation- Methods- Lexical, Syntactic, Semantic, Contextual, Qualities of a Good Translation.

bdkbZ&4- vaxzsth&xn~;k'k dk fgUnh&vuqokn
vFkok NÙkhlx<+h&xn~;k'k dk fgUnh&vuqoknA

UNIT-IV Translation of an English Passage into Hindi
O R Translation of a Chhattisgarhi Passage into Hindi

bdkbZ&5- fgUnh&xn~;k'k dk vaxzsth& vuqoknA
vFkok
fgUnh&xn~;k'k dk NÙkhlx<+h vuqoknA

UNIT-V Translation of a Hindi Passage into English
O R Translation of a Hindi Passage into Chhattisgarhi

Books Prescribed

1- vuqokn fl)kar dh :ijs[kk % lqjs'k dqekj
2- vuqokn&dyk fl)kar vkSj iz;ksx % dSyk'k pUn HkkfV;k
3- vuqokn&fl)kar vkSj leL;k,¡ % johUnzukFk JhokLro ,oa xkLokeh

4- vuqokn foKku % HkkÔkkoSKkfud frokjh
5- vuqokn&dyk vkSj leL;k,¡ % oSKkfud vuqla/kku vkSj lkfgR; dsUnz e/kqjk ;] Hkkjr
6- Hkkjrh; Hkk"kkvksa ls vuqokn dh leL;k,¡ % HkksykukFk frokjh ,oa fdj.kcsyk

lseLVj&IV isij&XIV fodYi (A)

SEMESRER - IV PAPER - XIV OPTION (A)

laizs"k.kijd fgUnh

COMMUNICATIVE HINDI

bdkbZ&I laizs"k.k& ifjHkk"kk, izfdz;k, foLrkjA laizs"k.k&{kerk dks fodkl esa Hkk"kkfoKku dh Hkwfedk A

UNIT-I Communication- Definition, Process, Scope, Role of Linguistics in Improving Communicative Competence.

bdkbZ&I fgUnh esa okrkZyki& oDrk, Jksrk, fo"k;&oLrq, Hkk"kk, fLFkfr& lanHkZ, Hkwfedk&ifjorZu] f'k"Vkpkj ,oa rfd;kdykeA

UNIT-II Conversation in Hindi-Speaker, Hearer, Subject -Matter, Language, Context of Situation, Role- Shift, Manner, and Mannerism.

bdkbZ&III funsZ'kd rRo& iq#"kokpd loZuke, ladsrokpd loZuke, dkyokpd ,oa LFkkuokpd fØ;kfo'ks"k.k, dky ,oa i{kA vfUofr ¼drkZ&fdz;k, deZ&fdz;k, 'kwU;½A okP;

UNIT-III Diexis- Personal Pronouns, Demonstratove, Pronouns, Advarbs of Time and Place, Tense and Aspect. Concord (Subject-Verb, Object-Verb, None), Voices (Active-Passive), Speech (Direct-Indirect)

bdkbZ&IV ijlxZ&iz;ksx& ljy, lkekfld, feJ, Ñnar& fdz;k, fo'ks"k.k, laKk, ,oa fdz;kfo'ks"k.k ds :i esa iz;ksxA

UNIT-IV Postpositions and Their Uses- Simple, Compound, Complex. Participles Used as Verbs, Adjectives, Nouns, and Adverbs.

bdkbZ&V i;kZ;okph 'kCnksa dk fof'k"V iz;ksx, eqgkojksa ,oa yksdksfDr;ksa dk iz;ksxA

UNIT-V Specific Uses of Synonymous Words, Use of Idioms and Proverbs.

fu/kkZfjr iqLrdsa

Books Prescribed

1- ekud fgUnh dk 'kqf}ijd 0;kdj.k % jes'k pUnz egjks=k
2- ekud fgUnh esa 'kq} iz;ksx % jes'k pUnz egjks=k
3- fgUnh ijlxZ % fpŸkjatu dj

lseLVj&IV isij&XIV fodYi (B)

SEMESRER - IV PAPER - XIV OPTION (B)

COMMUNICATIVE ENGLISH

UNIT-I Communication- Definition, Process, Scope, Role of Linguistics in Improving Communicative Competence.

UNIT-II Conversation in English- Speaker, Hearer, Subject, Matter, Language, Context of Situation, Role-Shift, Manner and Mannerism,

UNIT-III Deixis- Personal Pronouns, Demonstrative Pronouns, Articles, Adverbs of Time and Place, Anaphora.

UNIT-IV Prepositions and Their Uses- With Nouns, Verbs, Adjectives. Prepositions Used As Conjunctions. Concord, Voices- Acive- Passive, Speech- Direct-Indirect.

UNIT-IV Use of Synonymous Words With Specific Meaning , Use of Idioms and Proverbs.

Books Prescribed

1. Communicative English : Leech
2. A University Grammar of English : Quirk et al
3. A Reference Grammar of English : R.A.Close

lsesLVj&IV isi'u i=&xv

SEMESTER - IV PAGES - XV

NÙkhlx<h

CHHATTISGARHI

bdkbZ&1- NÙkhlx<h dh HkkSxkfyd@Hkkf"kd lhek,¡] fodklA

UNIT-II Chhattisgarhi-Geographical and Historical Background, Origin, Nomenclature, Linguistic Boundaries, Development.

bdkbZ&2- NÙkhlx<h rFkk fgUnh dh vU; ckfy;k¡ ¼iwohZ ,oa if'peh fgUnh dh fo'ks"k lanHkZ esa½] NÙkhlx<h dh mickfy;k¡A

UNIT-II Chhattisgarhi and Other Dialects of Hindi. (with Special Feature of Eastern and Western Hindi), Sub Dialects of Chhattisgarhi.

bdkbZ&3- NÙkhlx<h dh /ofu;k¡&Loj] O;atu] la/;{kjA

UNIT-III Sound of Chhattisgarhi – Vowels, Consonants, and Diphthongs.

bdkbZ&4- NÙkhlx<h dh O;kdjf.kd dksfV;k¡& iq#"k] fyax] opu] dkjd] dky] i{k] o`fRr] okP;A

UNIT-IV Grammatical Categories of Chhattisgarhi- Person, Gender, Number, Case, Tense, Aspect, Mood, Voice.

bdkbZ&5- NÙkhlx<h& 'kCn&lEink& rRle] rn~Hko] vkxr] ladjA 'kCn&jpuk&ljy] ;kSfxd] feJA 'kCn&HksnA

UNIT-IV Chhattisgarhi Vocabulary- Tatsam, Tadbhav, Borrowed, Hybrid. Word-Formation– Simple, Compound, Complex. Parts of Speech.

fu/kkZfjr iqLrdsa

Books Prescribed

1- NRrhlx<h Òk"kk dk mn~fodkl % ujsUæ oekZ
2- NRrhlx<h] gych] Òrjh cksfy;ksa dk Òk'kkoSKkfud v/;;u % Òkypan jko
3- fgUnh Hkk"kk mn~Hko vkSj fodkl % mn;ukjk;.k frokjh
4- NRrhlx<h dk O;kdjf.kd dksfV;k¡ % fpRr jatu dj
5- NRrhlx<h cksyh] O;kdj.k vkSj dks"k % dkfrZdjke tSu

lseLVj&IV i'u i=&XVI

ç¨fDr&fo'y"k.k

DISCOURSE-ANALYSIS

1- ç¨fDr % ç¨fDr dh vojèkkj.kk ,oa çÑfr] ç¨fDr d fofÒUu i ;k ; A

Discourse : Concept & Nature of Discourse, Different Terms for Discourse.

2- ç¨fDr&çdkj % e©f[kd] fyf[kr] okrkZyki] lkfgfR;d] ,dkyki A

Discourse-Types : Oral, Written, Conversation, Literary, Monologue.

3- ç¨fDr&lajpuk % Fkhe&lajpuk] Vkfid&lajpuk] okD;&lajpuk e ç¨fDreyd rRo] ç¨fDr&fpgud A

Discourse-Structure : Theme Structure, Topic-Structure, Discourse Elements in Sentence-Structure, Discourse-Markers.

4- ç¨fDr ls lacfèkr vU; ladYiuk,¡ % ç¨fDr v©j lanÒ] ç¨fDr v©j 'kSyh] ç¨fDr v©j fo"k;&oLrq

Discourse Related Concepts : Discourse and Context, Discourse and Style, Discourse and Subject-Matter.

5 llfDr % okD;xr] vFkZxr] ,oa lanÒxr llfDr A

Cohesion : Syntactic, Semantic and Contextual Cohesion.

fuèkkZfjr iqLrd Books Prescribed

1. Gillian Brawn & George Yule – Discourse-Analysis, Cambridge.
2. Michael Stubbs – Discourse-Analysis, Basil Blackwell, Oxford
3- Ò¨ykukFk frokjh % Òk"kkfoKku] fdrkc egy
5. M.A.K. Halliday & Ruqaiya Hasan – Cohesion in English, Longman,
Deborah Schiffrin – Discourse Markers, Cambridge.

एम.ए. पूर्व भाषाविज्ञान

M.A. PREVIOUS LINGUISTICS

प्रश्न पत्र Paper	प्रश्न पत्र का नाम title of the paper	पूर्णांक m.m.
1.	भाषाविज्ञान का परिचय एवं भारतीय भाषाचिंतन परंपरा Introduction to Linguistics and Indin Linguistic Tradition	100
2.	भाषा की प्रयोजनीयता Functionality of Language	100
3.	ध्वनिकी एवं ध्वनिमी Phonetics and Phonemics	100
4.	रूपविज्ञान Morphology	100
5.	अर्थविज्ञान Semantics	100

एम.ए. पूर्व भाषाविज्ञान

M.A. PREVIOUS LINGUISTICS

प्रश्न पत्र paper - 1

भाषाविज्ञान का परिचय एवं भारतीय भाषाचिंतन परंपरा

Introduction to Linguistics and Indian Linguistic Tradition

इकाई-1 भाषा-परिभाषा एवं विशेषताएँ, भाषा के अवयव-ध्वनि, रूप, शब्द, पदबंध, उपवाक्य, वाक्य, अर्थ ।

UNIT-I Language - Definition and Characteristics, Constituents of Language - Sound, Morph, Word, Phrase, Clause, Sentence, Meaning.

इकाई-2 मानव-भाषा एवं मानवेतर भाषा, मौखिक एवं लिखित भाषा, भाषा और बोली, बोली के भाषा बनने के कारण, भाषाई परिवर्तन के कारण एवं दिशाएँ ।

UNIT-II Human Language and Non - human Language, Oral and Written Language, Language and Sialect, Factors causing a dialect to be a language, Factors causing Language Change and Directions of change.

इकाई-3 भाषाविज्ञान- परिभाषा, प्रकृति, भाषा-अध्ययन की विभिन्न पद्धतियाँ-वर्णनात्मक, तुलनात्मक, ऐतिहासिक, व्यतिरेकी ।

UNIT-III Linguistics- Definition, Nature, Various Methods of Linguistic study - Descriptive, Comparative, Historical, Contrastive.

इकाई-4 भाषाविज्ञान की शाखाएँ-ध्वनिविज्ञान, ध्वनिप्रक्रिया, रूपविज्ञान, वाक्यविज्ञान, अर्थविज्ञान, समाजभाषाविज्ञान, भाषाभूगोल, शैलीविज्ञान, अनुवादविज्ञान, मनोभाषाविज्ञान, भाषाशिक्षण । अन्य विज्ञानों से भाषाविज्ञान का संबंध।

UNIT-IV Branches of Linguistics - Phonetics, Phonology, Morphology, Syntax, Semantics, Sociolinguistics, Linguistic Geography Stylistics, Translatology, Psycho - linguistics, Language Teaching, Relation of Linguistics with other Sciences,

इकाई-5 भारतीय भाषा- चिंतन- परंपरा- वेद, निघंटु । यास्क, पाणिनि, कात्यायन, पतंजलि, कैयट, नागेश, भट्टोजिदीक्षित, हेमचंद्र, आदि का योगदान ।

UNIT-V Indian Linguistic Tradition - Vedas, Nighantu, Contributions of Yask, Nanini, Katyayan, Patanjali, Kaiyat, Nagesh, Bhattojidikshit, Hemchmdra, etc.

निर्धारित पुस्तकें

books prescribed-

1. भाषाविज्ञान एवं भाषाशास्त्र – कपिलनाथ द्विवेदी आपार्य
2. भाषाविज्ञान – भोला नाथ तिवारी
3. भाषाविज्ञान – राजमल बोरा (संपादक)
4. भाषाविज्ञान – सैद्धांतिक चिंतन – खीन्द्रनाथ श्रीवास्तव
5. भारतीय भाषावैज्ञानिक चिंतन – विद्यानिवास मिश्र
6. सैद्धांतिक भाषाविज्ञान – ल्यंस
7. Theoretical Linguistics- John Lyons
8. Introduction to General Linguistics- Robins
9. Linguistics- David Crystal
10. The study of Language- George Yule

प्रश्नपत्र – II paper- II

भाषा की प्रयोजनीयता

Functionality of Language

इकाई-1 भाषा के प्रयोजन

I भाषा- प्रयोजन का आशय

II. प्रयोजनमूलक भाषा का स्वरूप, व्याप्ति, एवं महत्व

III. भाषा के विविध रूप- कार्यालयी, जनसंचार साहित्य, विधि, आदि ।

UNIT-I Functions of Language

Meaning of Functions of Language, Nature, Scope and Importance of Functional language, Different Forms of language- Official, Media, Literature, Law, etc.

इकाई-2 भाषा और कंप्यूटर

1. कंप्यूटर : परिचय एवं उपयोग
2. इंटरनेट-परिचय
3. बेबसाइट
4. हिंदी/अँगरेजी सॉफ्टवेयर के पैकेज

UNIT-II Language and Computer

Computer - Introduction and use

Internet - Introduction.

Website, Hindi/English Software and Packages

इकाई-3 जनसंचार- की भाषा

अ – पत्रकारिता

1. पत्रकारिता : स्वरूप एवं प्रकार
2. समाचार – लेखन
3. साक्षात्कार, पत्रकार- वार्ता
4. विज्ञापन

आकाशवाणी, दूरदर्शन की भाषाकी प्रकृति,

UNIT-III Language and media

Journalism- Nature and Types, News Writing, Editing as an art, Interview, Press- Conference, Advertisement, Language of Radio and Television

इकाई-4 पारिभाषिक शब्दावली

1. स्वरूप एवं महत्व
2. पारिभाषिक शब्दावली- निर्माण के सिद्धांत
3. ज्ञान-विज्ञान के विभिन्न क्षेत्रों की पारिभाषिक शब्दावली (केवल निर्धारित शब्द)

UNIT-IV Technical Terminology

Nature and Importance, Principles of Formation of Technical Terms, Technical Terms of Various disciplines of Science and Humanities, (prescribed terms only)

इकाई-5 संक्षिप्तियाँ एवं पदनाम

1. प्रकृति महत्व एवं सीमाएँ
2. संक्षिप्ति के सिद्धांत
3. विभिन्न विषयों में प्रचलित संक्षिप्तियाँ
4. महत्वपूर्ण पद नाम

UNIT-V Abbreviations and Designations

Nature, Importance and Limitation
Principles of Abbreviations
Abbreviations used in different disciplines
Important Designations

निर्धारित पुस्तकें

Books Prescribed-

1. प्रयोजनमूलक हिंदी- बार्लेदु शेखर तिवारी
2. प्रयोजनमूलक हिंदी- दंगल झाल्टे
3. प्रयोजनमूलक हिंदी- सूर्यप्रसाद दीक्षित एवं अन्य
4. जनसंचार माध्यमों में हिंदी- चंद्रकुमार
5. दूरदर्शन हिंदी के प्रयोजनमूलक विविध प्रयोग- कृष्णकुमार रत्तू
6. कंप्यूटर के भाषिक अनुप्रयोग- विजय मल्होत्रा
7. हिंदी कंप्यूटिंग- त्रिभुवन नाथ शुक्ल
8. प्रयोजनमूलक हिंदी- चित्तरंजनकर एवं सुधीर शर्मा
9. कार्यालयी हिंदी- केशरी लाल वर्मा
10. A Communicative Grammar of English : Leech, Geoffrey

प्रश्नपत्र - III paper- III

ध्वनिकी एवं ध्वनिमी

Phonetics and Phonemics

इकाई-1 ध्वनिकी (ध्वनिविज्ञान)- प्रकृति एवं व्याप्ति, भाषाविज्ञान की अन्य शाखाओं से संबंध, ध्वनिकी की शाखाएँ- उच्चारण, संवहन, एवं श्रवण । ध्वनिकी एवं ध्वनिमी में अंतर ।

UNIT-I Phonetics- Nature and Scope, Relation with other branches of linguistics, Branches of Phonetics- Articulatory, Acoustic and Auditory.

Differences between Phonefftics and Phonology.

इकाई-2 वागवयवों का परिचय तथा ध्वनि-उच्चारण में उनकी भूमिका।

UNIT-II Introduction to Organs of Speech and their role in production of sounds.

इकाई-3 वाग्ध्वनियों का वर्गीकरण- स्वर एवं व्यंजन, स्वरों एवं व्यंजनों की सामान्य विशेषताएँ, स्वर एवं व्यंजन में समानताएँ एवं असमानताएँ।

UNIT-III Classification of Speech Sounds- Vowels and Consonants, General Characteristics of Vowels and Consonants, Similarities and differences between Vowels and Consonantsn;

इकाई-4 स्वरों का वर्गीकरण- जीभ की ऊँचाई, जीभ का भाग, होंठों की स्थिति, कोमल तालु की स्थिति, मांसपेशियों की स्थिति, दीर्घता के आधार पर । व्यंजनों का वर्गीकरण- स्थान एवं प्रयत्न, प्राणत्व, तथा घोषत्व के आधार पर ।

UNIT-IV Classification of Vowels- On the basis of tongue height, parts of tongue, position of soft palate, position of muscles, Length. Classification of Consonants- On the basis of places and manners of articulation, aspiration and voicing.

इकाई-5 अक्षर- परिभाषा एवं विशेषताएँ, हिंदी / अँग्रेजी की आक्षरिक संरचना । दीर्घता, बलाघात, सुर, तान, अनुतान (हिंदी/अँग्रेजी के उदाहरण)।

UNIT-V Syllable- Definition & characteristics, Syllabic Structure of Hindi / English, Length, stress, pitch, tone, Intonation. (Examples of Hindi / English)

निर्धारित पुस्तकें

Books Prescribed

1.	हिंदी ध्वनिकी और ध्वनिमी	:	रमेश चंद्र महरोत्रा
2.	ध्वनिविज्ञान	:	गोलोक बिहारी धल
3.	स्वनविज्ञान	:	चतुर्भुज साहाय
4.	हिंदी भाषा की ध्वनि संरचना	:	भोलानाथ तिवारी
5.	A Practical Introduction to Phonetics	:	Catford
6.	A Textbook of English Phonetics for Indian Students	:	T. Balasubramanian

प्रश्नपत्र - IV paper- IV

रूपविज्ञान

Morphology

इकाई-1 रूपविज्ञान- प्रकृति एवं क्षेत्र, शाखाएँ शब्द-साधन तथा रूप-साधन ।

UNIT-I Morphology- Nature and Scope, Branches, Derivational and Inflectional.

इकाई-2 रूप, संरूप, एवं रूपिम-परिभाषाएँ एवं अंतर ।

UNIT-II Morphs, Allomorphs and Morphane- Definition and Differences.

इकाई-3 रूपिमिक विश्लेषण के सिद्धांत एवं प्रयोग ।

UNIT-III Principles and Practices of Morphemic Analysis

इकाई-4 रूपवर्ग एवं शब्द वर्ग । शब्दों की सोपानक्रमिक संरचना ।

UNIT-IV Form- Classes and Word- Classes, Hierarchical structure of words.

इकाई-5 संज्ञा, सर्वनाम, विशेषण, एवं क्रिया शब्दों का रूप-साधन ।

UNIT-V Inflection of Nouns, Pronouns, Adjectives, Verbs.

निर्धारित पुस्तकें

Books Prescribed

1.	भाषाविज्ञान की रूपरेखा	:	उदय नारायण तिवारी

2.	हिंदी का रूपग्रामिक अध्ययन	:	महावीर सरन जैन
3.	हिंदी भाषा की रूप संरचना	:	भोलानाथ तिवारी
4.	Grammar	:	F. Palmer
5.	Introduction to Linguistic Structure	:	A. Hill

प्रश्नपत्र - V paper- V

अर्थविज्ञान

Semantics

इकाई-1 अर्थविज्ञान का क्षेत्र, अर्थविज्ञान और भाषाविज्ञान की अन्य शाखाएँ

UNIT-I Scope of Semantics, Semantics and other Branches of Linguistics.

इकाई-2 अर्थ-प्रकार-समानार्थकता, विलोमार्थकता, अनेकार्थकता, समनामता भाषिक अर्थ एवं संदर्भगत अर्थ में अंतर, अभिधा, लक्षणा, व्यंजना ।

UNIT-II Meaning - types: Synonymy, Antonymy, Polysemy. Homonymy, Diffrence between Linguistic Meanng and Contextual Meaning, Abhidha (Literal), Lakshana (idiomatic) Vyanjana (Suggestive).

इकाई-3 भारतीय एवं पाश्चात्य अर्थ चिंतन-परंपरा, अर्थ का निर्धारण, अर्थ- निर्धारण में संदर्भ की भूमिका ।

UNIT-III Indian and Western tradition of Semantics, Determination of meaning, Role of context in determination of meaning.

इकाई-4 अर्थपरिवर्तन के कारण- ऐतिहासिक, राजनैतिक, साहित्यिक, सामाजिक, धार्मिक, भौगोलिक । अर्थपरिवर्तन की दिशाएँ- विस्तार, संकोच, आदेश ।

UNIT-IV Causes of semantic change- historical, political, literary, social, religious, geographical, Directions of semantic charge- extension, contraction, suppletion.

इकाई-5 वाक्यविज्ञान एवं अर्थविज्ञान, प्रोक्ति, संज्ञा एवं क्रिया का आर्थी अभिलक्षण ।

UNIT-V Syntax and semantics, Discourse, Semantic features of nouns, verbs.

निर्धारित पुस्तकें

Books Prescribed

1.	सैद्धांतिक भाषाविज्ञान	:	लियोंस
2.	हिंदी भाषा की अर्थ- संरचना	:	भोलानाथ तिवारी
3.	Semantics	:	Palmer
4.	Semantics	:	(Vol 1-2) Lyons

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एम.ए. अंतिम भाषाविज्ञान
M.A. FINAL LINGUISTICS

प्रश्न पत्र Paper	प्रश्न पत्र का नाम title of the paper	पूर्णांक m.m.
6.	वाक्यविज्ञान Syntax	100
7.	भाषा एवं समाज Language and Society	100
8.	मनोभाषाविज्ञान एवं द्वितीय भाषाशिक्षण Psycholinguistics and Second Language Teaching	100
9.	क्षेत्र-प्रणाली Field - Mehod	100
10.	(a) अनुवाद Translation अथवा (b) छत्तीसगढ़ी Chhattisgarhi	100

षष्ठ प्रश्न-पत्र
वाक्यविज्ञान
(पेपर कोड - 0424)

इकाई-1 वाक्यविज्ञान और भाषाविज्ञान की अन्य शाखाओं (ध्वनिविज्ञान, रूपविज्ञान, अर्थ विज्ञान, संकेत- विज्ञान) में सहसंबंध ।

इकाई-2 वाक्य-संबंधी भारतीय एवं पाश्चात्य मत । वाक्य के अवयव, वाक्य के प्रकार - रचना एवं अर्थ की दृष्टि से ।

इकाई-3 निकटस्थ अवयव-विश्लेषण, अंत:केंद्रिक एवं बहि:केंद्रिक रचनाएँ, पदबध-संरचनात्मक व्याकरण, रूपांतरण परक-प्रजनक व्याकरण ।

इकाई-4 कारक-व्याकरण, संबंधपरक व्याकरण ।

इकाई-5 नियमबद्धता, प्रतिबंध-चयन, रूपांतरण ।

निर्धारित पुस्तकें :

1. आधुनिक भाषाविज्ञान - भोलानाथ तिवारी
2. हिन्दी का वाक्यात्मक व्याकरण - सूरजभान सिंह
3. हिन्दी का नवीनतम बीज-व्याकरण - रमेशचंद्र महरोत्रा एवं चित्तरंजन कर
4. हिन्दी का कारक-व्याकरण - लक्ष्मीबाई बालचन्द्रन
5. हिन्दी भाषा की वाक्य-संरचना - (सं) भोलानाथ तिवारी

PAPER-VI
SYNTAX

UNIT-I Relationshiop between syntax and other branches of linguistics- Phonetics, Marpholoyg, Semantics, Semiotics.

UNIT-I Indian and Western views on Sentence. Components of Sentance, Types of Sentance-Structurally and Semanticall.

UNIT-III Immedidate constituent Analysis, Endocentric and Exocentric Constructions, Phrase-Structure Grammar, Transformational- Generative Grammar.

UNIT-IV Case - Grammar, Relational Grammer.

UNIT-V Rule - Government,
Restrictions - Selectional and Trams for mational.

सप्तम प्रश्न-पत्र

भाषा एवं समाज

(पेपर कोड - 0425)

इकाई-1 भाषा और समाज, सामाजिकीकरण, भाषा-समुदाय एवं वाग्व्यवहार, भाषा एवं संस्कृति ।

इकाई-2 समाजभाषाविज्ञान एवं भाषा का समाजविज्ञान, सामाजिक स्तरीकरण और भाषा ।

इकाई-3 भाषा एवं राष्ट्र, भाषा-नियोजन, राष्ट्रभाषा, राजभाषा ।

इकाई-4 भाषाई संपर्क एवं समाजभाषिक परिवर्तन, द्विभाषिकता, बहुभाषिकता, भाषाद्वैत, पिजिन एवं क्रियोल ।

इकाई-5 रिश्ते-नाते एवं रंगों की शब्दावली ।

निर्धारित पुस्तकें :

1. हिन्दी भाषा का सामाजिक संदर्भ - (सं) रमानाथ सहाय
2. हिन्दी का सामाजिक संदर्भ - रवींद्रनाथ श्रीवास्तव
3. Sociolinguistics - Trudgill

PAPER-VII

LANGUAGE AND SOCIETY

UNIT-I Language and Society, Socialisation, Linguistic Community and Linguistic Repertoire, Language and Culture.

UNIT-I Socio-linguistics and Sociology of language, Social Stratification and Language.

UNIT-III Language and Nation, Language Planning, National Language, Official Language.

UNIT-IV Language- Contact and Socio Linguistic Change, Bilingualism, Multilingualism, Diglossia Pidgin and Creole.

UNIT-V Kinship Terms and Colour - terms.

अष्टम प्रश्न-पत्र

मनोभाषाविज्ञान एवं द्वितीय भाषाशिक्षण

(पेपर कोड - 0426)

इकाई-1 मनोभाषाविज्ञान-प्रकृति एवं व्याप्ति । भाषा और मानव-मस्तिष्क, भाषा-प्रत्यक्षीकरण का मनोवैज्ञानिक आधार ।

इकाई-2 उच्चरित शब्द-ज्ञान एवं भाषा-प्रयोग की सामान्य स्थितियाँ ।

इकाई-3 द्वितीय भाषा-अर्जन, अधिगम एवं शिक्षण, भाषिक पर्यावरण, विकासात्मक परिप्रेक्ष्य ।

इकाई-4 भाषा-सामर्थ्य एवं भाषा-व्यवहार, भाषा-अवाप्ति के विभिन्न स्तर ।

इकाई-5 भाषा-शिक्षण का मनोवैज्ञानिक उपागम, अभ्यास, एवं परीक्षण-विधियाँ ।

निर्धारित पुस्तकें :

1. भाषाविज्ञान एवं हिन्दी भाषाशिक्षण की अधुनातन प्रवृत्तियाँ - शिवेन्द्र किशोर वर्मा
2. हिंदी भाषाशिक्षण - मनोरमा गुप्त
3. अनुप्रयुक्त भाषाविज्ञान - भोलानाथ तिवारी

PAPER-VIII

PSYCHOLONGUISTICS AND SECOND LANGUAGE TEACHING

UNIT-I Psycholinguistics- Nature and Scope, Language and Human Brain, Psychological basis for language Tealisation.

UNIT-I Acquisition of Spoken words and common situations of language- Use.

UNIT-II Second Language Acquisition, Learning and teaching, Linguistic Environment, Developmental Perspectives.

UNIT-IV Linguistic Competence and Linguistics Performance, Different Levels of Language - Acquisition.

UNIT-V Psychological Approach to Language Teaching, Language Drill, and Testing Methods.

नवम प्रश्न-पत्र

क्षेत्र - पद्धति

(पेपर कोड - 0427)

इकाई-1 क्षेत्र-सर्वेक्षण - उद्देश्य, प्रतिचयन, प्रश्नावली, सूचक, सर्वेक्षक, क्षेत्र-सर्वेक्षण की आधार-सामग्री ।

इकाई-2 सामग्री संकलन-विधियाँ - प्राथमिक एवं द्वितीयक स्रोत, सूक्ष्म एवं व्यापक लिप्यंकन ।

इकाई-3 विश्लेषण - ध्वनिप्रक्रियात्मक, रूपप्रक्रियात्मक, वाक्यप्रक्रियात्मक, एवं अर्थप्रक्रियात्मक ।

इकाई-4 आकलन - प्रस्तुति, सारणी, चित्र, ग्राफ, आदि ।

इकाई-5 भाषिक मानचित्रावली - विधियाँ एवं प्रकार, महत्व ।

निर्धारित पुस्तकें :

1.	भाषा-भूगोल	-	कैलाशचंद्र भाटिया
2.	शब्द भूगोल	-	हीरालाल शुक्ल
3.	भाषा-सर्वेक्षण	-	मुरारीलाल उप्रेती
4.	छत्तीसगढ़ी जनभाषा	-	व्यास नारायण दुबे
5.	A Couse in Modun Leuguistic	-	C.F. Hockett
6.	Description Linguistics	-	H.A. Gleason.

PAPER-IX

FIELD METHOD

UNIT-I Field survey - Objective, Samysling, Questionnaire, Informant, Surveyor, Basic Material for field survey.

UNIT-I Data-Collection-Methods : Primary and Secondary sources, Narrow and Broad Transcription.

UNIT-III Analysis - Phonological, Morphological, Syntactic, and Semantic.

UNIT-IV Compilation - Presentation, Tabulation, Diagrams, Graphs etc.

UNIT-V Linguistic maps - Methods and Types. Importance.

दशम प्रश्न-पत्र

विकल्प (अ)

अनुवाद

(पेपर कोड - 0428)

इकाई-1 अनुवाद की परिभाषा, अनुवाद का उद्देश्य, महत्व और व्यवहार-क्षेत्र, अनुवादक के दोष, अनुवादक की सीमाएँ, सफल अनुवाद, अनुवाद-सिद्धांत ।

इकाई-2 अनुवाद-प्रक्रिया - नाइडा का चिंतन, न्यूमार्क का चिंतन, बाथगेट का चिंतन, निष्कर्ष । पाठों के प्रकार, अनुवाद के प्रकार - भाषा-बाह्य-अनुवाद-प्रकार, भाषा-केंद्रित-अनुवाद-प्रकार, गौण-अनुवाद-प्रकार ।

इकाई-3 अनुवाद-कार्य - अनुवादक के प्रकार, अनुवादक की क्षमताएँ, अनुवादक की भाषा, अनुवाद-मूल्यांकन की विधियाँ-कोशगत, वाक्यविन्यासगत, अर्थगत, संदर्भगत । अनुवाद-शिक्षण - समभाषिक संदर्भ में अनुवाद - शिक्षण, द्विभाषिक संदर्भ में अनुवाद-शिक्षण ।

इकाई-4 अँगरेज़ी - गद्यांश का हिन्दी में अनुवाद ।
अथवा छत्तीसगढ़ी - गद्यांश का हिन्दी में अनुवाद ।

इकाई-5 हिंदी - गद्यांश का अँगरेजी में अनुवाद ।
अथवा हिंदी - गद्यांश का छत्तीसगढ़ी में अनुवाद ।

निर्धारित पुस्तकें :

1.	अनुवाद सिद्घांत की रूपरेखा	:	सुरेश कुमार
2.	अनुवाद-कला-सिद्घांत और प्रयोग	:	कैलाश चंद्र भाटिया
3.	अनुवाद विज्ञान	:	भोलानाथ तिवारी
4.	अनुवाद-सिद्घांत और समस्याएँ	:	रवींद्रनाथ श्रीवास्तव एवं गोस्वामी
5.	अनुवाद-कला और समस्याएँ	:	वैज्ञानिक अनुसंधान और सांस्कृतिक मंत्रालय, भारत
6.	भारतीय भाषाओं से अनुवाद की समस्याएँ	:	भोलानाथ तिवारी एवं किरण बाला

PAPER-X

OPTION - (A)

TRANSLATION

UNIT-I Translation : Definition, Objective, Importance and Scope, Blemishes and Limitations of Translator.
Good Translation, Translation Theories.

UNIT-I Translation Process : Nida's view, Mewmark's view, Bathgate's view, Conclusion.
Type of Text, Types of Translation, Non-linguistic types of Translation, Linguistic types of Translation, Secondary types of Translation.

UNIT-III Translation-work - Types of Translator, Abilities of Translator, Language of Translator.
Translation Evaluation Methods- Lexical, Syntactic, Semantic, Contextual.
Translation teaching - Monolingual and bilingual contexts.

UNIT-IV Translation of an English Passage into Hindi. **O R**
Translation of a Chhattisgarh Passage into Hindi.

UNIT-V Translation of a Aivdi Passage into English. **O R**
Translation of a Hindi Passage into Chhattisgarh.

दशम प्रश्न-पत्र

विकल्प (ब)

छत्तीसगढ़ी

(पेपर कोड - 0429)

इकाई-1 छत्तीसगढ़ी की भौगोलिक / ऐतिहासिक पृष्ठभूमि- उत्पत्ति, नामकरण, भाषिक सीमाएँ एवं विकास ।

इकाई-2 छत्तीसगढ़ी तथा हिंदी की अन्य बोलियाँ (पूर्वी हिंदी और पश्चिमी हिंदी के विशेष संदर्भ में), छत्तीसगढ़ी की उपबोलियाँ ।

इकाई-3 छत्तीसगढ़ी की ध्वनियाँ - स्वर, व्यंजन, संध्यक्षर ।

इकाई-4 छत्तीसगढ़ी की व्याकरणिक कोटियाँ - पुरुष, लिंग, वचन, कारक, काल, पक्ष, वृत्ति, वाच्य ।

इकाई-5 छत्तीसगढ़ी की शब्द-संपदा- तत्सम् मूल, आगत, संकर । शब्द-रचना- यौगिक, सामासिक, मिश्र । शब्द-भेद।

निर्धारित पुस्तकें :

1.	छत्तीसगढ़ी भाषा का उद्विकास	-	नरेन्द्र वर्मा
2.	छत्तीसगढ़ी, हलबी, भतरी बोलियों का भाषा वैज्ञानिक अध्ययन	-	भालचंद राव तैलंग
3.	हिंदी और उसकी विविध बोलियाँ	-	दीपचंद जैन
4.	छत्तीसगढ़ी की व्याकरणिक कोटियाँ	-	(सं) चित्तरंजनकर
5.	छत्तीसगढ़ी बोली, व्याकरण और कोश	-	कांतिकुमार जैन
6.	छत्तीसगढ़ी जनभाषा	-	व्यास नारायण दुबे

PAPER-X

OPTION (B)

CHHATTISGARHI

UNIT-I Geographical and Historical Background of Chhattisgarhi - Origin, Nomenclature, Linguistic Boundaries and Development.

UNIT-I Chhattisgarhi and other Dialects of Hindi (with special reference to Eastern and Western Hindi), Sub-dialects of Chhattisgarhi.

UNIT-III Sounds of Chhattisgarhi - Vowels Consonants, and Diphthongs.

UNIT-IV Grammatical categories of Chhattisgarhi - Person, Gender, Number, Case, Tewse, Aspect, Mood, Voice.

UNIT-V Vocabulary of Chhattisgarhi - Tatsama, Borrowed, Hybrid, Word-formation - Compound, Complex, Parts of Speech.

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पं. रविशंकर शुक्ल विश्वविद्यालय रायपुर (छत्तीसगढ़)

पाठ्यक्रम

एम.ए. इतिहास (Syll Code- Prev.-261, Final-262)

एम.ए. लोक प्रशासन (Syll Code- Prev.-224, Final-225)

एम.ए. भाषा विज्ञान (Syll Code- Prev.-141, Final-142)

परीक्षा : 2014

âõ×õSÅÚÚUÂÚUÈÿææ / ßæçÆü·¤ÂÚUÈÿææÂ¥æØæðÁ·¤

कुलसचिव पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छत्तीसगढ़) की ओर से

अधिकृत मुद्रक एवं प्रकाशक :

गीता पब्लिकेशन

महामाईपारा, रायपुर (छत्तीसगढ़)

मूल्य : 35/-

एम. ए. (छत्तीसगढ़ी) 2017–18

Semester wise distribution of Courses and Credits

1. M. A. I Semester Chhattisgarhi

Course Code	Title of Paper	Marks		Credits
		Theory	Internal	
01.	छत्तीसगढ़ी के भौगोलिक अउ ऐतिहासिक पृष्ठभूमि	80	20	05
02.	छत्तीसगढ़ी के ध्वनि–संरचना	80	20	05
03.	छत्तीसगढ़ी के व्याकरण	80	20	05
04.	छत्तीसगढ़ी साहित्य के इतिहास	80	20	05
05.	संगोष्ठी /आंतरिक मूल्यांकन			02
	Total			**22**

2. M. A. II Semester Chhattisgarhi

Course Code	Title of Paper	Marks		Credits
		Theory	Internal	
01.	छत्तीसगढ़ी के लोक–साहित्य अउ संस्कृति	80	20	05
02.	छत्तीसगढ़ी के सीमावर्ती भाषा अउ बोली	80	20	05
03.	छत्तीसगढ़ी–काव्य	80	20	05
04.	कार्यालयीन छत्तीसगढ़ी	80	20	05
05.	संगोष्ठी/आंतरिक मूल्यांकन			02
	Total			**22**

3. M. A. III Semester Chhattisgarhi

Course Code	Title of Paper	Marks		Credits
		Theory	Internal	
01.	छत्तीसगढ़ी के शब्द–संरचना	80	20	05
02.	छत्तीसगढ़ी के भाषा–भूगोल	80	20	05
03.	प्रायोजन मूलक छत्तीसगढ़ी	80	20	05
04.	राजभाषा छत्तीसगढ़ी	80	20	05
05.	संगोष्ठी/आंतरिक मूल्यांकन			02
	Total			**22**

4. M. A. IV Semester Chhattisgarhi

Course Code	Title of Paper	Marks		Credits
		Theory	Internal	
01.	छत्तीसगढ़ी के वाक्य–संरचना	80	20	05
02.	छत्तीसगढ़ी अउ अनुवाद	80	20	05
03.	छत्तीसगढ़ी के तीज तिहार अउ परंपरा	80	20	05
04.	प्रायोगिक प्रशिक्षन अउ आंतरिक–मूल्यांकन	80	20	05
05.	संगोष्ठी/आंतरिक मूल्यांकन			02
	Total			**22**

1. एम. ए. छत्तीसगढ़ी पाठ्यक्रम म कुल 16 प्रश्न पत्र हावय। हरेक सेमेस्टर म चार प्रश्न पत्र रखे हे हावय।
2. हरेक सेमेस्टर म 22 कैडिट अनिवार्य रूप ले रखे गे हावय।
3. हरेक प्रश्न पत्र म 80 अंक रखे गे हावय।
4. हरेक प्रश्न पत्र म 20 अंक के आंतरिक मूल्यांकन या संगोष्ठी पाठ्यक्रम म शामिल करे गे हावय।

एम. ए. (छत्तीसगढ़ी) : पहला सेमेस्टर

पहला प्रश्न–पत्र

छत्तीसगढ़ी के भौगोलिक अउ ऐतिहासिक पृष्ठभूमि

1. छत्तीसगढ़ी के भौगोलिक संरचना, नामकरण, छत्तीसगढ़ी के उत्पत्ति अउ ओखर बोली
2. छत्तीसगढ़ी के विकास, म अन्य भाषा/बोली के प्रभाव
3. छत्तीसगढ़ म उपलब्ध भाषा–परिवार
4. छत्तीसगढ़ी के अन्य भाषा मन से संबंध
5. छत्तीसगढ़ी म अन्य भाषा के आगत–शब्द

निर्धारित पुस्तक सूची :

1. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा
2. कांति कुमार : छत्तीसगढ़ी बोली व्याकरण और कोश
3. भालचंद्र राव तैलंग : छत्तीसगढ़ी, हलबी और भतरी बोलियों का भाषा वैज्ञानिक अध्ययन
4. नरेन्द्र देव वर्मा : छत्तीसगढ़ी का उद्‌विकास
5. बलदेव प्रसाद मिश्र : छत्तीसगढ़ परिचय
6. शंकर शेष : छत्तीसगढ़ी का भाषाशास्त्री अध्ययन
7. बिहारी लाल साहू : छत्तीसगढ़ी लोक–साहित्य और भाषा
8. प्यारे लाल गुप्त : प्राचीन छत्तीसगढ़

दूसरा प्रश्न पत्र

छत्तीसगढ़ी के ध्वनि–संरचना

1. छत्तीसगढ़ी ध्वनियाँ–स्वर, व्यंजन, संध्यक्षर, स्वर–संयोग, संयुक्त व्यंजन
2. छत्तीसगढ़ी स्वरों के वर्गीकरण
3. छत्तीसगढ़ी व्यंजनों के वर्गीकरण
4. छत्तीसगढ़ी वर्णमाला, अक्षर के परिभाषा अउ प्रकार
5. छत्तीसगढ़ी के ध्वनिगुण–मात्रा, बलाधात, अनुतान

निर्धारित पुस्तक सूची :

1. गोलोक बिहारी धल : ध्वनि–विज्ञान
2. भालचंद्र राव तैलंग : छत्तीसगढ़ी का हलबी, भतरी का भाषा वैज्ञानिक अध्ययन
3. शंकर शेष : छत्तीसगढ़ी का भाषाशास्त्री अध्ययन
4. हीरालाल काव्योपाध्याय : ए ग्रामर आफ छत्तीसगढ़ी डायलेक्ट
5. चंद्रकुमार चंद्राकर : छत्तीसगढ़ी शब्द–कोश
6. पालेश्वर शर्मा : छत्तीसगढ़ी शब्द–कोश
7. रमेशचंद्र महरोत्रा एवं अन्य : छत्तीसगढ़ी शब्द–कोश
8. सत्यभामा आडिल : छत्तीसगढ़ी का व्यवहारिक शब्द–कोश

तीसरा प्रश्न–पत्र

छत्तीसगढ़ी के व्याकरण

1. छत्तीसगढ़ी के शब्द–भेद – संज्ञा, सर्वनाम, विशेषण, क्रिया, क्रियाविशेषण, अव्यय

2. व्याकरनिक के कोटियाँ– लिंग, वचन, पुरूष, कारक काल, वाच्य अउ वृति

3. कारक – कर्त्ता, कर्म, करण, आदि

4. वाक्य–संरचना – निर्माण अउ सिद्धान्त

5.वाक्य–रचना की अशुद्धियाँ – वर्तनी संबंधी, शब्द–संबंधी, व्याकरन–संबंधी आदि

निर्धारित पुस्तक सूची :–

1. चंद्रकुमार चंद्राकर : मानक छत्तीसगढ़ी व्याकरण
2. रमेशचंद्र महरोत्रा एवं अन्य : मानक छत्तीसगढ़ी का सुलभ व्याकरण
3. मंगत रवीन्द्र : छत्तीसगढ़ी व्याकरण
4. कांति कुमार : छत्तीसगढ़ी बोली व्याकरण और कोश
5. नरेन्द्र देव वर्मा : छत्तीसगढ़ी का उद्‌विकास
6. चितरंजन कर एवं अन्य : छत्तीसगढ़ी की व्याकरणिक–कोटियाँ
7. हीरालाल काव्योपाध्याय : ए ग्रामर आफ छत्तीसगढ़ी डायलेक्ट
8. शंकर शेष : छत्तीसगढ़ी का भाषाशास्त्री अध्ययन

चौथा प्रश्न पत्र

छत्तीसगढ़ी साहित्य के इतिहास

1. आदि युग : गाथा युग–प्रेम प्रधान गाथाएँ, धार्मिक अउ पौराणिक गाथाएँ

2. मध्य युग (भक्ति काल) वीरगाथाएँ, धार्मिक अउ सामाजिक गीत

3. आधुनिक युग : पद्य साहित्यकार– सुंदर लाल शर्मा, हरि ठाकुर, दानेश्वर शर्मा, द्वारिका प्रसाद तिवारी, कोदूराम दलित, पवन दीवान, श्यामलाल चतुर्वेदी,

4. आधुनिक युग के गद्य साहित्यकार – मोंगरा (शिवशंकर), चंदा अमारित बरसाइत (लखन लाल गुप्त), कुल के मरजाद (केयूरभूषण)

   कहानी – केयूर भूषण(आँसू म फिले अचरा), परदेसी राम वर्मा(छपरा), सत्यभामाआडिल (सीख–सीख के गोठ)

5. नाटक/निबंध – खूबचंद बघेल (करमछड़हा), नंदकिशोर तिवारी (परेमा)
   निबंध – पालेश्वर शर्मा(गुड़ी के गोठ)

निर्धारित पुस्तक सूची :–

1. नरेन्द्र देव वर्मा : छत्तीसगढ़ी का उद्विकास
2. शंकुतला वर्मा : छत्तीसगढ़ी लोक–जीवन और लोक–साहित्य का अध्ययन
3. दयाशंकर शुक्ल : छत्तीसगढ़ी लोक–साहित्य का अध्ययन
4. प्यारेलाल गुप्त : प्राचीन छत्तीसगढ़
5. नंदकिशोर तिवारी : छत्तीसगढ़ी साहित्य का ऐतिहासिक अध्ययन
6. बिहारी लाल साहू : छत्तीसगढ़ी साहित्य और भाषा
7. अनसुइया अग्रवाल : छत्तीसगढ़ी लोकोक्तियाँ और जन–जीवन
8. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा
9. महावीर अग्रवाल (संपादक) : हमर छत्तीसगढ़
10. शत्रुहन लाल पाण्डेय : छत्तीसगढ़ी का गद्य–साहित्य

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छत्तीसगढ़ी के लोक साहित्य अउ संस्कृति

1. छत्तीसगढ़ी लोककला : उद्‌भव अउ विकास; लोककला अउ कलाकार (रामचंद्र देशमुख, महासिंह चंद्राकर, दुलार सिंह)

2. छत्तीसगढ़ के जनजातिय संस्कृति (सरहुल, करमा, मुड़िया नुत्य, माड़िया नृत्य, गोंडी, हल्बी, दोरला के संदर्भ म)

3. छत्तीसगढ़ के लोकनाट्य – गम्मत, रहस, नाचा के परिचय

4. लोककला (लोकगाथा) – पंडवानी, भरथरी(झाडूराम देवांगन, देवदास बंजारे, तीजनबाई, सूरजबाई खांडे आदि)

5. राउतनाचा, सुआ नृत्य, चंदैनी, ददरिया, पंथीनृत्य, करमा, लोकनृत्य के संक्षिप्त परिचय

निर्धारित पुस्तक सूची :–

1. बिहारी लाल साहू : छत्तीसगढ़ी लोक साहित्य एवं भाषा
2. नंदकिशोर तिवारी : छत्तीसगढ़ी साहित्य का ऐतिहासिक अध्ययन
3. शंकुतला वर्मा : छत्तीसगढ़ी लोक–जीवन और लोक–साहित्य का अध्ययन
4. दयाशंकर शुक्ल : छत्तीसगढ़ी लोक–साहित्य का अध्ययन
5. नरेन्द्र देव वर्मा : छत्तीसगढ़ी का उद्‌विकास
6. बलदेव प्रसाद मिश्र : छत्तीसगढ़ परिचय
7. प्यारे लाल गुप्त : प्राचीन छत्तीसगढ़
8. महावीर अग्रवाल (संपादक) : हमर छत्तीसगढ़

छठा प्रश्न–पत्र

छत्तीसगढ़ी के सीमावर्ती भाषा अउ बोली

1. छत्तीसगढ़ी अउ पूर्वी हिन्दी के बोली
2. छत्तीसगढ़ी के सीमावर्ती भाषा अउ बोली
3. छत्तीसगढ़ी अउ उड़िया भाषा
4. छत्तीसगढ़ी अउ मराठी भाषा
5. पूर्वी हिंदी के परिचय अउ बिशेषता

निर्धारित पुस्तक सूची :

1. नरेन्द्र देव वर्मा : छत्तीसगढ़ी का उद्‌विकास
2. व्यास नारायण दुबे : छत्तीसगढ़ी जन भाषा
3. प्यारे लाल गुप्त : प्राचीन छत्तीसगढ़
4. बिहारी लाल साहू : छत्तीसगढ़ी लोक साहित्य अउ भाषा
5. बलदेव प्रसाद मिश्र : छत्तीसगढ़ परिचय
6. भालचंद्र राव तैलंग : छत्तीसगढ़ी, हलबी, भतरी का भाषावैज्ञानिक अध्ययन
7. कांति कुमार : छत्तीसगढ़ी बोली, व्याकरण एवं कोश

सातवाँ प्रश्नपत्र

छत्तीसगढ़ी काव्य

1. आदिकालीन काव्य – राम और कृष्ण काव्य, वीर गाथा – अहिरन रानी, रेवा रानी फुलबासन

2. मध्यकालीन काव्य – सुंदर लाल शर्मा – दानलीला
   मुकुटधर पांडे – मेघदूत

3. आधुनिक काव्य – प्यारेलाल गुप्त, हरि ठाकुर, नारायण लाल परमार नरेद्र देव वर्मा

4. नवगीतकार एवं उनकी रचना – जीवन यदु, लक्ष्मण मस्तुरिया, पवन दीवान, लाला जगदलपुरी

5. द्रुत पाठ के कवि – निरूपमा शर्मा , दानेश्वर शर्मा, केयूर भूषण, रामेश्वर वैष्णव

निर्धारित पुस्तक सूची :

1. सुंदर लाल शर्मा : दानलीला

2. नरेन्द्र देव वर्मा : छत्तीसगढ़ी का उद्विकास

3. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा

4. बलदेव प्रसाद मिश्र : छत्तीसगढ़ परिचय

5. महावीर अग्रवाल (संपादक) : हमर छत्तीसगढ़

आठवाँ प्रश्न–पत्र

कार्यालयीन छत्तीसगढ़ी

1. छत्तीसगढ़ी भाषा – मौखिक अउ लिखित औपचारिक अउ अनौपचारिक छत्तीसगढ़ी; मानक छत्तीसगढ़ी

2. कार्यालयीन छत्तीसगढ़ी के प्रयोग–क्षेत्र, टिप्पन, प्रारूपन अउ संक्षेपन

3. छत्तीसगढ़ी के प्रशासनिक शब्दावली

4. विज्ञान अउ तकनीकी शब्दावली

5. छत्तीसगढ़ी भाषा में कोड मिश्रण, संस्कृत अउ छत्तीसगढ़ी, अरबी–फारसी अउ छत्तीसगढ़ी, ॲग्रेजी अउ छत्तीसगढ़ी, आदि।

निर्धारित पुस्तक सूची :

1. केशरी लाल वर्मा : कार्यालयीन हिंदी

2. नंदकिशोर तिवारी(संपादक) : लोकाक्षर (छत्तीसगढ़ी त्रैमासिक पत्रिका)

3. महावीर अग्रवाल (संपादक) : हमर छत्तीसगढ़

4. हीरालाल काव्योपाध्याय : ए ग्रामर ऑफ छत्तीसगढ़ी डायलेक्ट

5. कैलाश नाथ पाण्डेय : प्रयोजनमूलक हिन्दी की नयी भूमिका

6. सुरेश माहेश्वरी : कार्यालयी हिन्दी एवं कार्यालयी अनुवाद तकनीक

7. कृष्ण कुमार गोस्वामी : प्रयोजनमूलक भाषा और कार्यालयी हिन्दी

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छत्तीसगढ़ी के शब्द–संरचना

1. शब्द–संरचना – तत्सम, तद्भव, देशज अउ विदेशी शब्द
2. अर्थ–संरचना – अनेकार्थी, विलोमर्थी पर्यायवाची, अमिधा, लक्ष्मण व्यंजना, वाक्यांश के लिए एक शब्द अउ समूहवाची शब्द
3. रूप–संरचना : प्रत्यय अउ उपसर्ग
4. मुहावरे, लोकोक्तियाँ अउ पहेलियाँ; अर्थ अउ वाक्य–प्रयोग
5. विशेषण से संज्ञा बनाना, क्रिया से संज्ञा अउ विशेषण बनाना, संज्ञा से क्रिया विशेषण बनाना

निर्धारित पुस्तक सूची :–

1. बिहारी लाल साहू : छत्तीसगढ़ी पहेलिकाएँ और संस्कृति
2. मंगत रवीन्द्र : छत्तीसगढ़ी व्याकरण
3. वासुदेव नंदन प्रसाद : आधुनिक हिंदी व्याकरण और रचना
4. गणेश खरे : हिंदी स्वरूप और प्रयोग
5. रमेशचंद्र महरोत्रा एवं अन्य : छत्तीसगढ़ी लोकोक्तियाँ कोश
6. ऋषभ नारायण वर्मा : छत्तीसगढ़ी भाषा का अंग्रेजी अनुवाद
7. हरिठाकुर एवं अन्य : छत्तीसगढ़ी भाषा, मुहावरे, लोकोक्तियाँ एवं लोक गीत
8. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा
9. राजेन्द्र सोनी एवं अन्य : आओ सीखें छत्तीसगढ़ी
10. रमेशचंद्र महरोत्रा एवं अन्य : छत्तीसगढ़ी मुहावरा कोश

दसवाँ प्रश्न–पत्र

छत्तीसगढी के भाषा–भूगोल

1. छत्तीसगढ़ी म विभिन्न भाषामन के प्रयोग, अउ क्षेत्र, भाषा प्रयोग म शैली–भेद अउ सांस्कृतिक–भेद।

2. छत्तीसगढ़ी भाषा का सामाजिक संदर्भ – द्विभाषिकता, पिजिन, क्रियोल, डिग्लोसिया (भाषा द्वैत), कोड़ मिश्रण अउ कोड परिवर्तन।

3. छत्तीसगढ़ी म संबोधन अउ मैत्रिय संबंध

4. छत्तीसगढ़ी रिश्ते–नाते अउ रंगमन के शब्दावली

5. छत्तीसगढ़ी भाषा के भेदक रूप के व्यवहार अउ मानचित्र

निर्धारित पुस्तक सूची :–

1. कैलाश चंद्र भाटिया : भाषा–भूगोल

2. मुरारी लाल उप्रेती : भाषा–सर्वेक्षण

3. उदय नारायण तिवारी : भाषा–शास्त्र की रूपरेखा

4. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा

5. रवीन्द्रनाथ श्रीवास्तव : हिंदी का सामाजिक सन्दर्भ

6. महावीर शरण जैन : भाषा एवं भाषाविज्ञान

7. भोलानाथ तिवारी : भाषाविज्ञान

8. हीरालाल शुक्ल : शब्द–भूगोल

9. मधु धवन : भाषान्तरण कला : एक परिचय

ग्यारवाँ प्रश्न पत्र

प्रायोजन मूलक छत्तीसगढ़ी

1. भाषा के विविध रूप – क्षेत्रीय छत्तीसगढ़ी, साहित्यिक छत्तीसगढ़ी, सामान्य छत्तीसगढ़ी, मानक छत्तीसगढ़ी, राजभाषा छत्तीसगढ़ी

2. जनसंचार के भाषा – समाचार–पत्र अउ पत्रिका के भाषा, दृश्य–श्रव्य माध्यम के छत्तीसगढ़ी

3. छत्तीसगढ़ी म विज्ञापन, समाचार, छत्तीसगढ़ी के समाचार–पत्र एवं पत्र–पत्रिका

4. विभिन्न पारिभाषिक शब्दावली, अनुवाद एवं निर्माण अउ विभिन्न विभागों की विशिष्ट पारिभाषिक शब्दावली–रेल, बैंक, डाकविभाग, पुलिस, न्यायालय, मंत्रालय आदि।

5. पाठ्यक्रम म छत्तीसगढ़ी : स्वरूप निर्धारण

निर्धारित पुस्तक सूची :

1. भोलानाथ तिवारी : भाषा विज्ञान

2. सत्यभामा आडिल : छत्तीसगढ़ी का व्यावहारिक शब्दकोश

3. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा

4. बिहारी लाल साहू : छत्तीसगढ़ी लोक भाषा और साहित्य

5. मंगल रवीन्द्र : छत्तीसगढ़ी व्याकरण

6. चंदकुमार चंद्राकर : मानक छत्तीसगढ़ी व्याकरण

7. रमेश चंद्र महरोत्रा एवं अन्य : मानक छत्तीसगढ़ी सुलभ व्याकरण

8. चितरंजन कर एवं अन्य : छत्तीसगढ़ी की व्याकरणिक कोटियाँ

बारवाँ प्रश्न–पत्र

राजभाषा छत्तीसगढ़ी

1. राजभाषा छत्तीसगढ़ी की अवधारणा
   संविधान में राजभाषा अधिनियम

2. राजभाषा का मानकीकरण
   ऐतिहासिक अउ, आधुनिकीकरण

3. वर्तनी–संबंधी मानकीकरण, शब्द–संबंधी मानकीकरण, अर्थ–संबंधी मानकीकरण, वाक्य–संबंधी मानकीकरण

4. कार्यालयीन/प्रशासनिक छत्तीसगढ़ी के प्रयुक्तियाँ
   वाणिज्य, ब्यापार, रेल, बैंक, विधि, विज्ञापन, यातायात, आदि।

5. सामाजिक स्तर–भेद के आधार पर छत्तीसगढ़ी–शिक्षा, प्रशासनिक, धर्म, समाज, आदि।

निर्धारित पुस्तक सूची :

1. सुधीर शर्मा : राजभाषा छत्तीसगढ़ी

2. व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा

3. विभाष कुमार झा एवं अन्य : छत्तीसगढ़ समग्र

4. हीरालाल शुक्ल : शब्द–भूगोल

5. हरिठाकुर एवं अन्य : छत्तीसगढ़ी भाषा, मुहावरे, लोकोक्तियाँ एवं लोक गीत

6. कैलाश नाथ पाण्डेय : प्रयोजनमूलक हिन्दी की नयी भूमिका

7. सुरेश माहेश्वरी : कार्यालयी हिन्दी एवं कार्यालयी अनुवाद तकनीक

8. कृष्ण कुमार गोस्वामी : प्रयोजनमूलक भाषा और कार्यालयी हिन्दी

9. ओम्प्रकाश सिंहल : प्रयोजनमूलक व्यावहारिक हिन्दी

एम. ए. (छत्तीसगढ़ी) : चौथा सेमेस्टर
तेरहवाँ प्रश्न–पत्र

छत्तीसगढ़ी के वाक्य संरचना

1. वाक्य–संरचना के आधार पर – सरल, मिश्र और संयुक्त वाक्य
2. छत्तीसगढ़ी के वाक्य अउ उपवाक्य – संज्ञा उपवाक्य, विशेषण उपवाक्य, क्रिया उपवाक्य, क्रिया विशेषण उपवाक्य
3. पदबंध–संरचना अउ पदक्रम – संज्ञा–पदबंध, सर्वनाम–पदबंध, विशेषण–पदबंध, क्रिया–पदबंध, क्रिया विशेषण–पदबंध
4. छत्तीसगढ़ी सब्द म असुद्धि अउ निराकरन
5. छत्तीसगढ़ी म विराम–चिह्नों के असुद्धि

निर्धारित पुस्तक सूची :–

1. भोलानाथ तिवारी : वाक्य विज्ञान
2. कांति कुमार : छत्तीसगढ़ी व्याकरण बोली और कोश
3. हरिठाकुर एवं अन्य : छत्तीसगढ़ी भाषा, मुहावरे, लोकोक्तियाँ एवं लोक गीत
4. हीरालाल शुक्ल : शब्द–भूगोल
5. सूरज भान सिंह : हिंदी का वाक्यात्मक व्याकरण
6. कामताप्रसाद गुरू : हिंदी व्याकरण

चौदवाँ प्रश्न पत्र

छत्तीसगढ़ी अउ अनुवाद

1. अनुवाद के परिभाषा, उद्देश्य एवं महत्व और प्रकार
2. अनुवाद के सीमा – सफल अनुवादक के गुन, अनुवाद के सिद्धान्त, अनुवाद की भाषा
3. छत्तीसगढ़ी ले हिंदी अनुवाद (पद्यांश/गद्यांश, पाठ)
4. हिंदी ले छत्तीसगढ़ी अनुवाद (पद्यांश/गद्यांश, पाठ)
5. छत्तीसगढ़ी अनुवाद (स्वेच्छा से)– हलबी, भतरी, गोंडी, सरगुजिया, लरिया

निर्धारित पुस्तक सूची :–

1. सुरेश कुमार : अनुवाद : सिद्धान्त की रूपरेखा
2. भोलानाथ तिवारी : अनुवाद–विज्ञान
3. रवीन्द्रनाथ श्रीवास्तव एवं गोस्वामी : अनुवाद सिद्धान्त और समस्याएँ
4. कैलाशचंद्र भाटिया : अनुवाद कला सिद्धान्त और प्रयोग
5. भोलानाथ तिवारी एवं किरण बाला : भारतीय भाषाओं से अनुवाद की समस्याएँ

पंद्रवाँ प्रश्न–पत्र

छत्तीसगढ़ के तीज–तिहार अउ परंपरा

1. छत्तीसगढ़ के लोक–जीवन, धार्मिक अउ ओखर सामाजिक महत्व

2. छत्तीसगढ़ी लोकगीत – नारी गीत, पुरूष गीत, जातीय गीत, ऋतु गीत, बालक गीत

3. छत्तीसगढ़ी संस्कार–गीत अउ गहना

4. छत्तीसगढ़ के तीज–तिहार – अक्ती, हरेली, राखी, खमरछठ, पोला तीजा, नवरात्रि, दशहरा, देवारी, अउ होरी आदि।

5. छत्तीसगढ़ के लोक चित्रकला – चौक, सदनाही, आटे कन्हैया, हरितालिका, गोबर चित्रकला, घर सिंगार, विवाह चित्र, अउ गोदना आदि।

निर्धारित पुस्तक सूची :–

1. मन्नू लाल यदु : छत्तीसगढ़ की लोकोक्तियों का भाषावैज्ञानिक अध्ययन

2. हीरालाल शुक्ल : शब्द–भूगोल

7. कांति कुमार : छत्तीसगढ़ी; व्याकरण बोली और कोश

8. हरिठाकुर एवं अन्य : छत्तीसगढ़ी भाषा, मुहावरे, लोकोक्तियाँ एवं लोक–गीत

9. चितरंजन कर एवं अन्य : छत्तीसगढ़ी की व्याकरणिक–कोटियाँ

10. हीरालाल काव्योपाध्याय : ए ग्रामर आफ छत्तीसगढ़ी डायलेक्ट

सोलवाँ प्रश्न–पत्र

प्रायोगिक प्रक्षिशन अउ आंतरिक मूल्यांकन

1. जनजाति भाषा अउ ओखर संस्कृति
2. छत्तीसगढ़ी शब्दावली के संकलन
3. कोनो पद्य के छत्तीसगढ़ी अनुवाद
4. कोनो गद्य के छत्तीसगढ़ी अनुवाद
5. छत्तीसगढ़ के लोक साहित्य अउ प्रचलित शब्द के संकलन

निर्धारित पुस्तक सूची :–

1. कांति कुमार : छत्तीसगढ़ी; व्याकरण बोली और कोश
2. हरिठाकुर एवं अन्य : छत्तीसगढ़ी भाषा, मुहावरे, लोकोक्तियाँ एवं लोक गीत
3. चितरंजन कर एवं अन्य : छत्तीसगढ़ी की व्याकरणिक–कोटियाँ
4. हीरालाल काव्योपाध्याय : ए ग्रामर आफ छत्तीसगढ़ी डायलेक्ट
5. गोलोक बिहारी धल : ध्वनि–विज्ञान
6. शंकर शेष : छत्तीसगढ़ी का भाषाशास्त्री अध्ययन
7- व्यास नारायण दुबे : छत्तीसगढ़ी जनभाषा

M A ENGLISH

SYLLABUS

SESSION 2017 -18

INDEX

SEMESTER :

Semester-I & Semester-II

Semester-III & Semester-IV

ANNUAL EXAMINATION :

M.A. English Previous

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- - - - - - -

M A ENGLISH

SYLLABUS OF SEMESTER SYSTEM

M.A. ENGLISH (SEMESTER SYSTEM)
2017-18
SCHEME OF MARKS

FIRST SEMESTER

Semester	Paper	Title	Marks Theory/ Internal	Total
I	I	Poetry – I	80 20	100
	II	Drama – I	80 20	100
	III	Prose – I	80 20	100
	IV	Fiction-I	80 20	100
			Total	400

SECOND SEMESTER

Semester	Paper	Title	Marks Theory/ Internal	Total
II	I	Poetry – II	80 20	100
	II	Drama – II	80 20	100
	III	Prose – I I	80 20	100
	IV	Fiction-II	80 20	100
			Total	400

M.A. ENGLISH
SEMESTER - I

PAPER - I
POETRY – I

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study

UNIT-II- Chaucer : Prologue to Canterbury Tales (Detailed)

UNIT-III - John Donne: Death Be not Proud, Valediction, Forbidden Mourning, The Good Morrow, Extasie, Cannonization (Detailed)
Shakespeare : Sonnets1,18,26,54,55,60,116 (Non- detailed) Andrew Marvell : To His Coy Mistress (Non - detailed)

UNIT-IV- John Milton : Paradise Lost – Book 1 (Detailed)
John Dryden : Absalom and Achitophel (Non - detailed)

UNIT-V- Alexander Pope : Rape of the Lock (Detailed Study)
Thomas Gray: Elegy Written in a Country Churchyard (Detailed)
Blake : The Tyger, Ah: Sunflower

M.A.ENGLISH
SEMESTER – I
PAPER - II
DRAMA - I

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study.

UNIT-II Christopher Marlowe : Dr. Faustus (Detailed)

UNIT-III Ben Jonson : The Alchemist (Non - detailed) John W
ebster : The Duchess of Malfi (Detailed)

UNIT-IV William Shakespeare : Hamlet (Non- detailed)
Macbeth (Detailed)

UNIT-V William Shakespeare : King Henry IV- Part I (Non- detailed)
The Tempest (Detailed)

M.A. ENGLISH
SEMESTER - I
PAPER - III
PROSE - I

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study.

UNIT-II Francis Bacon : Selected Essays : Of Studies, of Friendship, Of Truth, Of Beauty (All – Detailed)

UNIT-III Thomas Browne : Urn Burial (Detailed Study)
John Milton : Aeropagitica (Non - detailed)

UNIT-IV Joseph Addison : Sir Roger at Home, Sir Roger at Assizes, Sir Roger at Church (All Detailed)
Richard Steele : Recollections of Childhood, A Day in London, The Spectator Club (Non -detailed)
Rousseau : Confessions (Non -detailed)

UNIT-V Samuel Johnson : Life of Milton (Non -detailed)
R. L. Stevenson : Walking Tours, Apology for Idlers, El Dorado (Alldetailed)

M.A. ENGLISH

SEMESTER - I
PAPER - IV
FICTION - I

Maximum marks 80

UNIT-I Important Literary Movements : Renaissance to Modern Age: Renaissance, Reformation, Metaphysical Poetry, Classicism, Neo- Classicism, Romanticism, Development of Novel from Bunyan to Modern Age.

UNIT-II John Bunyan: The Way of the World
Daniel Defoe: Robinson Crusoe

UNIT-III Henry Fielding : Joseph Andrews
Oliver Goldsmith : The Vicar of Wakefield

UNIT-IV Sir Walter Scott : Ivanhoe
Jane Austen : Pride and Prejudice

UNIT-V Charles Dickens : Great Expectations
Thomas Hardy : Tess of the D‟urbervilles

M.A. ENGLISH (2017-18)
SEMESTER II
PAPER-I
POETRY II

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study.

UNIT-II William Collins : Ode to Evening (Detailed)
W . Cowper : The Solitude Of Alexander Selkirk (Non -detailed)

UNIT-III William Wordsworth : Tintern Abbey;Ode On Intimations of Immortality (Detailed)

Samuel Taylor Coledridge : Kubla Khan; Dejection : An Ode (Non Detailed)

UNIT-IV P.B. Shelley : Ode to W est Wind, To the Skylark (Non -detailed)
John Keats :Ode to a Nightingale; Ode on a Grecian Urn, Ode to Autumn (Detailed)

UNIT-V Tennyson : Lotus Eaters, Ulysses (Non - detailed)
Robert Browning : My Last Duchess ; Prospice, The Last Ride Together (All Detailed)
Mathew Arnold Scholar Gypsy (Non - detailed)

M.A. ENGLISH

SEMESTER II

PAPER - II

DRAMA - II

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study.

UNIT-II William Congreve : The Way of the World (Detailed)
Oliver Goldsmith : She Stoops to Conquer (Non-detailed).

UNIT-III J. M. Synge : Riders to the Sea (Detailed).
G. B. Shaw : Saint Joan (Non -detailed)

UNIT-IV T. S. Eliot : Murder in the Cathedral (Detailed)

UNIT-V Ibsen : A Doll's House (Non -detailed)

Chekov: The Cherry Orchard (Non- detailed)

M.A. ENGLISH
SEMESTER II
PAPER - III
PROSE – II

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study.

UNIT-II Charles Lamb: Dream Children, Dissertation Upon a Roasted Pig,
A Bachelor‟s Complaint,Christ‟s Hospital(All Detailed)

William Hazlitt: On Going a Journey, Indian Jugglers(Non- detailed)

UNIT-III Carlyle : Hero as Poet, Hero as a man of letters (Detailed)
Ruskin : Sesame (Non-detailed)

UNIT-IV Robert Lynd : On Forgetting, The Pleasure of Ignorance(Non -detailed)
A. G. Gardiner : On Saying Please, On the Rule of the Road (D)

UNIT-V Thomas Moore : Utopia (Non-detailed)
Machiavelli : The Prince (Non -detailed)

M.A. ENGLISH

SEMESTER II

Maximum marks 80

PAPER - IV
FICTION - II

UNIT-I - Figures of Speech, Structuralism, Imagism, Symbolism, Stream of Consciousness, Science Fiction.

UNIT-II James Joyce : Portrait of the Artist as a Young Man.
Virginia W oolf : Mrs. Dalloway

UNIT-III- D. H. Lawrence : Sons and Lovers
George Orwell : Animal Farm

UNIT-IV Joseph Conrad : Heart of Darkness
W illiam Golding : Lord Of Flies

UNIT-V Chinua Achebe : Anthills of Savannah
Bapsi Sidhwa : Ice- Candy Man

RECOMMENDED READING FOR MA ENGLISH (SEMESTER SYSTEM)
SEMESTER - I
PAPER - I, POETRY – I

- Tillyard : Milton
- C.M. Bowra : From Virgil to Milton
- B. Rajan : Paradise Lost and 17th Century Reader
- Ifor Ivans : A Short History of English Literature
- Bradley : Oxford Lectures on Poetry
- C.S. Lewis : A Preface to Paradise Lost

C.T.Thomas : Paradise Lost

- Mark Van Doren : John Dryden.
- Tillotson : On the Poetry of Pope.
- M. Mack : Pope and His Contemporaries

PAPER - II, DRAM A - I

- A.C. Bradley : Shakespearean Tragedy
- G. Wilson Knight : The Essential Shakespeare
- Boas : Marlowe
- A.L. Williams Ed. : Twentieth Century Interpretations of the Works of Marlowe.
- Nicoll : Theory of Drama
- F.P. Wilson : The English Drama. Clarendon Press,
- T.B. Tomlinson : A Study of Elizabethan and Jocobean Tragedy .
- Anne Barton : Ben Jonson, Dramatist (Cambridge University. Press.)
- F.H. Marres : The Alchemist. (Cambridge University. Press.)

P.Weller9series): Hamlet. Macbeth

PAPER - III, PROSE – I

- Sukanta Chowdhary : Bacon‟s Essays
- Corthope : Addison
- Hugh Walker : English Essays and Essayists
- Dobre : English Prose Style
- Smithens : Life of Joseph Addison
- B.Prasad : An Introduction to the Study of Literature

PAPER - IV, FICTION- I

- Mcllongh Bruce : Representative English Novels
- Barbara Nardy : Moral Art of Dickens
- Beach J. Warren : The Technique of Thomas Hardy
- Edward Wagenknecht : Cavacadet English Novel
- Malcolm Bradburry : The Modern British Novel
- Kettle Arnold : An Introduction to English Novel Vol. I, Vol. II

SEMESTER - II
PAPER - I, POETRY - II

- C.M. Bowra : The Romantic Imagination
- Walter Jackson Bate : From Classes to Romantic
- R.A. Scolt James : The making of Literature
- Basil Welley : The Eighteenth Century Background
- J. Jacson : Collected Coleridge

PAPER - II, DRAMA - II

David Green and E.M. Stephens : J.M. Synge
Lady Gregons : Our Irish Theatre
Nicholas Grene : Synge : A critical study of the plays.
Raynond W illiams : Drama from Ibsen to Brecht
A Nicoll : History of the English Drama 1660 -1900
Eric, Entley : Shaw : A Reconsideration
Martin meisel : Shaw and the Nineteenth Century Theatre
Joseph Chian : T.S. Eliot Poet and Dramatist
R. David Clark : Twentieth Century Interpretation of Murder in Cathedral

PAPER - III, PROSE - II

Minto : A mannal of English Prose Legouis
and Cazamian : A Histor y of English Literature
Compton-Rickett : A History of English Literature
Hugh W alker : The Literature of the Victorian Era.]
A.C. Benson : Ruskin
E. Albert : A History of English Literature
B. W illey : Nineteenth Century Study

PAPER - IV, FICTION - II

M.H. Abrams : A glossary of Literar y Terms
J.A. Cuddon : Dictonary of Literary Terms and Literary theory
Karl Fredrick : Joseph Conrad : The three Lives : A Biography
Cadric W alts : Conrad's Heart of Darkness : A Critical and contextual Discussion.
Ian W att : Convad in the nineteenth Cantury
David Caroll : Chinua Achebe
Jayafoxm raw : Culture and anarchy in the Novels of Chinua Achebe
C L Inneo and B lind fors : Critical perspective on Chinua Achebe
R.K. Dhawan : The Novels of Bapsi Sidhwa.
P.Ashok: : A Companion To Literary Forms

MA ENGLISH (SEMESTER SYSTEM) 2017-18
SCHEME OF MARKS
THIRD SEMESTER

Semester	Paper	Title	Marks Theory/ Internal	Total
III	**I**	Critical Theory – I	**80 20**	**100**
	II	Indian Writing in English – I	**80 20**	**100**
	III	American Literature – I	**80 20**	**100**
	Optional papers- **IV**(A) Or IV (B)	Linguistics – I **Or** English Language Teaching	**80 20**	**100**
	V (A) Or V (B)	Romanticism – I **Or** Modernist Literature – I	**80 20**	**100**
			Total	**500**

MA ENGLISH (SEMESTER SYSTEM) 2017-18
SCHEME OF MARKS
FOURTH SEMESTER

Semester	Paper	Title	Marks Theory/ Internal	Total
IV	**I**	Critical Theory– II	**80 20**	**100**
	II	Indian Writing in English – II	**80 20**	**100**
	III	American Literature – II	**80 20**	**100**
	Optional papers-IV(A) Or IV (B)	Linguistics – II **Or** English Language Teaching	**80 20**	**100**
	Optional papers V (A) Or V (B)	Romanticism – II **Or** Modernist Literature – I I	**80 20**	**100**
			Total	**500**

M. A. ENGLISH
SEMESTER - III
PAPER - I
CRITICAL THEORY - I

Maximum marks 80

UNIT-I Aristotle – Poetics (Butcher Editon)

UNIT-II Longinus – On the Sublime

UNIT-III Philip Sidney – An Apology for Poesy
John Dryden - Essay on Dramatic Poesy

UNIT-IV William Wordsworth : Preface to Lyrical Ballads
Samuel Taylor Coleridge : Biographia Literaria (Ch XIII to XVII)

UNIT-V Mathew Arnold : Study of Poetry, Function of Criticism

Note : There will not be any passage for explanation.

M. A. ENGLISH
SEMESTER - III
PAPER - II
INDIAN WRITING IN ENGLISH – I

Maximum marks 80

Note: There will not be any passages for explanation.

UNIT-I Sri Aurobindo : Savitri – Book I, Canto I.
Tagore : Songs 1to 15 from Gitanjali

UNIT-II Kamla Das : The Freaks, A Hot Noon in Malabar, The Looking Glass, The Sunshine Cat.
Nissim Ezekiel : Enterprise, Poet Lover and Birdwatcher, Night of Scorpion.

UNIT-III Girish Karnad : Nagamandala
Vijay Tendulkar : Silence! The Court is in Session

UNIT-IV Raja Rao : Kanthapura
Mulk Raj Anand : Coolie

UNIT-V V. S. Naipaul : A House for Mr. Biswas
Bharti Mukherjee: Jasmine

M. A. ENGLISH
SEMESTER - III
PAPER - III
AMERICAN LITERATURE - I

Maximum marks 80

Note : There will not be any passages for explanation

UNIT-I Walt Whitman : When Lilacs Last in the Door yard Bloomed
I Hear America Singing

UNIT-II Emily Dickinson : Bring Me the Sunset in a Cup (128), The Soul Selects her Own Society (303)
Some Keep the Sabbath Going to Church(324)
There Has Been a Death in the Opposite House (389)

UNIT-III Wallace Stevens : Peter Quince at the Clavier
Of Modern Poetry
Sunday Morning
A Postcard from the Volcano

UNIT-IV R. W . Emerson : Self Reliance
Henry David Thoreau : Civil Disobedience

UNIT-V Puritanism, Democracy in America, Romanticism in America,
Indian Thought in Emerson, Thoreau and Whitman, New England Renaissance

M. A. ENGLISH
SEMESTER-III

PAPER - IV (A) LINGUISTICS - I

Maximum marks 80

UNIT-I -Language : Definition, Human Language and its difference with Animal Communication, speech and writing as two manifestations of language, Characteristics of Human Language.

UNIT-II -Linguistics:Definition,Objective,Branches Of Linguistics:Phonetics, Phonology, Morphology, Syntax and Semantics. Linguistics and related disciplines.

UNIT-III- Phonetics – Definition, Branches: Articulatory Phonetics, Acoustic Phonetics, Auditory Phonetics.The Organs of Speech and their functions.

UNIT-IV- Classification of Human Speech Sounds: Characteristics of Vowels and Consonants, similarities and differences between Vowels and Consonants Phonetic Symbols (IPA)

UNIT-V Classification of Vowels: On the basis of height of the tongue, parts of the tongue, position of soft palate, position of muscles and length.

Classification of Consonants : On the basis of place and manner of articulation, aspiration and voicing Sound attributes : Length, Stress, Pitch, Intonation and Juncture.

M. A. ENGLISH
SEMESTER - III
PAPER - IV (B)
ENGLISH LANGUAGE TEACHING - I

Maximum marks 80

UNIT-I -What language teaching is about? Distinction between L 1 and L 2 , Second Language learning and bilingualism second language versus foreign language learning and acquisition.

UNIT-I Language Teaching Theories

Grammar Translation or Traditional Method

The Direct Method
The Reading Method

UNIT-III The Teaching of

Segmental Features of English
The Supra Segmental Features of English

UNIT-IV Audio Visual and Supplementar y Aids

The use of Audio Visual aids in teaching, Aids Supplementar y to text Books.

UNIT-V Language Teaching:The Construction and use of language tests techniques to test the production sound segments, techniques for testing of intonation.

M. A. ENGLISH
SEMESTER – III
PAPER - V (A)
ROMANTICISM - I

Maximum marks 80

UNIT-I William W ordsworth : Retrospect – Love of Nature leading to Love of Mankind lines (1 – 100) From Prelude Book – VIII

UNIT-II Samual Taylor Coleridge : Frost at Midnight , Rime of Ancient Mariner

UNIT-III John Keats : Endymion (Book I, Lines 1 -24) Hyperion (Book – I)

UNIT-IV Byron : The Vision of Judgement

John Keats : From the Letters (from English Critical Text edited by Enright and Chickera

UNIT-V Short notes

M. A. ENGLISH
SEMESTER - III
PAPER - V (B)
MODERNIST LITERATURE - I

Maximum marks 80

UNIT-I Annotations from the texts prescribed for detailed study

UNIT-II -Gerard Manly Hopkins : The Windhover(Detailed)
Pied Beauty (Detailed)
Felix Randal (Detailed)
William Butler Yeats :The Second Coming, Sailing to Byzantium, Byzantium (Non - detailed)

UNIT-III -T.S. Eliot : The Waste Land (First two sermons) (Detailed)

UNIT-IV -W . H. Auden : The Shield of Achilles(Detailed),
September 1,1939(Detailed)
In Memory of W .B.Yeats (Detailed)

UNIT-V- Dylan Thomas : Fern Hill, Refusal to Mourn the Death (Non -detailed)

M. A. ENGLISH (2017-2018)
SEMESTER - IV
PAPER - I
CRITICAL THEORY - II

Maximum marks 80

UNIT-I - Bharata : Natyashastra (Rasa and Bhava Theory)
Anandavardhanachar ya : Dhvanyaloka

UNIT-II -T. S. Eliot : Tradition and Individual Talent

UNIT-III -I. A. Richards : Communication of the Artist, Analysis of a Poem

UNIT-IV- Saussure : Nature of Linguistic Sign
Michel Foucault : What is an Author ?

UNIT-V - Northrop Fry : The Function of Criticism
Elaine Showalter : Feminist Criticism in Wilderness

Note : There will not be any passage for explanation

M. A. ENGLISH
SEMESTER - IV
PAPER - II
INDIAN WRITING IN ENGLISH - II

Maximum marks 80

UNIT-I- R. Parthasarthy : From Exile, From Trial, From Homecoming (from Rough Passage, 1977)
Jayanta Mahapatra : Indian Summer, A Missing Person, Hunger

UNIT-II- N. C. Choudhary : The Autobiography of an Unknown Indian
Jawaharlal Nehru : The Discovery of India

UNIT-III - M. K. Gandhi : The Story Of My Experiments with Truth
A.P. J. Kalam : Ignited Minds

UNIT-IV -Shashi Deshpande : The Dark Holds No Terror
Anita Desai : Cry the Peacock

UNIT-V- Amitav Ghosh: The Glass Palace
Arvind Adiga : The White Tiger

Note : There will not be any passage for explanation.

M. A. ENGLISH
SEMESTER - IV
PAPER - III
AMERICAN LITERATURE - II

Maximum Marks 80

UNIT-I- Eugene o"Neill : The Emperor Jones
Tennesse Williams : The Glass Menagerie

UNIT-II- Arthur Miller : All My Sons
Edward Albee : W ho is Afraid of Virginia W oolf ?

UNIT-III-

William Faulkner: The Sound and the Fury
Ernest Hemingway: The Old Man and the Sea

UNIT-IV- Nathaniel Hawthorne : The Scarlet Letter
Mark Twain : The Adventures of Huckleberry Finn

UNIT-V- Expressionism
Naturalism
Realism
Existentialism
The Theatre of the Absurd

Note : There will not be any passage for explanation.

M.A.ENGLISH
SEMESTER IV
PAPER - IV (A)
LINGUISTICS - II

Maximum marks 80

UNIT-I- Phoneme : Definition, Distinctive features of sounds, Allophones, Classification of English phonemes

UNIT-II- Morphology : Morpheme, morph, allomorph, types of morphemes, W ord –classes

UNIT-III -Syntax : Sentence types – Simple, Compound, complex; Constituents, Immediate Constituents, IC Analysis;

Syntactic devices: W ord order, Function words and content words, Government, concord.

UNIT-IV- Semantics : Semene, Types of meaning: Synonym y, Atonym y Polys ym y, Homonymy, Collocation, Sets.

UNIT-V -Introduction to Phrase Structure Grammar.

Limitation to Phrase Structure Grammar

M.A.ENGLISH
SEMESTER IV
PAPER - IV (B)
ENGLISH LANGUAGE TEACHING -II

Maximum marks 80

UNIT-I -Trends in linguistic theories. Beginning of modern linguistics, Language varieties, Aspects of language study – phonology, grammar, lexicology, semantics, Discourses, Bloomfield and American Structuralism. Neof eathian theory, Transformative Generative Grammar.

UNIT-II -Language Teaching Theories

The Audio – Lingual Method

The Audio – Visual Method – Features, sources and history, techniques and theoretical assumptions thereof ;Cognitive theory.

UNIT-III -Teaching the Mechanics of Pronunciation ;Vocabulary; Reading and Writing

UNIT-IV- Audio – Visual and Supplementar y aids Planning for a language laboratory, language laborator y systems, specific advantages provided by language laboratory.

UNIT-V -Language Testing: Techniques to test production of lexical units, testing auditory comprehension, how to test speaking ability, achievement, diagnostic and aptitude testing.

M.A. ENGLISH
SEMESTER IV
PAPER - V (A)
ROMANTICISM - II **Maximum marks 80**

Note :

There will not be any passages for explanation.

UNIT-I- P. B. Shelley : Adonais, Hellas (The world‟s great age begins a new)

UNIT-II -Charles Lamb: Imperfect Sympathies, Valentine's Day
William Hazlitt: On Actors and Acting(I and II),On Going a Journey

UNIT-III -Sir Walter Scott : The Bride of Lammermoor
Jane Austen : Emma

UNIT-IV -Shelley : A Defence of Poetry
M. H. Abrams : Orientation of Critical Theories (From The Mirror and the Poetry)

UNIT-V Short notes

M.A.ENGLISH
SEMESTER - IV
PAPER - V (B)
MODERNIST LITERATURE - II

Maximum marks 80

Note : There will not be any passage for explanation.

UNIT-I Samuel Becket : Waiting for Godot

UNIT-II John Osborne : Look Back in Anger

UNIT-III J. M Coetzee : Disgrace
Doris Lessing : The Grass is Singing

UNIT-IV Margaret Atwood : The Edible Woman

UNIT-V Edward Said: Orientalism

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Recommended Reading for Papers of SEMESTER-III and SEMESTER-IV

CRITICAL THEORY

Allen Tate : Tension in Poetry

Trilling, Lionel : "Sense of the Past"

Richards I.A. "Four Kinds of Meaning"

Ranson, J.C. "Criticsm as Pure Speculation"
Bodkin,Maud Archetypal PaT

A.Chaskar: An

Introduction To Literary Theory &

Criticism

M.S.A.Nagrajan : English

Literary Criticism & Theory

INDIAN WRITING IN ENGLIS

Ghosh, Aurobindo: Savitri

Radhakrishan, S.:The Creative Life

Nahal, Chaman: Azadi

Bhattacharya, Bhabani: Dream in Hawaili

Joshi, Arun : The Strange Case of Billy Biswas

Singh, Khuswant : Train to Pakistan

Sahgal, Nayantara : The Day in the Shadow

Venkataramani, K.S. Murugan the Tillar‟

Nagarajan, K. :The Chronicles of Kedaram
Desai, Anita : Fire on the Mountain

Jayakrishna Nair : Cutting Edges : Biology of Experience in the Poetr y of Kamla Das

AMERICAN LITERATURE

Emerson, Ralph W :Nature, The Rhodora,

Brahma, The Poet, Hamatroya Hawthorne Nathaniel :

The House of seven Gables

Melville, Herman : Billy- Budd "Bartleby"

Poe. Edgar, Allan : The Fall of the House of

Usher, The Raven

Lowell, J. Russell : A Fable for Critics

Nanda Dutta : American Literature

Crane Stephen : The Open Boat, The Blue Hotel

James, Henry :The Portrait of a Lady

Draiser, Theodre : Sister Carrie

Howels, W illiam Dean : The Rise of Silas Lapham

Adam, Henry :The Education of Henry Adams

LINGUISTICS

D. Crystal : Linguistics

S.K. Verma & N, Krishnaswam y : Modern Linguistics : An Introduction

ENGLISH LANGUAGE TEACHING

Lado, Robert : Language Testing.

Meres A Edmond : A Language Teachers Guide.

Stern, H.H. : Fundamental concepts of Language Teaching

Corder, S. Pit : Introducing Applied Linguistics

Ed. Kinsella, Valerie : Language Teaching and Linguistics : Surveys

Ed Jailing, Hans : Modern Language Teaching

Hayes, A.S. : Language Laborator y Facilities.

Nagaraja, Geetha : English Language Teaching, Orient Longman

Geeta Nagrajan: English Language Teaching Approaches Methods

V.Saraswati: English Language Teaching Principal & Practice

MODERNIST LITERATURE

Encountering Disgrace: Reading and Teaching Coetzee's Novel- Bill McDonald

Samuel Beckett's Waiting for Godot: A Reference Guide- William Hutchings

Orientalism, Postmodernism, and Globalism- **Bryan S. Turner**

Postcolonial Theory: Contexts, Practices, Politics- **Bart Moore-Gilbert**

SYLLABUS OF ANNUAL EXAM

M.A. PREVIOUS ENGLISH
Session 2017-18

All Four Papers shall be Compulsory

Paper	Title	Total
I	Poetry – I	100
II	Drama – I	100
III	Prose – I	100
IV	Fiction-I	100
TOTAL		400

M.A. PREVIOUS (ENGLISH) 2017-18
PAPER - I
POETRY
(Paper Code - 0301)

UNIT-I	Geoffrey Chaucer	:Prologue to the Canterbury Tales	- D
	Edmund Spenser	:Faerie Queen Book-I	- ND
UNIT-II	William Shakespeare	Sonnets : 1, 18, 26, 54, 60, 116	- ND
	John Donne	Death Be not Proud; Valediction; Forbidden Mourning, Sun rising, Extasie, Canonization-	All D
	John Milton	Paradise Lost, Book I.	–D
UNIT-III-	John Dryden	Absalom and Achitophel	-ND
	Alexander Pope	The Rape of the Lock.	–D
	Thomas Gray	Elegy Written in the Country Church Yard	-ND
UNIT-IV	William Wordsworth :	Intimations of Immortality from, Recollections of Early Childhood Tintern Abbey	- All D
	S.T. Coleridge	Ode to Dejection; Kubla Khan	- ND
	P. B. Shelley	Ode to the West Wind, To Sk ylark	- ND
	John Keats	Ode to Autumn, Ode to Nightingale,,Ode on a Grecian Urn	-All D

UNIT-V	Alfred Tennyson	Lotus Eaters, Ulysses.	– ND
	Robert Browning	My Last Duchess, Prospice , The Last Ride Together,	- All D
	Mathew Arnold	The Scholar Gips y Dover Beach The Forsaken Merman	- All D

Note : 'D' refers to the texts prescribed for detailed study.
'ND' refers to the texts described for Non – detailed study.

Recommended Reading

1. Tillyard — Milton
2. C.M. Bowra — From Virgil to Milton
3. B. Rajan — Paradise Lost and 17 th Centur y Reader
4. Ifor Ivans — A Short History of English Literature
5. Bradley — Oxford Lectures on Poetry
6. C.S. Lewis — A Preface to Paradise Lost
7. Mark Van Doren — John Dryden.
8. Tillotson — On the Poetry of Pope.
9. M. Mack — Pope and His Contemporaries
10. John Batt — - Auguston Satire
11. W alter Jackson Bate — - From Classes to Romantic
12. R.A. Scott James — - The Making of Literature
13. Basil W elley — - The Eighteenth Century Background
14. J. Jacson — -Collected Coleridge
15. C.T.Thomas — : Paradise Lost

PAPER – II
(DRAMA)
(Paper code- 0302)

UNIT-I	Christopher Marlowe	Dr. Faustus	- D
	Ben Jonson	The Alchemist-	ND
	John W ebster	:The Duchess of Malfi	- ND
UNIT-II	W illiam Shakespeare	Twelfth Night	- ND
		Hamlet	- D
		Othello	- ND
		The Tempest	- D
UNIT-III	Congreve	The W ay of the W orld	- ND
	Oliver Goldsmith	She Stoops to Conquer	- ND
UNIT- IV	J. M. Synge	Riders to the Sea	- ND
	G.B. Shaw	Arms and The Man	- ND
	T.S. Eliot	Murder in the Cathedral	- D
UNIT-V	Henrik Ibsen	: A Doll‟s House	- ND
	Anton Chekhov	The Cherry Orchard	ND

Note:'D' refers to the texts prescribed for detailed study and 'ND' refers to the texts prescribed for Non-detailed study

Recommended Reading :

A.C. Bradley	Shakespearean Tragedy
G. W ilson	The Essential Shakespeare
Clough Douglas	Evil and Suffering in the Play
A.L. W illiams Ed.	Twentieth Century Interpretations of the W orks of Marlowe
Bowers Fredmon	Elizabethan Reverse Tradition
Nicoll	Theory of Drama
Styon J.L	Modern Drama in Theory and Practice
David Magersshock-	The Real Chekhov.
P.Weller series): Hamlet.	Macbeth

PAPER III
PROSE
(Paper Code- 0303)

UNIT-I	Francis Bacon	Of Studies, Of Truth, Of Revenge, Of Friendship	- All D
	Thomas Browne	:Urn Burial	- ND
UNIT-II	Addison & Steele	Coverley Papers Essays : 1, 110, 112, 117, 119	- All D
	James Boswell	: :Life of Dr. Johnson	- ND
	Rousseau	: Confessions	- ND
UNIT-III	C. Lamb	Dream Children, Bachelor‟s ComplaintChrist Hospital, Dissertation Upon a Roasted Pig. –	All D
	W . Hazlitt	: On Going a Journey, Indian Jugglers	ND
UNIT-IV	T. Carlyle	: Hero as a Poet	D
	J. Ruskin	: Sesame	ND
UNIT-V	Robert Lynd	: On Forgetting , The Pleasure of Ignorance	D A.
	G. Gardiner	: On Saying Please, On the Rule of the Road	D
	Thomas More	: Utopia	ND
	Machiavelli	: The Prince	ND

Note:
'D' refers to the texts prescribed for detai led study.
'ND' refers to the texts prescribed for Non - detailed study

Recommended Reading

1. Sukanta Chowdhary - Bacon’s Essays
2. Corthope - Addison
3. Hugh W alker - English Essays and Essayists
4. Dobre -English Prose Style
5. Smithens - Life of Joseph Addison
6. B.Prasad - An Introduction to the Study of Literature

PAPER - IV
FICTION
(Paper Code - 0304)

There shall not be any passage for explanation.

UNIT-I	John Bunyan	: The Pilgrim‟s Progress
	Daniel Defoe	:The Adventures of Rob inson Crusoe
UNIT-II	Richardson	: Pamela
	Henry Fielding	:Joseph Andrews
	Oldver Goldsmith :	The Vicar of Wakefield.
UNIT-III	Sir Walter Scott	Ivanhoe.
	Jane Austen	Pride and Prejudice.
	Charles Dickens	Great Expectations.
UNIT-IV	James Joyce	:Portrait of the Artist as a Young Man
	Virginia W oolf	:Mrs. Dalloway
	D. H. Lawrence	:Sons & Lovers
UNIT-V	Chinua Achebe	Anthills of the Savannah
	Bapsi Sidhwa	Ice - Candy – Man
	Yann Martel	Life of Pi

Recommended Reading

Mcllongh Bruce Representative English Novels

Barbara Nardy Moral Art of Dickens

Beach J. W arren - The Technique of Thomas Hardy

Edward W agenknecht - Cavacadet English Novel

Malcolm Bradburr y - The Modern British Novel

Kettle Arnold - An Introduction to English Novel Vol. I, Vol. II

David Caroll - Chinua Achebe

C.L. Innes and B. Lind fors - Critical Perspectives on Chi nua Achebe

R.K. Dhawan -The Novels of Bapsi Sidhwa

P.Ashok: A Companion To Literary Forms

SYLLABUS OF ANNUAL EXAM

M.A. FINAL ENGLISH 2017-18
SCHEME OF MARKS

Paper	Title	Total
I	Critical Theory I	100
II	Indian Writing in English – I	100
III	American Literature I	100
Optional papers- IV(A) Or IV (B)	Linguistics I **Or** English Language Teaching	100
V (A) Or V (B)	Romanticism – I **Or** Modernist Literature – I	100
TOTAL		500

PAPER - I
(CRITICAL THEORY-I – FROM ARISTOTLE TO ARNOLD)
(Paper Code- 0305)

UNIT-I	Aristotle	: Poetics
	Longinus	: On the Sublime
UNIT-II	Sidney	:An Apology for Poetry.
	Dryden	: Essay on Dramatic Poesy
UNIT-III	Wordsworth	: Preface to Lyrical Ballads
	Coleridge	:Biographia Literaria Ch. I to IV
	Mathew Arnold	:Study of Poetry, Function of Criticism
UNIT-IV	T.S. Eliot	:Tradition and the Individual Talent.
	Michael Foucault :	W hat is an Author
UNIT-V	Saussure	:Nature of the Linguistic Sign
	Elaine Showalter	:Feminist criticism in wilderness
	Northrop Fry	: The function of criticism at present time

Recommended Reading

1. Horace	:	The Art of Poetry
2. James Henry	:	The Art of Fiction
3. Empson, W illiam	:	Seven Types of Ambiguity
4. W illiam Raymond	:	Politics and Letters “Four Kinds of Meaning”
5. Richards I.A.	:	“Tension in Poetry”
6. Tate Allan	:	“Sense of the Past”
7. Trilling, Lionel	:	“Criticsm as Pure Speculation”
8. Ranson, J.C.	:	
9. Sartre, Jean- Pau		:W hat is Literature?
10. Bodkin,Maud	:	Archetypal patterns in poetry

PAPER II
(INDIAN WRITING IN ENGLISH-I)
(Paper Code - 0309)

UNIT-I	Sri Aurobindo		: Savitri – Book I, Canto I
	Rabindra.Nath Tagore	:	Gitanjali
	Toru Dutt	:	Sita, The Lotus, our Casuarina Tree
	Sarojini Naidu	:	Indian Dancers, Love and Death The Old W oman
UNIT-II	R. Parthasarthy		From Exile, From Trial From Homecoming
	Jayanta Mahapatra :		Indian Summer, A missing Person The Logic
	Kamla Das		The Freaks, A Hot Noon in Malabar, The Looking Glass, The Sunshine Cat
	Nissim Ezekiel		Enterprise, Poet, Lover and Birdwatcher, Night of Scorpion.
UNIT-III	M.K. Gandhi		My Experiments with Truth.
	N.C. Choudhari		Autobiography of an unknown Indian
	J.L. Nehru	:	Discovery of India (Ch. I to Ch. V)
UNIT-IV	Girish Karnad		The Fire and the Rain
	V. Tendulkar		Silence, The Court is in session
	Mahesh Dattani	:	Final Solutions
UNIT-V	Raja Rao	:	Kanthapura
	R. K. Narayan	:	The Guide
	Arvind Adiga	:	The W hite Tiger
	Kiran Desai	:	The Inheritance of Loss.

Recommended Reading

1. Ghosh, Aurobindo
: Savitri
2. Radhakrishan, S.
: The Creative Life
3. Nahal, Chaman
: Azadi
4. Bhattacharya, Bhabani : : Dream in Hawaili
5. Joshi, Arun
: The Strange Case of Billy Biswas
6. Singh, Khuswant
: Train to Pakistan
7. Jayakrishnan Nair : Cutting Edges : Biology of Experience in the Poetr y of Kamla Das
8. Sahgal, Nayantara : The Day in the Shadow
9. Venkataramani, K.S. : Murugan the Tillar‟
10. Nagarajan, K.
: The Chronicles of Kedaram
11. Desai, Anita
: Fire on the Mountain

PAPER III
(AMERICAN LITERATURE-I)
(Paper Code- 0310)

UNIT-I W alt W hitman	:	W hen Lilacs Last in the Dooryard Bloomed, There was a Child W ent Forth.
Emily Dickinson		:Success is Counted Sweetest, Hope is the thing with Feathers..., I Felt a Funeral In My Brain,After Great Pain a Formal Feeling Comes.
UNIT-II Robert Frost	:	Stopping by the W oods…, Birches, Departmental
Sylvia Plath	:	Daddy, Lady Lazarus, The Bee Meeting. .
UNIT-III Emerson	:	Self –Reliance
Thoreau		Civil Disobedience
UNIT-IV Eugene O Neil		The Hairy Ape
Tenneessee W illiams		:The Glass Menagerie
Arthur Miller		Death of a Salesman
Albee		W ho's Afraid of Virginia W oolf
UNIT-V W. Faulkner		Sound and fury
Hemingway	:	The Old Man and the Sea
Hawthorne	:	The Scarlet Letter
Mark Twain	:	Adventures of HuckleBerry Finn

Recommended Reading

Emerson, Ralph W	Nature The Rhodora Brahma The Poet Hamatroya
Hawthorne Nathaniel	The House of seven Gables My Kinsman, Major Molinerux Billy- Budd "Bartleby"
Melville, Herman	The Fall of the House of Usher Murder in the Rue Morgue
Poe. Edgar, Allan	The Raven The Poetic Principal "The philosophy of Composition"
Lowell, James Russell	A Fable for Critics
Crane Stephen	The Open Boat The Blue Hotel
James, Henry	The Portrait of a Lady The Art of Fiction
Dreiser, Theodre	Sister Carrie
Howels, W illiam Dean	The Rise of Silas Lapham
Adams, Henry	The Education of Henr y Adams

PAPER IV (A) OPTIONAL
(LINGUISTICS)
(Paper Code-0311)

:

UNIT-I W hat is language? W hat is Linguistics? Human language and its difference with animal communication. Speech and W riting as two manifestations of language characteristic features of human language duality of patte rning (Patterns of sound and patterns of morphemes and words), Creativity, Displacement (difference between context bound animal communication and Context Free Human Language). Redundancy, culture preserving and culture transmitting Features.

UNIT-II Linguistics : Aspects, The Branches and Tools. Levels of analysis - phonological, lexical, syntactic and semantic.
Linguistics : application and related disciplines.

UNIT-III Phonetics: Articulatory Phonetics, Auditory Phonetics, Acoustic phonetics
The Organs of speech -Places of Articulation.
Vowels and Consonants, Dipthongs, Clusters and Syllables.
Supra segmentals and Prosodic Phenomena - Stress, Pitch, Intonation, Juncture, Rhym e.

UNIT-IV Phonology
Structural Linguistics : The Phoneme - Free Variation and neutralization, pattern congruity
Morphology : W ords and morphemes – free morphemes and bound morphemes
Allomorphs.

UNIT-V Syntax : W ord Classes
I.C. Analysis -: Models of IC analysis
Introduction to Phrase structure Grammar – Its Limitations

Recommended Reading

1. D. Crystal, Linguistics (Penguin, Harmondsworth, 1971)
2. S.K. Verma & N, Krishnaswam y, Modern Linguistics : A introduction (Oxford UP 1989)

PAPER IV (B) OPTIONAL (ENGLISH LANGUAGE TE ACHING)

(Paper Code-0312)

.

UNIT-I W hat Language teaching is about, distinction between L1 and L2, Second language learning and bilingualism, second language versus foreign language learning and acquisition. Trends in Linguistic theories, Beginning of modern linguistics, Language varieties, Aspect of Language Study – Phonology, Grammar, Lexicology, Semantics, Discourses, Bloomfield and American Structuralism. Neofeathian Theor y, Tran formative Generative Grammar.

UNIT-II Language Teaching Theories

(i) Grammar Translation or traditional met hod
(ii) The Direct Method
(iii) The Reading Method
(iv) The Audio-Lingual Method
(v) The Audio-visual Method- Features, Sources and history, techniques and theoretical assumptions thereof.
(vi) Cognitive Theory

UNIT-III The Teaching of

(i) Segmental features of English
(ii) The Super Segmental features of English

Teaching the 'Mechanics of

A. Pronunciation
B. Vocabulary
C. Reading and
D. W riting

UNIT-IV Audio-visual and Supplementary Aids

The use of audio-visual aids in teachin g, Aids supplementary to text books Audio- Visual and Supplementar y Aids. Planning for language laboratory, Language laborator y systems, Specific advantages provided by language laboratory.

UNIT-V Language Testing

The construction and use of language tes ts, Techniques to test the production of sound segments, techniques for testing of intonation. Techniques to test production of lexical units, Testing auditory comprehensions, How to test speaking ability, achievement, Diagnostic and Aptitude testing.

Recommended Reading

1. Lado, Robert — Language Testing.
2. Meras A Edmond — A Language Teachers Guide.
3. Stern, H.H. — Fundamental concepts of Language Teaching
4. Corder, S. Pit — Introducing Applied Linguistics
5. Ed. Kinsella, Valerie : — Language Teaching and Linguistics : Surveys.
6. Ed. Jalling, Hans — Modern Language Teaching
7. Hayes, A.S. — Language Laborator y Facilities.
8. Nagaraj, Geetha — English Language Teaching, Orient Language Pv t. Ltd.

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PAPER V (A) OPTIONAL
(ROMANTICISM)

UNIT-I	William W ordsworth	Retrospect-Love of Nature Leading to Love of Mankind Lines (1 - 100) From Prelude Book VIII
	Samuel Taylor Coleridge	Frost at Midnight, Rime of the Ancient Mariner
UNIT-II	P.B. Shelley	Adonais, Hellas ("The worlds" Great Age Begins a New)
	John Keats	Endymion (Book I, Lines 1-24) Hyperion (Book – I)
UNIT-III	Byron	The Vision of Judgment The Isles (Criti cism)
	Keats	From The Letters (From English Critical Text Edited By Enright & D‟ Chikrera
UNIT-IV	Charles Lamb	Imperfect Sym pathies, Valentines Day South sea House
	W .Hazlitt :	On Actors and Acting (I and II) on Going a Journey
UNIT-V	Sir W alter Scott	The Bride of Lammermoor
	Jane Austen	Emma
	Shelley	A Defense of Poetr y
	M.H. Abrams	Orientation of Critical Theories (From the Mirror and the poetry)

PAPER V (B) OPTIONAL
(MODERNIST LITERATURE)

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UNIT-I	**G.M.**Hopkins	Pied Beauty, Felix Randal The W ind Hover
	W .B. Yeats	The Second Coming, Sailing to Byzantium, Byzantium
	T.S. Elliot	The W aste Land (First two Sermons)
UNIT-II	W .H. Auden	: The Shield of Achilles, Sept. 1, 1937, Spain
	Dylan Thomas	: Fernhill, Refusal to Mourn the Death.
UNIT-III	Samuel Beckett	: W aiting for Godot
	John Osborne	: Look Back in Anger
UNIT-IV	Joseph Conrad	Heart of Darkness
	W illiam Golding	: Lord of the Flies
UNIT-V	I.A. Richards	Principles of Literary criticism " Communication and the Artist" "Analysis of a poem"

पं. रविशंकर शुक्ल विश्वविद्यालय

रायपुर (छत्तीसगढ़)

पाठ्यक्रम

एम. ए. पूर्व हिन्दी

CODE -111

एम. ए. अंतिम हिन्दी

CODE-112

परीक्षा 2017–18

सेमेस्टर परीक्षा प्रणाली

एवं

वार्षिक परीक्षा प्रणाली

सत्र 2017–18 एम.ए. हिन्दी अंक विभाजन सेमेस्टर प्रणाली

प्रथम सेमेस्टर
अंक विभाजन

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
प्रथम : (आदिकाल एवं पूर्व मध्यकाल)	80	20	100
द्वितीय :प्राचीन एवं मध्यकालीन काव्य	80	20	100
तृतीय :छायावाद एवं पूर्ववर्ती काव्य	80	20	100
चतुर्थ :नाटक, एकांकी एवं चरितात्मक कृति	80	20	100
		कुल	400 अंक

द्वितीय सेमेस्टर
अंक विभाजन

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
पंचम :(उत्तर मध्यकाल एवं आधुनिक काल)	80	20	100
षष्ठ : मध्यकालीन काव्य	80	20	100
सप्तम : प्रयोगवादी एवं प्रगतिवादी काव्य	80	20	100
अष्टम : उपन्यास, निबंध एवं कहानी	80	20	100
		कुल	400 अंक

तृतीय सेमेस्टर
अंक विभाजन

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
प्रथम : साहित्य के सिद्धांत तथा अलोचना शास्त्र	80	20	100
द्वितीयः भाषा विज्ञान	80	20	100
तृतीयः कामकाजी हिन्दी एवं पत्रकारिता	80	20	100
चतुर्थ : भारतीय साहित्य	80	20	100
		कुल	400 अंक

चतुर्थ सेमेस्टर
अंक विभाजन

प्रश्न पत्र	बाह्य परीक्षा	आंतरिक मूल्यांकन	कुल अंक
पंचम : हिन्दी आलोचना तथा समीक्षा शास्त्र	80	20	100
षष्ठ : हिन्दी भाषा	80	20	100
सप्तम : मीडिया लेखन एवं अनुवाद	80	20	100
अष्टम : जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)	80	20	100
		कुल	400 अंक

टीपः– प्रत्येक प्रश्न पत्र में 20 अंकों के आंतरिक मूल्यांकन के अंतर्गत दो आंतरिक मूल्यांकन का आयोजन अनिवार्य होगा एवं इसका मूल्यांकन विभाग के शिक्षकों के द्वारा किया जावेगा तथा प्राप्तांक विश्वविद्यालय को प्रेषित किया जावेगा ।

एम.ए. – हिन्दी – 2017–18
प्रथम सेमेस्टर
प्रश्न पत्र – प्रथम
आदिकाल एवं पूर्व मध्यकाल

योग : 80

पाठ्य विषयः–

इकाई–1 आदिकाल –इतिहास दर्शन और साहित्येतिहास
हिन्दी साहित्य के इतिहास लेखन की परम्परा, साहित्येतिहास के पुनर्लेखन की रामरयाएँ ।
हिन्दी साहित्य के इतिहास का काल–विभाजन और नामकरण, नामकरण की समस्याएँ ।

इकाई –2 हिन्दी साहित्य के आदिकाल की पृष्ठभूमि, वीरगाथाकाल तथा रासो काव्य, सिद्ध नाथ एवं जैन साहित्य, साहित्यिक प्रवृत्तियॉं, काव्य धाराएँ, प्रतिनिधि रचनाकार ।

इकाई –3 पूर्व मध्यकाल (भक्ति काल),
सांस्कृतिक चेतना एवं भक्ति–आंदोलन, भक्ति काल की प्रमुख प्रवृत्तियॉं, काव्य–धाराएँ – निर्गुण, सगुण भक्ति धारा, संत काव्य सामान्य प्रवृत्तियॉं ।

इकाई–4 रूफी प्रेमाख्यानक काव्य – प्रवृत्तियॉं, प्रेमाख्यानक परम्परा और हिन्दी में उसका विकास ।
रामभक्ति काव्य, कृष्ण भक्ति काव्य, सामान्य प्रवृत्तियॉं और दार्शनिक विचार धाराएँ, उपलब्धियॉं ।

इकाई– 5 लघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)

इकाई –6 वस्तुनिष्ठ एवं अतिलघुउत्तरीयप्रश्न (सम्पूर्ण पाठ्ययक्रम से)

आंतरिक मूल्यांकन 20

निर्धारित पुस्तकें :–

1. हिन्दी साहित्य का इतिहास (संशोधित – आचार्य रामचंद्र शुक्ल)
2. हिन्दी साहित्य का आदिकाल – हजारी प्रसाद द्विवेदी
3. हिन्दी साहित्य का इतिहास (नेशनल पब्लिशिंग हाऊस, दिल्ली) – डॉ. नगेन्द्र
4. आदिकालीन हिन्दी साहित्य (वाराणसी विश्वविद्यालय प्रकाशन) – डॉ. शम्भूनाथ पाण्डेय
5. आदिकालीन हिन्दी साहित्य सांस्कृतिक पीठिका (हिन्दी ग्रंथ अकादमी) – डॉ. राममूर्ति त्रिपाठी
6. हिन्दी साहित्य का इतिहास – डॉ. बच्चन सिंह

एम.ए. (हिन्दी) – 2017–18

प्रथम सेमेस्टर
प्रश्न पत्र – द्वितीय
प्राचीन एवं मध्यकालीन काव्य

योग : 80

पाठ्य विषयः–

व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन अपेक्षित है ।

1. चंदबरदाई : पृथ्वीराज रासो, संपादक आचार्य हजारी द्विवेदी, डॉ. नामवर सिंह (शशिवृता विवाह खंड)
2. कबीर ग्रंथावलीः संपादक डॉ. श्याम सुंदर दास (100 साखियॉ तथा 25 पद) पद क्रमांक– 11, 16, 24, 26, 27, 40, 45, 49, 60, 64, 70, 72, 75, 79, 89, 93, 99, 100, 101, 103, 110, 111, 135, 268
   साखियॉ– गुरूदेव कौ अंग 1 से 20, सुरिमण कौ अंग 1 से 10, विरह कौ अंग 1 रो 10, ग्यान विरह कौ अंग 1 रो 10, चितावणी कौ अंग 1 रो 10, माया कौ अंग 1 से 5, परचा कौ अंग 1 से 10 ।
3. मलिक मोहम्मद जायसी : पद्मावत संपादक आ. रामचंद्र शुक्ल (नागमति विरह खण्ड एवं सिंहल दीपखण्ड)

टीपः– द्रुत पाठ हेतु निम्नांकित 5 कवियों का एवं उनकी रचनाओं का अध्ययन अनिवार्य है, इन कवियों पर लघुत्तरी प्रश्न पूछे जायेंगे– अमीर खुसरों, विद्यापति, मीराबाई, रहीम, रैदास, रसखान ।

आंतरिक मूल्यांकन 20 अंक

<u>निर्धारित पुस्तकें:–</u>

1. डॉ. विपिन बिहारी द्विवेदी – चंदबरदाई
2. कबीर की विचारधारा – डॉ. गोविन्द त्रिगुणायन
3. प्रमुख प्राचीन कवि – डॉ. द्वारिका प्रसाद सक्सेना
4. कबीर साहित्य की परख – परशुराम चतुर्वेदी
5. जायसी की विशिष्ट शब्दावली – डॉ. इंदिरा कुमारी सिंह का विश्लेषणात्मक अध्ययन
6. मलिक मोहम्मद जायसी और उनका काव्य – डॉ. शिवसहाय पाठक
7. अमीर खुसरों और उनका साहित्य – डॉ. भोलानाथ तिवारी
8. कबीर – रां. हजारी प्रसाद द्विवेदी

एम.ए.पूर्व (हिन्दी) 2017–18

प्रथम सेमेस्टर
प्रश्न पत्र – तृतीय
छायावाद एवं पूर्ववर्ती काव्य

कुल : 80

पाठ्य विषयः– व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन अपेक्षित है ।

1. मैथिलीशरण गुप्त – साकेत नवम् सर्ग
2. जयशंकर प्रराद – कामायनी (चिन्ता, श्रद्धा, इड़ा सर्ग)
3. सूर्यकांत त्रिपाठी निराला – राम की शक्ति पूजा, तुलसीदास (प्रथम 10 छंद)

द्रुत पाठ हेतु निम्नांकित 6 कवियों का अध्ययन किया जाएगा ।

अयोध्या सिंह उपाध्याय– ''हरिऔध'', हरिवंशराय बच्चन, मुकुटधर पांडेय, जगन्नाथ दारा रत्नाकर, पंत, महादेवी (लघुत्तरीय प्रश्न द्रुत पाठ एवं पाठ्यक्रम से पूछे जाएंगे।)

इकाई विभाजन

इकाई 1 व्याख्या

इकाई 2 मैथिलीशरण गुप्त

इकाई 3 जयशंकर प्रराद, सूर्यकान्त त्रिपाठी निराला

इकाई 4 द्रुत पाठ के कवि ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकेंः–

1. साकेत एक अध्ययन– डॉ. नगेन्द्र
2. कवि निराला – आचार्य नंद दुलारे वाजपेयी
3. निराला की साहित्य साधना – डॉ. रामविलास शर्मा
4. नया साहित्य नये साधना – आचार्य नंद दुलारे वाजपेयी
5. कामायनी एक पुनर्विचार – मुक्तिबोध
6. प्रसाद का काव्य – प्रेमशंकर
7. हिन्दी साहित्य आधुनिक परिदृश्य – अज्ञेय
8. हिन्दी साहित्य का इतिहास – नगेन्द्र
9. बच्चन की कविताओं का शैलीवैज्ञानिक अध्ययन – डॉ. शीला शर्मा

एम.ए. – (हिन्दी) – 2017–18

प्रथम सेमेस्टर
प्रश्न पत्र – चतुर्थ
आधुनिक गद्य साहित्य
(नाटक, एकांकी एवं चरितात्मक कृति)

पूर्णांक : 80

पाठ्य विषय :–

नाटक	1	चन्द्रगुप्त	–	जयशंकर प्रसाद
	2	हानूश	–	भीष्म साहनी
एकांकी	1	दीपदान	–	रामकुमार वर्मा
	2.	एक दिन	–	लक्ष्मीनारायण मिश्र
	3.	ताँबे के कीड़े	–	भुवनेश्वर
	4.	तौलिए	–	उपेन्द्रनाथ अश्क
	5.	मम्मी ठकुराइन	–	लक्ष्मीनारायण लाल

चरितात्मक कृति–	पथ के साथी	1	निराला भाई
	(केवल दो)	2	सुभद्रा

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें:–

1. हिन्दी नाटक उद्‌भव और विकारा – डॉ. दशरथ ओझा
2. हिन्दी नाटक रिद्धांत और विवेचन – डॉ. गिरीश ररतोगी
3. हिन्दी नाटक पुनर्मूल्यांकन – डॉ. सत्येन्द्र तनेजा
4. समसामयिक हिन्दी नाटकों में चरित्र सृष्टि – डॉ. जयदेव तनेजा
5. प्रराद के नाटकों का शारत्रीय अध्ययन – जगन्नाथ प्रराद शर्मा
6. आधुनिक हिन्दी नाटक – नगेन्द्र
7. नाटक रंगमंच और मोहन राकेश – डॉ. सुरेन्द्र यादव
8. प्रराद युगीन हिन्दी नाटक – डॉ. भगवती प्रराद शुक्ल
9. प्रसाद के नाटक एवं नाट्‌य शिल्प – डॉ. शांति स्वरूप गुप्त
10. नाटककार मोहन राकेश – डॉ. सुन्दर लाल कथूरिया
11. हिन्दी एकांकी : उद्‌भव और विकारा – रामचरण महेन्द
12. हिन्दी रंगमंच : दशा और दिशा – जयदेव तनेजा
13. भष्म साहनी के उपन्यास और नाटक – डॉ. राकेश कुमार तिवारी

एम.ए. (हिन्दी) – 2017–18
द्वितीय सेमेस्टर
प्रश्न पत्र – पंचम
(उत्तर मध्यकाल से आधुनिक काल तक)

समय 3 घंटे पूर्णांक : 80

पाठ्य विषयः–

इकाई 1– उत्तर मध्यकाल (रीतिकाल)
काल सीमा, नामकरण, प्रवृत्तियॉ, रीतिकालीन साहित्य की विभिन्न धारायें (रीतिबद्ध, रीतिसिद्ध, रीतिमुक्त) प्रवृत्तियॉ एवं विशेषताएँ । रीतिकाल के प्रतिनिधि रचनाकार एवं रचनाएँ ।

इकाई 2 आधुनिक काल – आधुनिक काल की सामाजिक, राजनैतिक, आर्थिक एवं सांस्कृतिक पृष्ठभूमि । सन् 1857 की राज्य क्रांति एवं पुनर्जागरण, भारतेन्दु युग– प्रमुख साहित्यकार, साहित्य एवं साहित्यिक विशेषताएँ ।

इकाई 3 द्विवेदी युग – प्रमुख साहित्यकार एवं साहित्यिक विशेषताएँ, छायावाद– नामकरण और प्रवृत्तियॉ, प्रमुख साहित्याकार, साहित्यिक विशेषताएँ । छायावादोत्तर काल (विभिन्न प्रवृत्तियॉ) प्रगतिवाद, नई कविता, नवगीतवाद तथा समकालीन कविता, स्वच्छन्दतावाद सामान्य परिचय ।

इकाई 4 हिन्दी गद्य का विकास –
आधुनिक काल, गद्य साहित्य के विभिन्न रूपों का उद्भव और विकास, उपन्यास व कहानी का विकास और सामान्य प्रवृत्तियॉ, निबंध का विकास और प्रवृत्तियॉ, नाटक का उद्भव और विकास– सामान्य प्रवृत्तियॉ, गीति– नाटकों का परिचयात्मक विवेचन ।

इकाई 5 लघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से पांच प्रश्न)

इकाई 6 वस्तुनिष्ठ एवं अतिलघुत्तरीय प्रश्न (सम्पूर्ण पाठ्यक्रम से)

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें :–

1. आधुनिक साहित्य की प्रवृत्तियॉ – डॉ. नामवर सिंह
2. हिन्दी साहित्य बीसवीं शताब्दी – नन्ददुलारे वाजपेयी
3. आधुनिक हिन्दी साहित्य का इतिहास – कृष्ण शंकर शुक्ल
4. गद्य की विविध विधाएँ – डॉ. बापूराव देसाई
5. हिन्दी कहानी – उद्भव और विकास – डॉ. सुरेश सिन्हा
6. हिन्दी उपन्यास की प्रवृत्तियॉ – डॉ. शशि भूषण सिंह
7. हिन्दी नाटक उद्भव और विकास – डॉ. दशरथ ओझा
8. हिन्दी साहित्य का इतिहास – आचार्य रामचन्द्र शुक्ल
9. हिन्दी साहित्य का उद्भव और विकास – आचार्य हजारी प्रसाद द्विवेदी
10. हिन्दी साहित्य की भूमिका – आचार्य हजारी प्रसाद द्विवेदी

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प्रश्न पत्र – षष्ठ
मध्यकालीन काव्य

समय 3 घंटे पूर्णांक : 80

पाठ्य विषयः– व्याख्या एवं विवेचन के लिए निम्नांकित तीन कवियों का अध्ययन किया जाएगा

1 सूरदास – भ्रमरगीत सार – संपादक आचार्य रामचंद्र शुक्ल (50 पद)
पद रांख्या – 1 रो 10, 21 रो 30, 51 रो 60, 61 रो 70, 81 रो 90 तक (50 पद)

2 तुलरीदारा – रामचरित मानरा (सुंदरकाण्ड) गीताप्रेरा गोरखपुर

3 बिहारी – बिहारी रत्नाकर संपादक जगन्नाथ दास रत्नाकर (प्रारंभिक 100 दोहे)

द्रुत पाठ हेतु निम्नांकित 5 कवियों एवं उनकी रचनाओं का (विषय एवं शिल्पगत) ज्ञान अपेक्षित है ।

केशव, भूषण, पद्माकर, देव, घनानंद, राधा विनोद – खांडेराव भोराले

इन कवियों पर लघुत्तरीय प्रश्न पूछे जाएंगे ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें :–

1. बिहारी– डॉ. विश्वनाथ प्रसाद मिश्र
2. तुलसीदास और उनका युग संदर्भ – डॉ. भगीरथ मिश्र
3. सूरदास के काव्य का मूल्यांकन – डॉ. रामरतन भटनागर
4. तुलसी साहित्य के नये संदर्भ – डॉ. एल.एन.दुबे
5. सूरदास – डॉ. हरबंस लाल वर्मा
6. तुलसीदास – प्रो. सतीश कुमार अशोक प्रकाशन नई दिल्ली
7. सूरदास – मैनेजर पाण्डेय

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प्रश्न पत्र – सप्तम
(प्रयोगवादी एवं प्रगतिवादी काव्य)

कुल अंक : 80

पाठ्य विषय–

स.ही.वात्स्यायन अज्ञेय– नदी के द्वीप, असाध्यवीणा, बावरा अहेरी, कलगी बाजरे की, यह दीप अकेला, उधार, देह वल्ली, रोन मछली

ग.मा. मुक्तिबोध – कविता – अंधेरे में ।

नागार्जुन – बरान्त की अगवानी, कोई आए तुमरो रीखे, शिशिर विष कन्या, तो फिर क्या हुआ, यह तुम थी, कोयल आज बोली है, शासन की बंदूक, सिन्दूर तिलकित भाल, अकाल और उसके बाद, बादल को घिरते देखा ।

द्रुत पाठ हेतु निम्नांकित 5 कवियों का अध्ययन किया जायेगा ।

केदारनाथ अग्रवाल, त्रिलोचन शास्त्री, भवानी प्रसाद मिश्र, विनोद कुमार शुक्ल, धूमिल

(लघुत्तरी प्रश्न द्रुत पाठ एवं सम्पूर्ण पाठ्यक्रम से पूछे जायेंगे)

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें :–

1. मुक्तिबोध की काव्य प्रक्रिया – अशोक चक्रधर
2. अज्ञेय का रचना संसार – डॉ. रामस्वरूप चतुर्वेदी
3. कविता की तीसरी आंख – डॉ. प्रभाकर श्रोत्रिय
4. कविता से साक्षात्कार – मलयज
5. हिन्दी साहित्य का इतिहास – डॉ. रामचन्द्र शुक्ल
6. कविता की संगत – विजय कुमार
7. कविता का अर्थात – परमानंद श्रीवास्तव
8. नागार्जुन का रचना संसार – विजय बहादुर सिंह
9. छायावादोत्तर प्रबंध काव्यों में ऐतिहासिक, सांस्कृतिक एवं दार्शनिक तत्वों का अनुशीलन – डॉ. ज्योति पाण्डेय
10. छायावादोत्तर काव्यों की विभिन्न प्रवृत्तियों एवं उनका चैन्तनिक पक्ष – डॉ. ज्योति पाण्डेय

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प्रश्न पत्र – अष्टम
आधुनिक गद्य साहित्य
(उपन्यास, निबंध एवं कहानी)

पाठ्य विषयः– पूर्णांक : 80

उपन्यास–	1 गोदान	–	प्रेमचंद
	2 बाणभट्ट की आत्मकथा	–	हजारी प्रसाद द्विवेदी
निबंध –	1 चढ़ती उमर	–	बालकृष्ण भट्ट
	2 कविता क्या है?	–	रामचंद्र शुक्ल
	3 माटी की मूरतें	–	रामवृक्ष बेनीपुरी
	4 चन्द्रमा मनसो जातः	–	विद्यानिवास मिश्र
	5 वैष्णव की फिसलन	–	हरिशंकर परसाई
कहानी –	1 उसने कहा था	–	चन्द्रधर शर्मा गुलेरी
	2 पुरस्कार	–	जयशंकर प्रसाद
	3. ईदगाह	–	प्रेमचंद
	4. वापसी	–	उषा प्रियम्वदा
	5. बादलों के घेरे	–	कृष्णा सोबती

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें:–

1.	प्रेमचंद और उनका युग –	रामविलास शर्मा
2.	गोदान के अध्ययन की समस्याएं –	डॉ. गोपाल राय
3.	कथाकार फणीश्वरनाथ रेणु –	चंद्रभाव सोनवडी
4.	हिन्दी उपन्यास की शिल्पविधि का विकास –	सिद्धनाथ तनेजा
5.	हिन्दी उपन्यास उद्भव और विकास –	सुरेश सिन्हा
6.	प्रेमचंद : एक अध्ययन –	राजेश्वर गुरू
7.	महादेवी प्रतिनिधि गद्य रचनाएं –	सं. रामजी पाण्डेय
8.	हिन्दी निंबध के आधार स्तम्भ –	डॉ. हरिमोहन
9.	हिन्दी कहानी : उद्गव और विकास –	सुरेश सिन्हा
10.	कहानी : स्वरूप और संवेदना –	राजेन्द्र यादव
11.	कहानी : नयी कहानी –	नामवर सिंह
12.	हजारी प्रसाद द्विवेदी –	सं. विश्वनाथ तिवारी
13.	प्रेमचंद का जीवनदर्शन एवं रंगभूमि –	डॉ. शंकर बुन्देले

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तृतीय सेमेस्टर
प्रश्न पत्र – प्रथम
साहित्य के सिद्धांत तथा आलोचना शास्त्र

पूर्णांक : 80

पाठ्य विषयः–

इकाई–1 भारतीय काव्य शास्त्र
– काव्य लक्षण, काव्य हेतु, काव्य प्रयोजन और काव्य के प्रकार
– रस सिद्धांत, रस का स्वरूप, रस निष्पत्ति और साधारणीकरण, रस के अंग ।

इकाई–2 अलंकार सिद्धांत रीति सिद्धांत, वक्रोक्ति सिद्धांत, ध्वनि सिद्धांत और औचित्य सिद्धांत

इकाई–3 पाश्चात्य काव्य शास्त्र
प्लेटो – काव्य सिद्धांत
अरस्तु– अनुकरण का सिद्धांत, विरेचन सिद्धांत, लोंजाइनस–उदात्त की अवधारणा

इकाई 4 मैथ्यू आर्नल्ड– कला की अवधारणा
टी.एस. इलियट – कला की निर्वैयक्तिकता, कॉलरिज–कल्पना सिद्धांत
रवच्छदतावाद – मार्क्सवाद

आंतरिक मूल्यांकन 20 अंक

1. डॉ. गणपति चन्द्रगुप्त – भारतीय एवं पाश्चात्य काव्य सिद्धांत
2. डॉ. भगीरथ मिश्र – पाश्चात्य काव्य शास्त्र, इतिहास, सिद्धांत एवं वाद
3. डॉ. राममूर्ति त्रिपाठी– भारतीय काव्य शारत्र के नये क्षितिज
4. डॉ. शिवकुमार मिश्र– मार्क्सवादी साहित्य के सिद्धांत
5. डॉ. नगेन्द्र – भारतीय काव्य शास्त्र की भूमिका
6. डॉ. निर्मला जैन – पाश्चात्य राहित्य चिंतन
7. मुलजी भाई– भारतीय और पाश्चात्य काव्य शास्त्र
8. डॉ. गंगा प्रसाद विमल – आधुनिकता, साहित्य के संदर्भ में ।

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तृतीय सेमेस्टर
प्रश्न पत्र – द्वितीय
(भाषा विज्ञान)

पूर्णांक : 80

पाठ्य विषयः–

इकाई–1 भाषा और भाषा विज्ञान, भाषा की परिभाषा और अभिलक्षण, भाषा व्यवस्था और भाषा व्यवहार, भाषा संरचना, भाषा विज्ञान स्वरूप एवं व्याप्ति, अध्ययन की दिशाएँ–वर्णनात्मक, ऐतिहासिक और तुलनात्मक ।

इकाई–2 स्वन प्रक्रिया : स्वन विज्ञान का स्वरूप और शाखाएँ, वागवयव और उनके कार्य, स्वन की अवधारणा और स्वनों का वर्गीकरण, स्वन गुण, स्वनिक परिवर्तन । स्वनिम विज्ञान का स्वरूप, स्वनिम की अवधारणा, स्वनिम के भेद ।

इकाई 3 व्याकरण : रूप विज्ञान का स्वरूप और शाखाएँ, रूपिम की अवधारणा और भेद, मुक्त – आबद्ध अर्थदर्शी और संबंधदर्शी रूपिम और शाखाएँ, रूपिम के भेद और प्रकार्य । वाक्य के भेद, वाक्य–विश्लेषण, निकटस्थ अवयव विश्लेषण ।

इकाई 4 अर्थ विज्ञान : अर्थ की अवधारणा, शब्द और अर्थ का संबंध, पर्यायता, अनेकार्थता, विलोमता अर्थ परिवर्तन ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें:–

1. सामान्य भाषा विज्ञान– डॉ. बाबूराम सक्सेना
2. भाषा विज्ञान – डॉ. भोलानाथ तिवारी
3. भारत के भाषा परिवार – डॉ. रामनिवास शर्मा
4. भाषाशास्त्र की रूपरेखा – उदयनारायण तिवारी
5. हिन्दी शब्दानुशासन – किशोरी दास बाजपेयी
6. भाषा विज्ञान और भाषा शास्त्र – कपिलदेव द्विवेदी
7. सामान्य भाषाविज्ञान – बाबूराम सक्सेना
8. हिन्दी और उसका संक्षिप्त इतिहास – भोलानाथ तिवारी
9. हिन्दी और उसकी विविध बोलियाँ – प्रो. दीपचंद जैन
10. भाषा विज्ञान के सिद्धांत और हिन्दी भाषा – द्वारिका प्रसाद मिश्र

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प्रश्न पत्र – तृतीय
(कामकाजी हिन्दी एवं पत्रकारिता)

पाठ्य विषयः– पूर्णांक : 80

इकाई–1 हिन्दी के विभिन्न रूप – राजनात्मक भाषा, संचार भाषा, राजभाषा, माध्यम भाषा, कार्यालयीन हिन्दी (राजभाषा) के प्रमुख प्रकार्य– प्रारूपण, पत्र लेखन, संक्षेपण, पल्लवन, टिप्पणी ।

इकाई–2 पारिभाषिक शब्दावली, स्वरूप एवं महत्व, पारिभाषिक शब्दावली निर्माण के सिद्धांत, ज्ञान–विज्ञान के विभिन्न क्षेत्रों की पारिभाषिक शब्दावली । हिन्दी कम्प्यूटर– कम्प्यूटर परिचय, उपयोगिता क्षेत्र, वेब पेज पब्लिशिंग परिचय ।

इकाई–3 इंटरनेट संपर्क उपकरणों का परिचय, प्रकार्यात्मक रख–रखाव एवं इंटरनेट समय मितव्यतता के सूत्र । इंटरनेट एक्सप्लोइट अथवा नेट स्केप । हिन्दी शाफ्टवेयर पैकेज ।

इकाई–4 पत्रकारिता का स्वरूप एवं प्रकार, हिंदी पत्रकारिता का संक्षिप्त इतिहास । समाचार लेखन कला, संपादन के आधारभूत तत्व, व्यवहारिक प्रूफशोधन, शीर्षक संरचना, लीड, इंट्रो एवं शीर्षक,
संपादकीय लेखन, पृष्ठ सज्जा, साक्षात्कार, पत्रकारवार्ता एवं प्रेस प्रबंधन, प्रमुख प्रेस कानून एवं आचार संहिता ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें:–

1. प्रयोजन परक हिन्दी – प्रो. सूर्यप्रसाद दीक्षित
2. प्रशासनिक हिन्दी – पुष्पा कुमारी, क्लासिक पब्लिक कम्पनी
3. पत्रकारिता के छह दशक – जगदीश प्रसाद चतुर्वेदी
4. हिन्दी पत्रकारिता का प्रतिनिधि संकलन – तरूशिखा सुरजन, राजकमल प्रकाशन, नई दिल्ली
5. हिन्दी पत्रकारिता – कृष्ण बिहारी मिश्र
6. भारतीय समाचार पत्रों का संगठन एवं प्रबंधन – डॉ. सुकुमार जैन
7. पत्रकारिता का इतिहास एवं जनसंचार माध्यम – डॉ. संजीव भनावत
8. कम्प्यूटर के भाषिक अनुप्रयोग – विजय मल्होत्रा
9. कम्प्यूटर एप्लीकेशन – गौरव अग्रवाल

एम.ए. – (हिन्दी साहित्य) – 2017–18
तृतीय सेमेस्टर
प्रश्न पत्र – चतुर्थ
भारतीय साहित्य

पूर्णांक : 80

पाठ्य विषय :–

इकाई–1 भारतीय साहित्य का स्वरूप, भारतीय साहित्य के अध्ययन की समस्याएँ, भारतीय साहित्य में आज के भारत का बिम्ब, हिन्दी साहित्य में भारतीय मूल्यों की अभिव्यक्ति ।

इकाई –2 हिन्दीतर साहित्य का इतिहास जो तीन वर्गों में विभक्त है –

1. दक्षिणात्य भाषा वर्ग रो मलयालम
2. पूर्वांचल भाषा वर्ग में बँगला
3. पश्चिमोत्तर भाषा वर्ग में मराठी

प्रत्येक विद्यार्थी इन तीनों विकल्पों में रो एक भाषा चयन करेंगे बशर्ते वह भाषा अपनी क्षेत्रीय भाषा से भिन्न भाषा वाले वर्ग से संबंधित हो।
विद्यार्थी एक भाषा वर्ग (मलयालम, बंगला, मराठी) में से किसी एक के इतिहारा का अध्ययन करेंगे।

इकाई –3 हिन्दी भाषा साहित्य एवं बंगला भाषा साहित्य का तुलनात्मक अध्ययन ।

इकाई– 4 उपन्यास– अग्निगर्भ (बंगला– महाश्वेता देवी)

नाटक – हयवदन (कन्नड़–गिरीश कर्नाड)

कविता संग्रह– कोच्चि के दरख्त (मलयालम– के.जी. शंकर पिल्लै)

इकाई चार के अंतर्गत केवल आलोचनात्मक प्रश्न पूछे जाएँगे ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें :–

1. मलयालम साहित्य – परख और पहचान – प्रो. आर. सुरेन्द्रन ।
2. राष्ट्रीय चेतना और मलयालम साहित्य – प्रो. आर. सुरेन्द्रन ।
3. मराठी भाषा और साहित्य – राजमल वोरा
4. मलयालम साहित्यकारों से साक्षात्कार – प्रो. आर. सुरेन्द्रन ।
5. बंगला भाषा और साहित्य का इतिहास – भारतीय भाषा संस्थान, इलाहाबाद
6. भारतीय साहित्य – डॉ. नगेन्द्र
7. भारतीय साहित्य रत्नमाला – सं.कृष्णदयाल भार्गव
8. भारतीय साहित्य के इतिहास की समस्याएँ – डॉ. रामविलास शर्मा

9. भारतीय भाषाओं के साहित्य का इतिहास – केन्द्रीय हिन्दी निर्देशालय, दिल्ली ।
10. भारतीय साहित्य : अवधारणा, समन्वय एवं सादृश्यता– जगदीश गुप्त

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चतुर्थ सेमेस्टर
प्रश्न पत्र – पंचम
(हिन्दी आलोचना तथा समीक्षा शास्त्र)

पूर्णांक : 80

पाठ्य विषयः–

इकाई 1 मनोविश्लेषण वाद, अस्तित्ववाद, अभिजात्यवाद, स्वच्छंदतावाद, अभिव्यंजनावाद, मार्क्सवाद, आधुनिक समीक्षा की विशिष्ट प्रवृत्तियॉं, संरचनावाद, शैलीविज्ञान, उत्तर आधुनिकता

इकाई 2 हिन्दी कवि आचार्यों का काव्य शास्त्रीय चिंतन– लक्षण काव्य परम्परा

– आचार्य रामचन्द्र शुक्ल, आचार्य नंददुलारे वाजपेयी, डॉ. रामविलास शर्मा, केशव, देव

इकाई 3 आधुनिक हिन्दी आलोचना की प्रमुख प्रवृत्तियॉं– शास्त्रीय, ऐतिहासिक, मनोविश्लेषणवादी, सौंदर्य शास्त्रीय, शैली वैज्ञानिक

इकाई 4 व्यवहारिक समीक्षा : काव्यांश की स्वविवेक के अनुसार व्याख्या

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें :–

1. डॉ. गोविंद त्रिगुणायत – शास्त्रीय समीक्षा के सिद्धांत भाग 1 एवं 2
2. डॉ. भगवत स्वरूप मिश्र – हिन्दी आलोचना : उद्‌भव और विकारा
3. डॉ. रामेश्वर खण्डेलवाल – हिन्दी आलोचना के आधार स्तम्भ
4. डॉ. शिवकरण सिंह – आलोचना के बदलते मानदण्ड और हिन्दी साहित्य
5. डॉ. नंदकिशोर नवल – हिन्दी आलोचना का विकारा
6. योगेन्द्र शाही – अस्तित्ववाद किर्कगार्द से कामू तक
7. रणधीर सिन्हा – आलोचनात्मक रामविलास शर्मा

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चतुर्थ सेमेस्टर
प्रश्न पत्र – षष्ठ
(हिन्दी भाषा)

पूर्णांक : 80

पाठ्य विषयः–

इकाई–1 हिन्दी की ऐतिहारिक पृष्ठभूमि : प्राचीन भारतीय आर्य भाषाएँ – वैदिक तथा लौकिक संस्कृत और उनकी विशेषताएँ । मध्यकालीन भारतीय आर्यभाषाएँ – पालि, प्राकृत, शौरसेनी, अर्धमागधी, मागधी, अपभ्रंश और उनकी विशेषताएँ । आधुनिक भारतीय भाषाएँ और उनका वर्गीकरण ।

इकाई–2 हिन्दी का भौगोलिक विरतार – हिन्दी की उपभाषाएँ, पश्चिमी हिन्दी, पूर्वी हिन्दी, राजस्थानी, बिहारी तथा पहाड़ी और उनकी बोलियाँ । खड़ी बोली, ब्रज और अवधी की विशेषताएँ ।

इकाई–3 हिन्दी के विविध रूप– संपर्क भाषा, राष्ट्रभाषा, राजभाषा के रूप में हिन्दी, माध्यम भाषा, रांचार भाषा, हिन्दी की रांवैधानिक रिथति ।

इकाई–4 हिन्दी में कम्प्यूटर सुविधाएँ – आंकड़ा संसाधन और शब्द संसाधन, वर्तनी शोधक, मशीनी अनुवाद, हिन्दी भाष शिक्षण । देवनागरी लिपि : विशेषताएँ और मानकीकरण ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुरतकें:–

1. हिन्दी भाषा का संक्षिप्त इतिहास – भोलानाथ तिवारी
2. हिन्दी और उसकी विविध बोलियों – प्रो. दीपचंद जैन
3. भाषा भूगोल – कैलाशचंद भटिया हिन्दी रामिति उ.प्र. शारान लखनऊ
4. हिन्दी भाषा की रूप संरचना – भोलानाथ तिवारी
5. राष्ट्रभाषा हिन्दी समस्याएँ और समाधान – देवेन्द्रनाथ शर्मा
6. नागरी लिपि और हिन्दी – अनंत चौधरी
7. सामान्य भाषा विज्ञान – डॉ. बाबूराम सक्सेना
8. भाषा विज्ञान – डॉ. भोलानाथ तिवारी

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चतुर्थ सेमेस्टर
प्रश्न पत्र – सप्तम
(मीडिया–लेखन एवं अनुवाद)

पूर्णांक : 80

पाठ्य विषयः–

इकाई–1 मीडिया लेखन

जनसंचार : प्रौद्योगिक एवं चुनौतियाँ, विभिन्न जनसंचार–माध्यमों का स्वरूप– मुद्रण, श्रवण, दृश्य–श्रव्य, इंटरनेट, श्रवण–माध्यम (रेडियो), मौखिक भाषा की प्रकृति । समाचार लेखन एवं वाचन, रेडियो नाटक, उद्घोषणा लेखन, विज्ञापन–लेखन, फीचर तथा रिपोर्ताज ।

इकाई–2 दृश्य–श्रव्य माध्यम (फिल्म, टेलीविजन एवं रेडियो), दृश्य–माध्यमों में भाषा की प्रकृति, दृश्य एवं श्रव्य सामग्री का सामंजस्य, पार्श्व वाचन (वॉयस ओवर) पटकथा–लेखन, टेली–ड्रामा, संवाद–लेखन, साहित्य की विधाओं का दृश्य माध्यमों में रूपान्तरण, विज्ञापन की भाषा ।

इकाई–3 अनुवाद – सिद्धांत एवं व्यवहार

अनुवाद का स्वरूप, क्षेत्र, प्रक्रिया एवं प्रविधि । हिन्दी की प्रयोजनीयता में अनुवाद की भूमिका । कार्यालयीन हिन्दी और अनुवाद, जनसंचार माध्यमों का अनुवाद, विज्ञापन में अनुवाद, वैचारिक साहित्य का अनुवाद, वाणिज्यिक अनुवाद, वैज्ञानिक तकनीकी तथा प्रौद्योगिकी क्षेत्रों में अनुवाद, विधि साहित्य की हिन्दी और अनुवाद ।

इकाई–4 व्यावहारिक अनुवाद अभ्यास, कार्यालयीन अनुवाद, कार्यालयीन एवं प्रशासनिक शब्दावली, प्रशासनिक प्रयुक्तियाँ, पदनाम, विभाग, आदि पत्रों के अनुवाद, पदनामों–अनुभागों–दस्तावेजों–प्रतिवेदनों के अनुवाद, साहित्यिक अनुवाद के सिद्धांत एवं व्यवहार–कविता, कहानी, नाटक, सारानुवाद, दुभाषिया–प्रविधि ।

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें:–

1. जनसंचार माध्यमों में हिन्दी – डॉ. चन्द्रकुमार (क्लासिकल पब्लिक कंपनी)
2. जनमाध्यम एवं पत्रकारिता – प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
3. पत्रकारिता का इतिहास एवं जनसंचार माध्यम– डॉ. संजीव भागवन्त (उ.प्र. जयपुर)
4. पत्रकारिता के विविध आयाम – वेदप्रताप वैदिक
5. दूरदर्शन : हिन्दी के प्रयोनमूलक विविध प्रयोग : डॉ. कृष्णकुमार रत्तू (मीनाक्षी प्रकाशन, जयपुर)
6. जनमाध्यम एवं पत्रकारिता – प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
7. अनुवाद के सिद्धांत – सुरेश कुमार
8. अनुवाद सिद्धांत की रूपरेखा – सुरेश कुमार
9. अनुवाद – बोध – डॉ. गार्गी गुप्त (भारतीय अनुवाद परिषद् दिल्ली)

एम.ए. – (हिन्दी) – 2017–18

चतुर्थ सेमेस्टर
प्रश्न पत्र – अष्टम
जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)

पूर्णांक : 80

पाठ्य विषय :–

इकाई–1 छत्तीसगढ़ी भाषा–भौगोलिक सीमा, नामकरण, भाषिक स्वरूप एवं व्याकरणिक विशेषताएँ ।

इकाई–2 छत्तीसगढ़ी साहित्य की युग प्रवृत्तियाँ एवं इतिहास ।

इकाई–3 छत्तीसगढ़ी कविता एवं कवि –
(1) सुंदरलाल शर्मा
(2) मुकुटधर पाण्डेय
(3) हरि ठाकुर
(4) डॉ. नरेन्द्र देव वर्मा

इकाई–4 छत्तीसगढ़ी नाटक एवं उपन्यास
1. करमछड़हा (नाटक) – डॉ. खूबचंद बघेल
2. आवा (उपन्यास) – परदेशीराम वर्मा

इकाई–5 द्रुतपाठ हेतु निम्नलिखित रचनाकार का अध्ययन (पांच लघुत्तरीय प्रश्न पूछे जायेंगे)
(1) लखन लाल गुप्त (2) लक्ष्मण मस्तुरिहा (3) केयूर भूषण
(4) मुकुन्द कौशल (5) लोचन प्रसाद पाण्डेय (6) लाला जगदलपुरी
(7) पवन दीवान (8) कोदूराम दलित

आंतरिक मूल्यांकन 20 अंक

निर्धारित पुस्तकें :–

1. छत्तीसगढ़ी भाषा का उद्‌विकास – डॉ. नरेन्द्र देव वर्मा
2. छत्तीसगढ़ी, हलबी, भतरी भाषाओं का भाषा वैज्ञानिक अध्ययन – भालचंद्र राव तैलंग
3. छत्तीसगढ़ी परिचय– डॉ. बलदेव मिश्र
4. छत्तीसगढ़ी लोकसाहित्य का अध्ययन – दयाशंकर शुक्ल
5. छत्तीसगढ़ी लोकजीवन और लोकसाहित्य का अध्ययन – डॉ. शकुन्तला वर्मा
6. छत्तीसगढ़ी भाषा का शास्त्रीय अध्ययन– डॉ. शंकर शेष
7. प्राचीन छत्तीसगढ़ी बोली – प्यारेलाल गुप्त
8. छत्तीसगढ़ी लोक साहित्य और भाषा – डॉ. बिहारीलाल साहू
9. छत्तीसगढ़ी भाषा और साहित्य – डॉ. सत्यभामा आडिल
10. छत्तीसगढ़ के साहित्यकार – देवीप्रसाद वर्मा
11. मानक छत्तीसगढ़ी व्याकरण – चंद्रकुमार चंद्राकर

2017–18
एम.ए. पूर्व (हिन्दी)

एम.ए. पूर्व में कुल पांच प्रश्न पत्र होंगे । प्रत्येक प्रश्न पत्र तीन घण्टे का तथा 100 अंको का होगा । इस परीक्षा में भाषा और साहित्य का व्यापक ज्ञान अपेक्षित है । निर्धारित पुस्तक और उसके निर्दिष्ट अंश केवल व्याख्यापरख प्रश्नों के लिए है । रामीक्षात्मक प्रश्न कृतिकार के रांपूर्ण कृतित्व रो रांबंधित रहेंगे । द्रुत पाठ के लिए रचनाकार के कृतित्व से परिचित होना आवश्यक है । हिन्दी भाषा और साहित्य के संपूर्ण वाड.गमय का ज्ञान अपेक्षित है । हिन्दी के समकालीन भारतीय साहित्य, जनपदीय भाषा का राहित्य एवं रोजगारोन्मुख व्यावरायिक हिन्दी का पाठ्यक्रम बदलते युग की मांग है । अतः विद्यार्थियों को युगानुरूप हिन्दी के विविध व्यावसायिक रूपों का भी अध्ययन करना होगा ।

प्रत्येक प्रश्न पत्र में संबंधित काल के इतिहास एवं संस्कृति की जानकारी भी अपेक्षित है । अपने क्षेत्र से संबंधित आंचलिक बोली/भाषा का अपेक्षित ज्ञान एवं क्षेत्रीय शब्दों का सर्वेक्षण कार्य आवश्यक है ।

एमए. पूर्व हिन्दी के निम्नलिखित पांच प्रश्न पत्र होंगेः–

क्रं.	प्रश्न पत्र	प्रश्न पत्र का नाम	अंक	पेपर कोड
1.	प्रथम	हिन्दी साहित्य का इतिहास	100	0313
2.	द्वितीय	प्राचीन एवं मध्यकालीन काव्य	100	0314
3.	तृतीय	आधुनिक हिन्दी काव्य	100	0315
4.	चतुर्थ	आधुनिक गद्य काव्य	100	0316
5.	पंचम	जनपदीय भाषा और साहित्य (छत्तीसगढ़ी)	100	0317

एम.ए. पूर्व (हिन्दी)
प्रथम प्रश्न पत्र
हिन्दी साहित्य का इतिहास
(पेपर कोड 0313)

प्रस्तावना–

किरी भी देश के जनमानरा की मनोवृत्ति, दशा एवं रांवेदना के विविध स्वरूपों का संचित रूप वहां के साहित्य में परिलक्षित होता है । सामाजिक, राजनीतिक, सांस्कृतिक आदि विभिन्न परिस्थितियों के कारण चित्तवृत्तियों में परिवर्तन होता है, फलतः राहित्यिक रूपों में भी बदलाव आ जाता है । इरा बदली हुई विकारा प्रक्रिया को राहित्य के इतिहास के माध्यम से ही देखा परखा जा सकता है ।

हिन्दी क्षेत्र की परिस्थितियों से कमोबेश पूरा भारत प्रभावित होता रहा है जिराकी गूँज हिन्दी राहित्त में प्रतिध्वनित हैं । आठवीं नवीं शताब्दी रो लेकर आज तक

के विकास परिदृश्य के साथ साहित्यिक सृजनशीलता के विविध रूपों, प्रवृत्तियों और भाषा–शैलियों का ज्ञान हिन्दी साहित्य के इतिहास के माध्यम से ही किया जा सकता है । अतः इसका अध्ययन सर्वथा सार्थक एवं समीचीन है ।

पाठ्य विषय

इकाई–1 **इतिहास–दर्शन और साहित्येतिहास** ।

– हिन्दी राहित्य के इतिहारा लेखन की परम्परा, आधारभूत रामग्री और साहित्येतिहास के पुनर्लेखन की समस्याएँ ।

– हिन्दी साहित्य का इतिहास : काल विभाजन, सीमा–निर्धारण और नामकरण ।

– हिन्दी साहित्य : आदिकाल की पृष्ठभूमि, सिद्ध और नाथ–साहित्य, रासो–काव्य, जैन–साहित्य ।

– हिन्दी साहित्य के आदिकाल का ऐतिहासिक परिदृश्य, साहित्यिक प्रवृत्तियॉं, काव्यधाराएँ, गद्य साहित्य, प्रतिनिधि रचनाकार और उनकी रचनाएँ ।

इकाई–2 **पूर्व–मध्यकाल (भक्तिकाल) की ऐतिहासिक पृष्ठभूमि, सांस्कृतिक–चेतना एवं भक्ति–आंदोलन, विभिन्न–काव्यधाराएँ तथा उनका वैशिष्ट्य** ।

– प्रमुख निर्गुण रांत कवि और उनका अवदान ।

– भारत में सूफी मत का विकास तथा प्रमुख सूफी कवि और काव्यग्रंथ, सूफी काव्य में भारतीय संस्कृति एवं लोकजीवन के तत्व ।

– राम और कृष्ण काव्य, राकृष्णेत्तर काव्य, भक्तीतर काव्य, प्रमुख कवि और उनका रचनागत वैशिष्ट्य, भक्तिकालीन गद्य– साहित्य ।

इकाई–3 **उत्तरमध्यकाल (रीतिकाल) की ऐतिहासिक पृष्ठभूमि**, काल–सीमा और नामकरण, दरबारी संरक्षित लक्षण ग्रंथों की परम्परा, रीतिकालीन साहित्य की विभिन्न धाराएँ (रीतिबद्ध, रीतिसिद्ध और रीतिमुक्त) प्रवृत्तियॉं और विशेषताएँ, प्रतिनिधि रचनाकार और रचनाएँ । रीतिकालीन गद्य–राहित्य । आधुनिक काल की सामाजिक, राजनैतिक, आर्थिक एवं सांस्कृतिक पृष्ठभूमि, सन् 1857 की राजक्रांति और पुनर्जागरण ।

भारतेंदु युग : प्रमुख राहित्यकार, रचनाएँ और राहित्यिक विशेषताएँ ।

द्विवेदी युग : प्रमुख साहित्यकार, रचनाएँ और साहित्यिक विशेषताएँ ।

– हिन्दी स्वच्छदयावादी चेतना का परवर्ती विकास–छायावादी काव्य : प्रमुख राहित्यकार, रचनाएँ और राहित्यक विशेषताएँ ।

इकाई–4 **उत्तरछायावादी काव्य की विविध प्रवृत्तियॉं**–प्रगतिवाद, प्रयोगवाद, नयी कविता, नवगीत, रामकालीन कविता ।

प्रमुख साहित्यकार, रचनाएँ और साहित्यक विशेषताएँ ।

– हिन्दी गद्य की प्रमुख विधाओं (कहानी, उपन्यास, नाटक, निबंध, संस्मरण, रेखाचित्र, जीवनी, आत्मकथा, रिपोतार्ज, आदि) का विकास ।

– हिन्दी आलोचना का उद्‌भव और विकास ।
– दक्खिनी हिन्दी साहित्य का संक्षिप्त परिचय ।
– उर्दू साहित्य का संक्षिप्त परिचय ।
– हिन्दीत्तर क्षेत्रों तथा देशान्तर में हिन्दी भाषा और साहित्य ।

अंक विभाजन –

04 आलोचनात्मक प्रश्न	4 X 15	60 अंक
05 लघुत्तरीय प्रश्न	5 X 4	20 अंक
20 वस्तुनिष्ठ प्रश्नय	20X 1	20 अंक
	कुल	**100** अंक

संदर्भ–ग्रन्थ –

1. हिन्दी साहित्य का इतिहास– आचार्य रामचन्द्र शुक्ल
2. हिन्दी साहित्य का इतिहास– डॉ. नगेन्द्र
3. हिन्दी राहित्य का इतिहारा – बाबू गुलाबराय
4. हिन्दी साहित्य का इतिहास – डॉ. रामकुमार वर्मा
5. हिन्दी साहित्य का इतिहास– रमाशंकर शुक्ल रसाल ।
6. हिन्दी राहित्य का आदिकाल – डॉ. हजारी प्रराद द्विवेदी
7. हिन्दी साहित्य : युग और प्रवृत्तियॉ – डॉ. शिवकुमार शर्मा
8. आधुनिक हिन्दी साहित्य का इतिहास– कृष्ण शंकर शुक्ल ।
9. हिन्दी भाषा और राहित्य का इतिहारा– चतुररोन शारत्री
10. हिन्दी साहित्य का विवेचनात्मक इतिहास – देवीशरण रस्तोगी ।
11. हिन्दी साहित्य और उसका विकास – प्रेमलता अग्रवाल
12. हिन्दी साहित्य का संक्षिप्त इतिहास – श्यामसुन्दर दास एवं नंद दुलारे वाजपेयी
13. हिन्दी राहित्य का विवेचनात्मक इतिहारा – डॉ. रारयूकान्त शारत्री
14. हिन्दी साहित्य का इतिहास – हृदयेश मिश्र
15. हिन्दी साहित्य युग और धार – कृष्ण नारायण प्रसाद 'मागध' प्रसाद 'मागध'
16. रांरकृति के चार अध्याय– दिनकर
17. हिन्दी साहित्य का वृहद् इतिहास – नागरी प्रचारिणी सभी (18 भाग)
18. हिन्दी साहित्य– हजारी प्रसाद द्विवेदी
19. हिन्दी राहित्य की भूमिका – हजारी प्रराद द्विवेदी
20. हिन्दी साहित्य का वैज्ञानिक इतिहास – डॉ. गणपति चन्द्र गुप्त भाग 1 एवं 2

द्वितीय प्रश्न पत्र
प्राचीन एवं मध्यकालीन काव्य
(पेपर कोड–0314)

प्रस्तावना–

हिन्दी के आदिकालीन काव्य अपनी पृष्ठभूमि में अप्रभंश के आवेदन को पूरी तरह रामेटे हुए है । प्रबंध, मुक्तक आदि काव्य रूपों में रचित और अपभ्रंश एवं देशी भाषा में अभिव्यजिंत आदिकालीन साहित्य की परवर्ती कालों को प्रभावित करने में सक्रिय एवं सक्षम भूमिका रही है । इनका अध्ययन समाज, संस्कृति और गुण की धड़कनों को सम्रगता में रामझने के लिए अनिवार्य है ।

पाठ्य विषय–

व्याख्या एवं विवेचन के लिए निम्नांकित 6 कवियों का अध्ययन किया जाएगा

1. चंदरबरदाईः पृथ्वीराज रासो संपा, आचार्य हजारी प्रसाद द्विवेदी एवं डॉ. नावर सिंह (शशिवृता विवाह खण्ड)
2. विद्यापति : विद्यापति पदावली–संपा. रामवृक्ष बेनीपुरी (प्रारंभिक
3. कबीर ग्रंथावलीः रांपा. डॉ. श्यामसुंदर दारा (100 राखियॉ एवं 25 पद)

   साखियों : गुरूदेव की अंग 1 से 20, सुमिरण की अंग 1 से 10, विरह की अंग 1 से 10, ग्यान बिरह की अंग 1 से 10, परचा की अंग 1 से 10, रस की अंग, 1 रो 5 निहकर्मी पतिव्रता – 1 रो 10, चितावणी 1 रो 10, माया 1 से 5, काल की अंग 1 से 10 तक ।

   पद संख्या : 11, 16, 24, 26, 27, 40, 47, 49, 60, 64, 70, 72, 75, 89, 93, 98, 99, 100, 101, 103, 110, 111, 135, 268 = (25 पद)
4. सूरदास : भ्रमर गीत सार–संपा, आचार्य रामचंद्र शुक्ल (50 पद)
5. तुलरीदारा : रामचरित मानरा (गीता प्रेरा) (सुंदरकांड)
6. बिहारी : बिहारी रत्नाकर, – संपा, जगन्नाथ प्रसाद रत्नाकर (प्रारंभिक 100 दोहे)
7. खण्डेराव भोंरालेः राधा विनोद – उत्तरार्ध–अध्याय छब्बीरा (रूक्मिणी–कृष्ण विवाह)

द्रुत पाठ हेतु निम्नांकित 10 कवियों की रचनाओं का ज्ञान, भावगत, शिल्पगत विशेषताएँ, कालगत प्रवृत्तियॉ एवं कवि का परिचय जानना आवश्यक है । इन 10 कवियों पर 5 लघुत्तरीय प्रश्न पूछे जायेंगे ।

1.	नन्ददारा,	2.	दादू	3.	मीरा बाई	4.	रैदारा,
5.	रहीम	6.	रसखान	7.	केशव	8.	देव
9.	भूषण	10.	पद्माकर				

अंक विभाजन –

3 व्याख्या	3X 10 =	30 अंक
2 आलोचनात्मक प्रश्न	2X 15 =	30 अंक
5 लघुत्तरीय प्रश्न	5X 4 =	20 अंक
20 वरतुनिष्ठ/अति लघुत्तरीय प्रश्न	20X 1 =	20 अंक

इकाई विभाजन –

इकाई–1 व्याख्या
इकाई–2 चंदरबरदाई, विद्यापति एवं कबीर
इकाई–3 सूरदास, तुलसीदास, बिहारीलाल एवं खण्डेराव भोंसले
इकाई–4 दुतपाठ के 10 कवि
इकाई–5 सहायक पाठ्य पुस्तकों से – वस्तुनिष्ठ/अतिलघुत्तरी

सहायक पुस्तकें:–

1. हिन्दी साहित्य का इतिहास आचार्य रामचंद्र शुक्ल
2. हिन्दी साहित्य का आदिकाल – डॉ. हजारी प्रसाद द्विवेदी
3. चन्दबरदाई – डॉ. विपिन बिहारी द्विवेदी
4. विद्यापति – जयनाथ नलिन
5. महाकवि विद्यापति – डॉ. कृष्णानंद पीयूष
6. कबीर का रहस्यवाद – डॉ. रामकुमार वर्मा
7. कबीर साहित्य की परख – परशुराम चतुर्वेदी
8. रांत धर्मदारा : कबीर पंथ के प्रवर्तक – डॉ. रात्यभाम आडिल
9. कृष्ण काव्य और सूर – डॉ. प्रेमशंकर
10. सूरदास काव्य का मूल्यांकन – डॉ. रामरतन भटनागर
11. रूर राहित्य – डॉ. हजारी प्रराद द्विवेदी
12. सूरदास – डॉ. हरवंशलाल वर्मा
13. महाकवि तुलसीदास और उनका युग संदर्भ – डॉ. भागीरथ मिश्र
14. तुलसी दर्शन – डॉ. बलदेव प्रसाद मिश्र
15. बिहारी का मूल्यांकन – डॉ. बच्चन सिंह
16. मुक्तक काव्य परंपरा और बिहारी – डॉ. रामसागर त्रिपाठी
17. रीति स्वछन्द काव्य धारा – डॉ. कृष्णचन्द्र वर्मा
18. मध्यकालीन हिन्दी काव्यधारा – डॉ. रामस्वरूप मिश्र
19. भक्तिकाल और लोकजीवन – डॉ. शिवकुमार मिश्र
20. घनानंद और स्वच्छंद काव्यधारा – डॉ. मोहन लाल गौड़
21. कबीर – डॉ. महावीर अग्रवाल, श्री प्रकाशन, दुर्ग
22. कबीर – डॉ. हजारी प्रसाद द्विवेदी
23. प्रमुख प्राचीन कवि – डॉ. द्वारिका प्रसाद सक्सेना

तृतीय प्रश्न पत्र
आधुनिक हिन्दी काव्य
(पेपर कोड 0315)

प्रस्तावना –

आधुनिक हिन्दी काव्य पुनर्नवा के रूप में नवीन भावभूमि एवं वैचारिक गतिशीलता लेकर अवतरित हुआ । आधुनिकता, इहलौकिकता, विश्वजनीनता एवं वैज्ञानिक दृष्टिकोण इसकी प्रमुख विशेषताएँ है । उपेक्षित विषय भी यहाँ सार्थक एवं प्रासंगिक हो गए । उन्नीसवीं सदी के उत्तरार्द्ध से अद्यावधि तक की संवेदनाएँ, भावनाएँ एवं नूतन विचार सरणियाँ इसमें अभिव्यक्ति हुए है । मुकम्मल मनुष्य इसमें अभिव्यंजित हुआ है । विविध धाराओं में प्रवाहमान आधुनिक हिन्दी काव्य प्रेरणा और ऊर्जा का अजस्र स्त्रोत है । इस प्रश्न पत्र में व्याख्या एवं विवेचना के लिए निम्नांकित 7 कवियों का अध्ययन किया जाएगा ।

पाठ्य विषय–

1.	मैथिलीशरण गुप्ता	:	साकेत (नवम सर्ग)
2.	जयशंकर प्रसाद	:	कामायनी (चिन्ता, श्रद्धा, इड़ा सर्ग)
3.	सूर्यकांत त्रिपाठी निराला	:	राम की शक्ति पूजा, सरोज स्मृति एवं कुकुरमुत्ता ।
4.	पंत	:	(1) परिवर्तन (2) नौका विहार
5.	महादेवी वर्मा	:	(1) प्रिय सांध्य गगन (2) मैं नीरभरी दु:ख की बदली (3) पंत होने दो अपरिचित प्राण रहने दो अकेला (4) दूर गया वह निर्मम दर्पण (5) यह मंदिर का दीप इसे नीरव जलने दो (6) रूपसी तेरा घन केश पाश ।
6.	अज्ञेय	:	(1) नदी के द्वीप (2) असाध्य वीणा (3) बावरा अहेरी (4) सोन मछली (5) आंगन के चार (6) कितनी नावों में कितनी बार (7) सत्य तो बहुत मिले (8) एक सन्नाटा बुनता हूँ (9) हमने पौधों से कहा (10) सागर मुद्रा ।
7.	मुक्तिबोध	:	अंधेरे में ।
8.	नागार्जुन	:	(1) बादल को घिरते देखा है (2) सिन्दुर तिलकित भाल (3) बसन्त की आगवानी (4) कोई आए तुमसे सीखे (5) शिशिर विषकन्या (6) तो फिर क्या हुआ (7) यह तुम थीं (8) कोयल आज बोली है (9) अकाल और उसके बाद (10) शासन की बन्दूक ।

द्रुतपाठ हेतु निम्नांकित 12 कवियों का अध्ययन किया जाएगा । इसमें से किन्हीं 5 कवियों पर लघुत्तरीय प्रश्न पूछे जाऐंगे –

1.	अयोध्या सिंह उपाध्याय हरिऔध	2.	हरिवंशराय बच्चन	3.	केदारनाथ अग्रवाल
4.	भवानी प्रसाद मिश्र	5.	शमशेर बहादुर सिंह	6.	त्रिलोचन
7.	रघुवीर सहाय	8.	धूमिल	9.	सर्वेश्वर दयाल सक्सेना
10.	दुष्यंत कुमार	11.	इन्द्र बहादुर खरे	12.	माखनलाल चतुर्वेदी

अंक विभाजन –

3 व्याख्या	3X 10 =	30 अंक
2 आलोचनात्मक प्रश्न	2X 15 =	30 अंक
5 लघुत्तरीय प्रश्न	5X 4 =	20 अंक
20 वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न	20X 1 =	20 अंक
	कुल =	**100** अंक

इकाई विभाजन –

इकाई–1	व्याख्या।
इकाई–2	गुप्त, प्रसाद व निराला ।
इकाई–3	महादेवी वर्मा, अज्ञेय, मुक्तिबोध एवं नागार्जुन ।
इकाई–4	द्रुतपाठ के 12 कवि
इकाई–5	वस्तुनिष्ठ (सभी पाठ्यपुस्तकों से)

सहायक पुस्तकें–

1. साकेत एक अध्ययन – डॉ. नगेन्द्र
2. प्रसाद का काव्य – डॉ. प्रेमशंकर
3. कामायनी का पुनर्मूल्यांकन – डॉ. रामस्वरूप चतुर्वेदी
4. कामायनी एक पुनर्विचार – मुक्तिबोध
5. कामायनी के अध्ययन की समस्याएँ – डॉ. नगेन्द्र
6. कवि निराला – आचार्य नंद दुलारे वाजपेयी
7. निराला की साहित्य साधना – डॉ. रामविलास शर्मा
8. कवि दृष्टि – रामस्वरूप चतुर्वेदी
9. नयी कविता की पहचान – डॉ. राजेन्द्र मिश्र
10. हिन्दी साहित्य : आधुनिक परिदृश्य – अज्ञेय
11. नया साहित्य : नये प्रश्न – आचार्य नंददुलारे वाजपेयी
12. हिन्दी साहित्य सम्मेलन का प्रकार – विवरणिका
13. स्मृति लेखा – सं. ही. वात्स्यायन
14. कामायनी मिथक और स्वप्न – रमेश कुंतल मेंघ
15. फिलहाल – डॉ. अशोक वाजपेयी
16. अज्ञेय का रचना संसार – डॉ. रामस्वरूप चतुर्वेदी
17. कविता की तीसरी आंख – डॉ. प्रभाकर श्रोत्रिय
18. कविता से साक्षात्कार – मलयज
19. कविता का गल्प – डॉ. अशोक वाजपेयी
20. शमशेर बहादुर सिंह – डॉ. प्रगाकर श्रोत्रिय
21. हिन्दी साहित्य का इतिहास – आचार्य रामचन्द्र शुक्ल
22. निराला काव्य पुनर्मूल्यांकन – डॉ. धनंजय वर्मा
23. समकालीन हिन्दी कविता – रमेश अनुपम

24. समकालीन हिन्दी काव्य – डॉ द्वारिका प्रसाद सक्सेना
25. परम अभिव्यक्ति की खोज – डॉ. धनंजय वर्मा
(मुक्तिबोध के काव्य का पुर्नमूल्यांकन)
26. गोर के गीत – इन्द्रबहादुर खरे
27. आधुनिक काव्य संकलन – सत्यभामा आडिल
28. साकेश का शैली वैज्ञानिक अध्ययन – सुभ्रदा राउत
29. कवि कथाकार विनोद कुमार शुक्ल का साहित्य – डॉ. आस्था तिवारी (शताक्षी प्रकाश्न चौबे कालोनी, रायपुर)
30. प्रगतिशील कविता और केदार – गिरिजाशंकर गौतम (शताक्षी प्रकाशन चौबे कालोनी, रायपुर)
31. मूकमाटी – श्री विद्यासागर जी
32. छायावादोत्तर काव्य की विभिन्न प्रवृत्तियों एवं उनका चैन्तनिक पक्ष – डॉ. ज्योति पाण्डेय

चतुर्थ प्रश्न पत्र
आधुनिक गद्य–साहित्य
(पेपर कोड–0316)

उद्देश्य और प्रस्तावना–

आधुनिक काल में गद्य–साहित्य को अभूतपूर्वक सफलता मिली है । यह मानव–मन और मस्तिष्क की अभिव्यक्ति का सशक्त एवं अनिवार्य माध्यम बन गया है । मनुष्य का राग–विराग, तर्क–वितर्क तथा चिंतन–मनन जिस रागात्मकता के साथ कौशलपूर्व ढंग से गद्य में अभिव्यंजित होता है, वैसा अन्य साहित्यांग में नहीं । आधुनिक काल में गद्य की विविध रूपों का विकास इस तथ्य का साक्षी है कि प्रौढ़–मन मस्तिष्क की पूर्ण अभिव्यक्ति गद्य में ही संभव है । निबंध गद्य का प्रौढ़ शक्तिशाली प्रतिरूप, उसकी वैयक्तिक एवं स्वातंत्र्य चेतना का विश्वसनीय प्रतिनिधि है । नाटक, उपन्यास, कहानी तथा अन्य विविध विधाओं के रूप में गद्य साहित्य वामन से विराट बन गया है । आज मनुष्य को उसकी प्रकृति, परिवेश परिस्थिति तथा चिंतन की विकास प्रक्रिया के साथ सहज प्रामाणिक रूप में गद्य के माध्यम से ही जाना जा सकता है । अतः इसका अध्ययन अनिवार्य हैं । इस प्रश्न पत्र में 2 नाटक, 2 उपन्यास, 7 निबंध, 7 कहानियॉ एवं 1 चरितात्मक कृति पठनीय है ।

पाठ्य विषय–

व्याख्या एवं विवेचन के लिए निर्धारित –

1. चन्द्रगुप्त (जयशंकर प्रसाद)
2. हानूश (भीष्म साहनी)
3. गोदान (प्रेमचंद)
4. बाणभट्ट की आत्मकथा (हजारी प्रसाद द्विवेदी)
5. निबंध–
   1. बालकृष्ण भट्ट : चढ़ती उमर
   2. आचार्य रामचंद्र शुक्ल : कविता क्या है?
   3. आचार्य हजारी प्रसाद द्विवेदी : भारतीय साहित्य की प्राणशक्ति
   4. रामवृक्ष बेनीपुरी : माटी की मूरतें
   5. कुबेरनाथ राय : हरी हरी दूब और लाचार क्रोध
   6. विद्यानिवास मिश्र : चन्द्रमा मनसो जातः

7. हरिशंकर परसाई : वैष्णव की फिसलन

6. कहानी–

1. चन्द्रधर शर्मा गुलेरी : उसने कहा था
2. जयशंकर प्रसाद : पुरस्कार
3. प्रेमचंद : सुजान भगत
4. राजेन्द्र यादव : छोटे–छोटे ताजमहल
5. कृष्णा सोबती : बादलों के घेरे
6. उषा प्रियंवदा : वापसी
7. यशपाल : मक्रील

7. चरितात्मक कथा –

विष्णु प्रभाकर : आवारा मसीहा ।

द्रुत पाठ हेतु 5 नाटककार, 5 उपन्यासकार, 5 निबंधकार, 5 कहानीकार और 2 स्फुट गद्य विधाओं के रचनाकार रखे गए हैं । इनमें से प्रत्येक विधा से संबंधित 1–1 लघुत्तरीय प्रश्न पूछा जाएगा ।

नाटककार–	1. भारतेन्दु हरिश्चन्द्र	2. डॉ. रामकुमार वर्मा	3. भुवनेश्वर
	4. जगदीशचन्द्र माथुर	5. उपेन्द्रनाथ अश्क	
उपन्यासकार–	1. राहुल सांस्कृत्यायन	2. यशपाल	3. अमृतलाल नागर
	4. भीष्म सहानी	5. मन्नू भण्डारी	
निबंधकार–	1. प्रतापनारायण मिश्र	2. सरदार पूर्णसिंह	3. बालमुकुन्द गुप्त
	4. शिवपूजन सहायक	5. चन्द्रधर शर्मा गुलेरी	
कहानीकार–	1. पांडेय बेचन शर्मा उग्र	2. रांगेय राघव	3. फणीश्वरनाथ रेणु
	4. शिव प्रसाद सिंह	5. अमरकांत	

स्फुट ग्रंथ– 1. हरिवंशराय बच्चन (क्या भूलूँ क्या याद करूँ) 2. महादेवी वर्मा (संस्मरण)

अंक विभाजन

3 व्याख्या	3X 10 =	30 अंक
2 आलोचनात्मक प्रश्न	2X 15 =	30 अंक
5 लघुत्तरीय प्रश्न	5X 4 =	20 अंक
20 वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न	20X 1 =	20 अंक
	कुल –	100 अंक

इकाई विभाजन –

इकाई–1 व्याख्या
इकाई–2 चन्द्रगुप्त, हानूश, गोदान एवं बाणभट्ट की आत्मकथा
इकाई–3 निबंध, कहानी एवं चरितात्मक कथा आवारा मसीहा
इकाई–4 द्रुतपाठ के रचनाकार
इकाई–5 वस्तुनिष्ठ (सभी पाठ्यक्रमों से)

सहायक पुस्तकें–

1. हिन्दी नाटक उद्‌भव और विकास – डॉ. दशरथ ओझा
2. हिन्दी नाटक सिद्धांत और विवेचन – डॉ. गिरीश रस्तोगी
3. हिन्दी नाटक पुनर्मूल्यांकन – डॉ. सत्येन्द्र तनेजा
4. समसामयिक हिन्दी नाटकों में चरित्र सृष्टि – डॉ. जयदेव तनेजा
5. हिन्दी एकांकी की शिल्पविधि का विकास – डॉ. सिद्धनाथ कुमार
6. प्रेमचंद और उसका युग – डॉ. रामविलास शर्मा
7. गोदान के अध्ययन की समस्याएँ – डॉ. गोपाल राय
8. कहानी नई कहानी – डॉ. नामवर सिंह
9. नई कहानी की भूमिका – कमलेश्वर
10. शांति निकेतन में शिवालिक – डॉ. शिवप्रसाद सिंह
11. हजारी प्रसाद द्विवेदी – सं. विश्वनाथ तिवारी
12. कहानी, संवेदना और धरातल – राजेन्द्र यादव
13. कथाकार फणीश्वर नाथ रेणु – चंद्रभान सोनवणे
14. हिन्दी के आंचलिक उपन्यासों में जीवन सत्य – डॉ. इंदु प्रकाश पाण्डेय
15. हिन्दी उपन्यासों में आंचलिकता की प्रवृत्ति – डॉ. के.वुड़के
16. हिन्दी कहानी का रचना शास्त्र – डॉ. धनंजय वर्मा
17. हिन्दी कहानी का सफरनामा – डॉ. धनंजय वर्मा
18. प्रसाद के नाटकों का शास्त्रीय अध्ययन – जगन्नाथ प्रसाद शर्मा
19. रंग–दर्शन – नेमिचंद जैन
20. संस्मरण – महादेवी वर्मा
21. प्रेमचंद साहित्य में सूक्ति–सौष्ठव – राजकुमार पाण्डेय
22. हजारी प्रसाद द्विवेदी का साहित्य चिंतन – शशि पाण्डेय (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
23. हिन्दी लघुकथा का विकास – डॉ. अंजली शर्मा (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
24. भीष्म साहनी के उपन्यास और नाटक – डॉ. राकेश कुमार तिवारी (अभिषेक प्रकाशन, रायपुर)
25. नई कहानी और भीष्म साहनी – डॉ. राकेश कुमार तिवारी (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)

पंचम प्रश्न पत्र
जनपदीय भाषा और साहित्य
(पेपर कोड–0317)

उद्देश्य एवं प्रस्तावना–

हिन्दी साहित्य मात्र खड़ी बोली तक सीमित नहीं है । उसकी अनेक विभाषाओं में आज भी पर्याप्त साहित्य सृजन किया जा रहा है । प्राचीन साहित्य तो मुख्यतः विभाषाओं में ही प्राप्त है । इनका पृथक अध्ययन कराने से इन विभाषाओं का उत्तरोत्तर विकास होगा । इस प्रश्न पत्र में क्षेत्रीय/जनपदीय भाषा में रचित अर्वाचीन साहित्य का अध्ययन आवश्यक है ।

पाठ्य विषय–

1. अ. छत्तीसगढ़ी भाषा एवं व्याकरण–

(भौगोलिक सीमा, नामकरण, भाषा का इतिहास, व्याकरण के अंग–उपांग)

ब. छत्तीसगढ़ी साहित्य की युग प्रवृत्तियाँ एवं इतिहास

2. छत्तीसगढ़ी कविता एवं कवि : (व्याख्या एवं विवेचना)

(1) सुंदर लाल शर्मा (2) मुकटधर पाण्डेय (3) द्वारिका प्रसाद मिश्र
(4) कुंज बिहारी चौबे (5) कपिल नाथ कश्यप (6) श्याम लाल चतुर्वेदी
(7) गिरिवर दास वैष्णव (8) हरि ठाकुर (9) नारायण लाल परमार
(10) डॉ. नरेन्द्र देव वर्मा

3. छत्तीसगढ़ी गद्य एवं गद्यकार – (व्याख्या एवं विवेचना)

(1) रातवंतिन सुकवारा (श्याम लाल चतुर्वेदी)
(2) सुवा हमर संगवारी (लखन लाल गुप्त)
(3) गोररी के गोठ (डॉ. पालेश्वर प्रसाद शर्मा)
(4) ऑसू में फिले अचरा (केयूर भूषण)
(5) कउवा, कबूतर अऊ मनखे (परमानंद वर्मा)
(6) गाय न गय, सुख होय हरू (लक्ष्मण मस्तुरिहा)
(7) फिरंतिन (मौरी दाई) – (शिवशंकर शुक्ल)

4. छत्तीसगढ़ी नाटक एवं एकांकी – (व्याख्या एवं विवेचना)

(1) करमछड़हा (नाटक) – डॉ. खूबचंद बघेल

(2) परेमा (एकांकी) – नन्दकिशोर तिवारी

(3) राउत के डर (एकांकी) – टिकेन्द्र टिकरिहा

5. उपन्यास– (व्याख्या एवं विवेचना)

आवा– परदेशी राम वर्मा

द्रुत पाठ के लिए निम्नांकित कवियों का अध्ययन किया जाएगा । इनमें से किन्हीं पांच पर लघुत्तरीय प्रश्न पूछे जाऐंगे ।

(1) नरसिंह दास	(2) शुकलाल प्रसाद पाण्डेय	(3) लोचन प्रसाद पाण्डेय
(4) कपिलनाथ मिश्र	(5) प्यारेलाल गुप्ता	(6) लाल जगदलपुरी
(7) लखनलाल वर्मा	(8) कोदूराम दलित	(9) डॉ. बल्देव
(10) दानेश्वर वर्मा	(11) पवन दीवान	(12) जीवन यदु
(13) ऊधोराम झखमार	(14) बद्रीविशाल परमानन्द	

अंक विभाजन –

3 व्याख्या	3X 10	=	30 अंक
2 आलोचनात्मक प्रश्न	2X 15	=	30 अंक
5 लघुत्तरीय प्रश्न	5X 4	=	20 अंक
20 वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न	20X 1	=	20 अंक
	कुल	=	100 अंक

इकाई विभाजन –

इकाई–1 व्याख्या (01 कविता, 01 गद्यकथा, 01 नाटक एवं उपन्यास)

इकाई–2 छत्तीरागढ़ी कविता एवं कवि
छत्तीसगढ़ी गद्य एवं गद्यकार

इकाई–3 छत्तीरागढ़ी नाटक, एकांकी एवं आवा (उपन्यारा)

इकाई–4 द्रुतपाठ के रचनाकार व छत्तीसगढ़ी साहित्य की युग प्रवृत्तियॉ एवं इतिहास (आमुख)

इकाई–5 भाषा एवं व्याकरण (वस्तुनिष्ठ)

पाठ्यपुस्तक छत्तीसगढ़ी भाषा और साहित्य– संपादक– डॉ. सत्यभामा आडिल ।

सहायक पुस्तकें:–

1.	छत्तीसगढ़ी का उद्विकास –	डॉ. नरेन्द्रदेव वर्मा
2.	छत्तीसगढ़ी बोली व्याकरण और कोश –	डॉ. कांतिकुमार
3.	छत्तीसगढ़ी हलवी, भतरी भाषाओं का भाषावैज्ञानिक अध्ययन –	भलाचंद्रराव तैलंग
4.	छत्तीसगढ़ी परिचय–	डॉ. बलदेव प्रसाद मिश्र
5.	खूब तमाश –	गोपाल प्रसाद मिश्र
6.	छत्तीसगढ़ी लोकसाहित्य का अध्ययन –	दयाशंकर शुक्ल
7.	ए ग्रामर ऑफ छत्तीसगढ़ डायलेक्ट – अनुवादक ग्रियर्सन	हीरालाल काव्यापाध्याय
8.	स्व. लोचन प्रसाद पाण्डेय –	प्यारेलाल गुप्त
9.	छत्तीसगढ़ी लोकजीवन और लोकसाहित्य का अध्ययन–	डॉ. शंकुतला वर्मा
10.	छत्तीसगढ़ी का भाषा शास्त्रीय अध्ययन –	डॉ. शंकुतला वर्मा
11.	प्राचीन छत्तीसगढ़ी बोली –	प्यारेलाल गुप्त
12.	छत्तीसगढ़ी साहित्य का ऐतिहासिक अध्ययन –	नंदकिशोर तिवारी
13.	झाँपी –	जमुना प्रसाद कसार
14.	छत्तीसगढ़ी लोकसाहित्य और भाषा –	डॉ. बिहारी लाल साहू
15.	छत्तीसगढ़ के नव रत्न –	रमेश नैयर (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
16.	छत्तीसगढ़ी लोक साहित्यः अर्थ और व्याप्ति –	डॉ.अनुसूया अग्रवाल (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
17.	छत्तीसगढ़ के साहित्यकार –	देवीप्रसाद वर्मा (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
18.	मानक छत्तीसगढ़ी व्याकरण –	चंद्रकुमार चंद्राकर (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
19.	पैदल जिंदगी का कवि –	डॉ. डुमन लाल ध्रुव
20.	पुतरा–पुतरी के बिहाव –	परदेसीराम वर्मा
21.	अपूर्वा –	डॉ. नरेन्द्रदेव वर्मा
22.	पुतरा–पुतरी के बिहाव –	परदेसीराम वर्मा

23.	दुवारी –	प्रदीप कुमार वर्मा
24.	रत्ना –	पारसनाथ देवांगन
25.	छत्तीसगढ़ के सुराजी –	सुशील यदु
26.	संत धर्मदास –	डॉ. सत्यभामा आडिल
27.	पिंवरी लिखे तोर गाग –	बद्रीविशाल परमानंद
28.	लोकरंग 1, 2 –	संपादक सुशील यदु
29.	सोन चिरइया –	हेमनाथ यदु
30.	हमार छत्तीसगढ़ –	सं. महावीर अग्रवाल
31.	कौशल्यानंदन (छत्तीसगढ़ी अनुवाद) –	प्रगंजन शास्त्री
32.	ऋतुसंहार (छत्तीसगढ़ी अनुवाद) –	रसिक बिहारी अवधिया
33.	रूहा सपनाय दारभात –	ऊधोराम झखमार
34.	छत्तीसगढ़ी गजल –	मुकुन्द कौशल
35.	खोरबाहरा तोला गांधी बनाबो –	डॉ. राजेन्द्र सोनी
36.	चोर ले जादा मोटरा अलवाईन –	डॉ. राजेन्द्र सोनी
37.	छत्तीसगढ़ हाइकू –	डॉ. राजेन्द्र सोनी
38.	छत्तीसगढ़ी लोकोक्तियां और जनजीवन –	डॉ. अनुसूया अग्रवाल
39.	छत्तीसगढ़ के युग पुरूष त्यागमूर्ति ठाकुर प्यारेलाल–	रमेश नैयर (शताक्षी प्रकाशन चौबे कालोनी, रायपुर)
40.	छत्तीसगढ़ की लोक कथाएँ–	जयप्रकाश मानस (शताक्षी प्रका. चौबे कालोनी, रायपुर)

छत्तीसगढ़ी शब्दकोश–

1.	छत्तीसगढ़ी शब्दकोश –	डॉ. पालेश्वर वर्मा
2.	छत्तीसगढ़ी शब्दकोश –	डॉ. चन्द्रकुमार चन्द्राकर
3.	छत्तीसगढ़ी गाषा, वियाकरण अउ कोस –	मंगत रवीन्द्र
4.	छत्तीसगढ़ी शब्दकोश –	रमेश चन्द्र महरोत्रा एवं अन्य
5.	छत्तीसगढ़ी व्यवहारिक शब्द कोश –	डॉ. सत्यभामा आडिल
6.	छत्तीसगढ़ी मुहावरा कोश –	डॉ. रमेशचन्द्र महरोत्रा एवं अन्य

पत्र–पत्रिकाएँ –

1.	लोकाक्षर–	छत्तीसगढ़ी त्रैमासिक पत्रिका, बिलासपुर
2.	छत्तीसगढ़ी सेवक –	साप्ताहिक छत्तीसगढ़ी पत्र, सं. जागेश्वर प्रसाद

3. देशबंधु का साप्ताहिक मड़ई अंक– सं. सुधा वर्मा

4. काहे रे नलिनी तू कुम्हलानी – वार्षिक पत्रिका, सं. परदेशीराम वर्मा

5. धरोहर (मासिक पत्रिका) – सं. दुर्गा प्रसाद पारकर ।

2017–18
एम.ए. (हिन्दी) अंतिम

एम.ए. अंतिम हिन्दी में निम्नलिखित अनिवार्य प्रश्न पत्र होंगे ।

क्रं.	प्रश्न पत्र	प्रश्न पत्र का नाम	अंक	पेपर कोड
1.	षष्ठ	काव्यशास्त्र एवं साहित्यालोचन	100	0318
2.	सप्तम	भाषाविज्ञान एवं हिन्दी भाषा	100	0319
3.	अष्टम	प्रयोजनमूलक हिन्दी	100	0320
4.	नवम	भारतीय साहित्य	100	0321
5.	दशम	पत्रकारिता प्रशिक्षण	100	0322

षष्ठ प्रश्न पत्र
काव्यशास्त्र एवं साहित्यलोचन
(पेपर कोड–0318)

प्रस्तावना–

रचना के वैशिष्ट्य और मूल्यबोध के उद्घाटन के लिए काव्यशास्त्र और साहित्यलोचन का ज्ञान अपरिहार्य है । इनसे साहित्यिक समझ विकसित होती है । यह दृष्टि मिलती है जिसके आधार पर साहित्य के मर्म और मूल्यवत्ता की वास्तविक परख की जा सके । सामाजिक–सांस्कृतिक परिवेश के साथ रचना का आस्वाद प्राप्त करने, रचना को उसकी समग्रता में समझने और जॉचने–परखने के लिए भारतीय और पाश्चात्य काव्य शास्त्र तथा हिन्दी के निजी साहित्यलोचन का अध्ययन समीचीन है ।

पाठ्यविषय

इकाई–1 संस्कृत काव्यशास्त्र : काव्य–लक्षण, काव्य हेतु, काव्य प्रयोजन, काव्य के प्रकार ।

रस–सिद्धांतः रस का स्वरूप, रस निष्पत्ति, रस के अंग, साधारणीकरण, सहृदय की अवधारणा

अलंकार सिद्धांत : मूल स्थापनाएँ, अलंकारों का वर्गीकरण ।

रीति का सिद्धांतः रीति की अवधारण, काव्य–गुण, रीति एवं शैली,

रीति सिद्धांत की प्रमुख स्थापनाएँ ।

वक्रोक्ति–सिद्धांतः वक्रोक्ति की अवधारण, वक्रोक्ति के भेद, वक्रोक्ति एवं अभिव्यंजनावाद ।

ध्वनि–सिद्धांत : ध्वनि का स्वरूप, ध्वनि– सिद्धांत की प्रमुख स्थापनाएँ,

ध्वनि– काव्य के प्रमुख पद । भेद, गुणीभूत, व्यंग्य, चित्र–काव्य ।

औचित्य सिद्धांत : परमुख स्थापनाएँ, औचित्य के भेद

इकाई–2 – पाश्चात्य काव्यशास्त्र

प्लेटो : काव्य सिद्धांत

अरस्तू : अनुकरण– सिद्धांत, त्रासदी– विवेचन

लोजाइनस : उदात्त की अवधारणा ।

मैथ्यू ऑर्नल्ड : आलोचना का स्वरूप और प्रकार्य ।

आई.ए.रिचड्र्स : रागात्मक अर्थ, संवेगों का संतुलन, व्यवहारिक आलोचना ।

कॉलरिज

डी.एरा. इलियट

इकाई–3 (क) हिन्दी कवि–आचार्यो का काव्यशास्त्रीय, चिंतन, लक्षण, काव्य परंपरा एवं काव्य शिक्षा–

(1) केशवदास (2) देव (3) रामचन्द्र शुक्ल (4) नंददुलारे वाजपेयी

(5) डॉ. रामविलारा शर्मा ।

(ख) हिन्दी आलोचना की प्रमुख प्रवृत्तियॉ :

शारत्रीय, व्यक्तिवादी, ऐतिहारिक तुलनात्मक, प्रभाववादी, मनोविश्लेषणवादी, सौंदर्यशास्त्रीय, शैली वैज्ञानिक और समाजशास्त्रीय ।

(ग) व्यावहारिक समीक्षा, काव्यांश की स्वविवेक के अनुसार व्याख्या ।

इकाई–4 सिद्धांत और वाद–अभिजात्यवाद, स्वच्छंदावाद, अभिव्यंजनावाद, मार्क्सवाद, मनोविश्लेषण तथा अस्तित्व वाद ।

	इकाई विभाजन	अंक विभाजन
1.	संस्कृत काव्य शास्त्र	15 अंक
2.	पाश्चात्य काव्यशास्त्र	15 अंक
3.	(क) हिन्दी कवि आचार्यो का काव्यशास्त्रीय चिंतन (ख) हिन्दी आलोचना की प्रमुख प्रवृत्तियॉ (ग) व्यावहारिक समीक्षा	15 अंक
4.	सिद्धांत और वाद	15 अंक

5.	5 लघुत्तरीय प्रश्न	5X4	20 अंक
6.	20 वस्तुनिष्ठ/अति लघुत्तरीय प्रश्न	20X1	20 अंक
		कुल	100 अंक

संदर्भ ग्रन्थः—

1.	साहित्य के प्रमुख पक्ष	—	डॉ. राममूर्ति त्रिपाठी
2.	रस सिद्धांत	—	डॉ. नगेन्द्र
3.	रीति काव्य की भूमिका	—	डॉ. नगेन्द्र
4.	भारतीय काव्यशास्त्री	—	डॉ. उद्यभान सिंह
5.	हिन्दी की सामाजिक समीक्षा	—	डॉ. रामाधार शर्मा
6.	हिन्दी आलोचना के आधार रतम्भ		
7.	समीक्षा के प्रतिमान	—	डॉ. निर्मला जैन
8.	पाश्चात्य काव्य शास्त्र	—	डॉ. विजय बहादुर सिंह
9.	पाश्चात्य समीक्षा के मानदंड	—	प्रो. प्रमोद वर्मा
10.	भारतीय और पाश्चात्य रामीक्षा	—	डॉ. गणेश खरे
11.	मार्क्सवादी साहित्य चिंतन	—	डॉ. शिव कुमार मिश्र
12.	आलोचना के नये मान	—	कर्ण सिंह चौहान
13.	कला की कसौटी	—	निर्मला वर्मा
14.	यथार्थवाद	—	डॉ. शिवकुमार मिश्रा
15.	दूसरी परम्परा की खोज	—	डॉ. नामवर सिंह
16.	समीक्षा के प्रतिमान	—	डॉ. गंगाचरण त्रिपाठी
17.	नया साहित्य नये प्रश्न	—	आचार्य नंद दुलारे वाजपेयी

सप्तम प्रश्न पत्र
भाषा विज्ञान एवं हिन्दी भाषा
(पेपर कोड–0319)

प्रस्तावना–

साहित्य आद्यंत एक भाषिक निर्मित है । साहित्य के गंभीर अध्ययन के लिए भाषिक व्यवस्था का सुस्पष्ट सर्वांगिण ज्ञान अपरिहार्य है ।

भाषा विज्ञान भाषा की वस्तुनिष्ट अध्ययन प्रणाली के रूप में भाषिक इकाईयों तथा भाषा संरचना के विभिन्न स्तरों पर इनके अंतः संबंधों के विन्यास को आलोकित कर न केवल अध्येता को भाषिक अंतर्दृष्टि देता है अपितु भाषा विषयक विवेचन के लिए एक निरूपक भाषा भी प्रदान करता है । मूल भाषा व्यवस्था पर आरोपित द्वितीय साहित्यक व्यवस्था की भाषिक प्रकृति की स्वीकृति प्राचीन भारतीय एवं अधुनातन पाश्चात्य साहित्य चिंतन में समान रूप से लक्षणीय है । कहने की आवश्यकता नहीं कि भाषा के साहित्येत्तर, प्रयोजनमूलक रूपों के अध्ययन में भी भाषा वैज्ञानिक चिंतन का लाभ उतना ही महत्वपूर्ण है ।

भाषा वैज्ञानिक आधार पर हिन्दी भाषा का ऐतिहासिक विकासक्रम, भौगोलिक विस्तार, स्वरूप, विविधरूपता तथा हिन्दी में कम्प्यूटर सुविधाओं विषयक जानकारी एवं देवनागरी के वैशिष्ट्य विकारा और मानवीकरण का विवरण हिन्दी के अध्येता के लिए अत्यंत उपयोगी है ।

पाठ्य विषय–

(क) भाषा विज्ञान

1. भाषा और भाषा विज्ञान, भाषा की परिभाषा और अभिलक्षण, भाषा–व्यवस्था और भाषा व्यवहार, भाषा–संरचना और भाषिक–प्रकार्य, भाषा विज्ञान–स्वरूप एवं व्याप्ति, अध्ययन की दिशाएँ–वर्णात्मक, ऐतिहारिक और तुलनात्मक ।
2. स्वनप्रक्रिया–स्वनविज्ञान का स्वरूप और शाखाएँ वागवयव और उनके कार्य, स्वनों का वर्गीकरण, स्वनिक परिवर्तन ।

3. व्याकरण–रूप–प्रक्रिया का स्वरूप और शाखाएँ, रूपिम की अवधारणा और भेद, मुक्त–आबद्ध अर्थदर्शी और संबंधी दर्शी, संबंधदर्शी रूपिम के भेद और प्रकार्य । वाक्य की अवधारणा, वाक्य के भेद, वाक्य विश्लेषण ।

4. अर्थाविज्ञान– अर्थ की अवधारण, शब्द और अर्थ का रांबंध, अर्थ–परिवर्तन ।

5. साहित्य और भाषाविज्ञान–साहित्य के अध्ययन में भाषाविज्ञान के अंगों की उपयोगिता ।

(ख) हिन्दी भाषा

1. हिन्दी की ऐतिहासिक पृष्ठभूमि, प्राचीन भारतीय आर्यभाषाएँ–वैदिक तथा लौकिक संस्कृत और उसकी विशेषताएँ । मध्यकालिन भारतीय आर्यभाषाएँ–पालि, प्राकृत–शौरसेनी, अर्धमागधी, मागधी, अपभ्रंश और उनकी विशेषताएँ । आधुनिक भारतीय आर्यभाषा–समूह और उनका वर्गीकरण ।

2. हिन्दी का भौगोलिक विस्तार, हिन्दी की उपभाषाएँ, पश्चिमी हिन्दी, पूर्वी हिन्दी, राजस्थानी, बिहारी तथा पहाड़ी और उनकी बोलियॉ । खड़ी बोली, ब्रज और अवधी की विशेषताएँ ।

3. हिन्दी का भाषिक स्वरूप–हिन्दी शब्द रचना–उपसर्ग, प्रत्यय, समास । रूपरचना लिंग, वचन और कारक व्यवस्था के संदर्भ में हिन्दी की संज्ञा, सर्वनाम, विशेषण और क्रियारूप । हिन्दी काव्य, रचना–पदक्रम और अन्विति ।

4. हिन्दी के विविध रूप–रांपर्क भाषा, राष्ट्रभाषा, राज भाषा के रूप में हिन्दी, माध्यम–भाषा, संचार भाषा, हिन्दी की संवैधानिक स्थिति ।

5. हिन्दी में कम्प्यूटर सुविधाएँ – आंकड़ा–रांराधन और शब्द–रांराधन, वर्तनी–शोधक, मशीनी अनुवाद, हिन्दी भाषा शिक्षण ।

6. देवनागरी लिपि–विशेषताएँ और मानवीकरण ।

इकाई विभाजन–

इकाई–1 भाषा और विज्ञान, रवन–प्रक्रिया

इकाई–2 व्याकरण

इकाई–3 अर्थ विज्ञान, साहित्य और भाषाविज्ञान ।

इकाई–4 हिन्दी की ऐतिहासिक पृष्ठभूमि, हिन्दी का भौगोलिक विस्तार, हिन्दी का भाषिक स्वरूप ।

इकाई–5 हिन्दी के विविध रूप, देवनागरी लिपि, हिन्दी में कम्प्यूटर की सुविधाएं ।

अंक विभाजन –

भाषा विज्ञान	(2 आलोचनात्मक प्रश्न)	2X15 =	30 अंक
हिन्दी भाषा	(2 आलोचनात्मक प्रश्न)	2X15 =	30 अंक
5 लघुत्तरीय प्रश्न		5X4 =	20 अंक
20 वस्तुनिष्ठ/अति लघुत्तरी प्रश्न		20X1 =	20 अंक
		कुल	**100** अंक

संदर्भ ग्रंथ–

1. भारतीय आर्य भाषा और हिन्दी – सुनीति कुमार चटर्जी
2. भारतीय भाषाएँ और भाषा संबंधी समस्याएँ –
3. हिन्दी भाषा का इतिहास – धीरेन्द्र वर्मा
4. नागरी अंक और अक्षर – धीरेन्द्र वर्मा
5. सामान्य भाषा विज्ञान – बाबूराम सक्सेना
6. भाषाविज्ञान और हिन्दी भाषा – भोलानाथ तिवारी
7. हिन्दी भाषाविज्ञान – मनमोहन गौतम (सूर्या प्रकाशन)
8. भाषाविज्ञान के सिद्धांत और हिन्दी भाषा – द्वारिका प्रसाद सक्सेना (भीमर्श प्रकाशन)
9. भाषाविज्ञान और भाषा – डॉ. कपिलदेव द्विवेदी
10. भाषाविज्ञान – देवेन्द्रनाथ शर्मा
11. भाषा शास्त्र – उदयनारायण तिवारी
12. हिन्दी भाषा और बोलियों का अंतर संबंध – सं.डॉ. सरोज मिश्रा (शांति प्रकाशन, इलाहाबाद)
13. हिन्दी का नवीनतम बीज–व्याकरण – रमेशचन्द्र मेहरोत्रा एवं चितरंजनकर
14. प्रयोजन मूलक हिन्दी – बालेन्दु शेखर तिवारी
15. हिन्दी भाषा की संरचना के अभ्यास – रवीन्द्रनाथ श्रीवास्तव

अष्टम प्रश्न पत्र
प्रयोजनमूलक हिन्दी
(पेपर कोड– 0320)

प्रस्तावना–

भाषा मानव जीवन की अनिवार्य सामाजिक वस्तु और व्यावहारिक चेतना है । जिसके दो मुख्य आयाम या प्रकार्य हैं । सौन्दर्यपरक और प्योजनपूरक भाषा के प्रयोजनपरक आवारा का संबंध हमारी सामाजिक आवश्यकताओं और जीवन व्यवहार से है ओर व्यक्तिपरक होकर भी जो समाज–सापेक्ष सेवा माध्यम (सर्विस–टूल्स) के रूप में प्रयुक्त होती है । उत्तर आधुनिक काल में जीवन और समाज की विभिन्न आवश्यकताओं और दायित्वों की पूर्ति के लिए विभिन्न व्यवहार क्षेत्र में उपयोग की जाने वाली प्रयोजनपरक हिन्दी का अध्ययन अति अपेक्षित है । इसके विविध आयामों से न केवल रोजगार या जीविका की समस्याएं हल होगी अपितु राष्ट्र भाषा तथा राजभाषा का संस्कार भी दृढ़ होगा ।

पाठ्य विषयः–

इकाई–1 खंड–क : कामकाजी हिन्दी

- हिन्दी के विभिन्न रूप–सर्जनात्मक भाषा, संचार–भाषा, राजभाषा, माध्यम–भाषा, मातृभाषा ।
- कार्यालयीन हिन्दी (राजभाषा) के प्रमुख प्रकार्य : प्रारूपण, पत्र लेखन, संक्षेपण, पल्लवन, टिप्पणी ।
- पारिभाषिक शब्दावली– स्वरूप एवं महत्व, पारिभाषिक शब्दावली–निर्माण के सिद्धांत ।
- ज्ञान–विज्ञान के विभिन्न क्षेत्रों की पारिभाषिक शब्दावली (निर्धारित शब्द)

हिन्दी कंप्यूटिंग

- कम्प्यूटरः परिचय, रूपरेखा, उपयोग तथा क्षेत्र वेब–पब्लिशिंग का परिचय ।
- इंटरनेट संपर्क– उपकरणों का परिचय, प्रकार्यात्मक रख–रखाव एवं इंटरनेट समय मितव्ययिता के सूत्र ।
- वेब–पब्लिशिंग
- इंटर एक्सप्लोइट अथवा नेटस्कोप ।

– लिंक, ब्राउजिंग, ई–मेल भेजना/प्राप्त करना, हिन्दी के प्रमुख इंटरनेट पोर्टल, डाउनलोडिंग व अपलोडिंग हिन्दी साफ्टवेयर, पैकेज ।

इकाई–2 खंड – ख– पत्रकारिता : स्वरूप एवं विभिन्न प्रकार ।

हिन्दी पत्रकारिता का संक्षिप्त इतिहास

– रामाचार– लेखन – कला

– संपादन के आधार भूत तत्व ।

– व्यवहारिक प्रूफ – शोधन

– शीर्षक की संरचना, लीड, इंट्रो एवं शीर्षक–संपादन, संपादकीय लेखन

– पृष्ठ सज्जा

साक्षात्कार, पत्रकार–वार्ता एवं प्रेस–प्रबंधन

प्रमुख प्रेस – कानून एवं आचार–संहिता ।

इकाई 3 खंड– गः मीडिया – लेखन

– जनसंचार : प्रौद्योगिक एवं चुनौयिॉ

– विभिन्न जनसंचार–माध्यमों का स्वरूप–मुद्रण, श्रव्य, दृश्य–श्रव्य, इंटरनेट ।

– श्रव्य माध्यम (रेडियो)

– मौखिक भाषा की प्रकृति । समाचार लेखन एवं वाचन । रेडियो नाटक । उद्घोषणा लेखन । विज्ञापन लेखन ।

– फीचर एवं रिपोतार्ज ।

– दृश्य – श्रव्य माध्यम (फिलम, टेलीविजन एवं विडियो)

– दृश्य माध्यमों में भाषा की प्रकृति ।

– दृश्य एवं श्रव्य सामाग्री का सामंजरय । पार्श्व वाचन (वायरा ओवर)

– पटकथा लेखन – टेली ड्रामा/डाक्यूमेन्ट्री ड्रामा ।

– संवाद– लेखन । साहित्य की विधाओं का दृश्य माध्यमों में रूपांतरण । विज्ञापन की भाषा ।

– इंटरनेट : सामग्री – सृजन (Contect Creation)

इकाई 4 खंड – घ : अनुवाद : सिद्धांत एवं व्यवहार

– अनुवाद का स्वरूप, क्षेत्र प्रक्रिया एवं प्रविधि

– हिन्दी की प्रयोजनीयता में अनुवाद की भूमिका

– कार्यालयीन हिन्दी और अनुवाद

– जन संचार माध्यमों का अनुवाद

– विज्ञापन में अनुवाद

– वैचारिक : साहित्य का अनुवाद

– वाणिज्यिक अनुवाद

– वैज्ञानिक, तकनीकी तथा प्रौद्योगिकी क्षेत्रों में अनुवाद

– विधि–साहित्य की हिन्दी और अनुवाद, व्यवहारिक अनुवाद अभ्यास ।

कार्यालयी अनुवाद : कार्यालयीन एवं प्रशासनिक शब्दावली, प्रशासनिक प्रयुक्तियॉं, पदनाम, विभाग आदि

– पत्रों के अनुवाद

– पदनामों, अनुभागों, दस्तावेजों, प्रतिवेदनों के अनुवाद

– बैंक – साहित्य के अनुवाद का अभ्यास

– विधि – साहित्य के अनुवाद का अभ्यास

– साहित्यिक – अनुवाद के सिद्धांत एवं व्यवहार : कविता, कहानी नाटक ।

– सारानुवाद

– दुभाषिया प्रविधि

– अनुवाद पुनरीक्षण एवं मूल्यांकन

इकाई विभाजन		अंक विभाजन
इकाई–1–क– कामकाजी हिन्दी व हिन्दी कम्प्यूटिंग		15 अंक
इकाई–2–ख– पत्रकारिता		15 अंक
इकाई–3–ग– मीडिया लेखन		15 अंक
इकाई–4– अनुवाद		15 अंक
इकाई–5–लघुत्तरीय प्रश्न	5X4 =	20 अंक

इकाई–6– 20 वस्तुनिष्ठ प्रश्न/अतिलघुत्तरीय प्रश्न 20X1 = 20 अंक

संदर्भ ग्रन्थ –

1. प्रयोजनात्मक हिन्दी – प्रो. सूर्यप्रसाद दीक्षित एवं सिंह (सुलभ प्रकाशन)
2. वाणिज्यिक हिन्दी – आर.बी.नारायण (ज्ञानोदय प्रकाशन)
3. व्यावहारिक हिन्दी – एन.डी.पालीवाल (मानीषा प्रकाशन, दिल्ली)
4. प्रशासनिक हिन्दी – पुष्पा कुमारी (क्लासिकल पब्लिक कम्पनी)
5. अच्छी हिन्दी – रामचन्द्र वर्मा
6. जनसंचार माध्यमों में हिन्दी – डॉ. चन्द्रकुमार (क्लासिकल पब्लिक कंपनी)
7. बैंकिंग हिन्दी पत्राचार, स्वरूप एवं सम्प्रेषण – डॉ. निश्चल एवं सिंह (किताब घर, नई दिल्ली)
8. पत्रकारिता के छः दशक – जगदीश प्रसाद चतुर्वेदी (साहित्य संगम, इलाहाबाद)
9. हिन्दी पत्रकारिता का वृहद इतिहास – अर्जुन तिवारी (वाणी प्रकाशन)
10. पत्रिका संपादन कला – डॉ. रामचन्द्र तिवारी (आलेख प्रकाशन)
11. हिन्दी पत्रकारिता – कृष्ण बिहारी मिश्र (भारतीय ज्ञानपीठ प्रकाशन)
12. भारतीय समाचार पत्रों का संगठन और प्रबन्ध– डॉ. सुकमाल जैन, म.प्र.हि.ग्र.अ.
13. जनमाध्यम और पत्रकारिता – प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
14. पत्रकारिता का इतिहास एवं जनसंचार माध्यम– डॉ. संजीव भानानत (यू.प्र. रायपुर)
15. वृहद् हिन्दी पत्र–पत्रिका कोश – सूर्य प्रसाद दीक्षित
16. पत्रकारिता संदर्भ कोश – डॉ. सुधीन्द्र, डॉ. रामप्रकाश (वाणी प्रकाशन)
17. पत्रकारिता के विविध आयाम – वेद प्रताप वैदिक
18. जनमाध्यम और पत्रकारिता – डॉ. प्रवीण दीक्षित (सहयोगी साहित्य संस्थान)
19. कम्प्यूटर अध्ययन : एक परिचय – नरेन्द्र सिंह पटेल (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
20. इंटरनेट : एक जानकारी – एस.मक्कड़ (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
21. दूरदर्शनः हिन्दी के प्रयोजनमूलक विविध प्रयोग– डॉ. कृष्ण कुमार रत्तू (मीनाक्षी प्रकाशन, जयपुर)
22. कम्प्यूटर के भाषिक अनुप्रयोग – विजय मल्होत्रा (वाणी प्रकाशन)
23. कम्प्यूटर एप्लीकेशन – गौरव अग्रवाल (शिवा प्रकाशन)
24. कम्प्यूटर क्या, क्यों और कैसे – रामबंशल विश्वविद्याचार्य (वाणी प्रकाशन)
25. अनुवाद के सिद्धांत – सुरेश कुमार
26. अनुवाद सिद्धांत की रूपरेखा – सुरेश कुमार
27. अनुवाद बोध – डॉ. गार्गीगुप्त (भारतीय अनुवाद परिषद, दिल्ली)

28.	साहित्यानुवाद –	संवाद और संवेदना – डॉ. आरसू (वाणी प्रकाशन)
29.	हिन्दी में व्यावहारिक अनुवाद –	आलोक रस्तोगी (सुमीत प्रकाशन)
30.	प्रयोजनमूलक हिन्दी –	(स.) डॉ. चितरंजन कर एवं डॉ. सुधीर शर्मा

नवम् प्रश्न पत्र
भारतीय साहित्य
(पेपर कोड– 0321)

प्रस्तावना –

भारतीय भाषाओं में हिन्दी भाषा और साहित्य का स्थान अन्य प्रांतीय भाषाओं की तुलना में अपेक्षाकृत अधिक महत्वपूर्ण है, इसलिए हिन्दी साहित्याध्ययन को अधिकाधिक गंभीर तथा प्रशस्त बनाना अत्यंत आवश्यक है । एक समेकित भारतीय साहित्य की रूपरचना के लिए हिन्दी का भारतीय संदर्भ सर्वथा प्रासंगिक है । इस दृष्टि से हिन्दी के स्नातकोत्तर विद्यार्थियों के लिए भारतीय भाषाओं के साहित्य का ज्ञान अनिवार्य है । तभी उनके ज्ञान क्षितिज एवं सांस्कृतिक दृष्टि का विकास होगा । यही नहीं, इससे हिन्दी अध्ययन का अंतरंग विस्तार भी होगा । इस प्रश्नपत्र के चार खंड होंगे । प्रत्येक खंड से एक–एक प्रश्न का उत्तर देना अनिवार्य होगा ।

पाठ्यविषय–

प्रथम खंड –

1. भारतीय साहित्य का स्वरूप
2. भारतीय साहित्य के अध्ययन की समस्याएँ
3. भारतीय साहित्य में आज के भारत का बिंब
4. भारतीयता का समाज शास्त्र
5. हिन्दी साहित्य में भारतीय मूल्यों की अभिव्यक्ति ।

द्वितीय खंड

इसके अंतर्गत हिन्दीतर साहित्य का अध्ययन अपेक्षित है, जो तीन वर्गों में विभाजित है–

1. दाक्षिणात्य भाषा वर्ग में मलयालम
2. पूर्वांचल भाषा वर्ग में बंगला
3. पश्चिमोत्तर भाषा वर्ग में मराठी

निर्देश–

1. प्रत्येक विद्यार्थी इन तीन विकल्पों में से एक भाषा का चयन करेगा, बशर्ते वह भाषा उसकी अपनी क्षेत्रीय भाषा से भिन्न भाषा वाले वर्ग से संबंधित हो ।
2. विद्यार्थी एक भाष–वर्ग (मलयालम/बंगाली/मराठी) में से किसी एक के साहित्य के इतिहास का अध्ययन करेगा ।

तृतीय खंड –

इस खंड के अंतर्गत तुलनात्मक अध्ययन अपेक्षित है । इसमें द्वितीय खंड में निर्धारित किसी एक हिन्दीतर भाषा साहित्य के साथ हिन्दी को जोड़कर अध्ययन करना होगा ।

चतुर्थ खंड–

इसके अंतर्गत एक उपन्यास, एक कविता संग्रह, एक नाटक का आलोचनात्मक अध्ययन किया जायेगा । प्रश्न आलोचनात्मक पूछे जाएँगे । तीनों विधाओं पर एक–एक प्रश्न पूछे जाएँगे । तीनों प्रश्नों के समान रूप से 5–5 अंक रखे जाएँगे ।
उपन्यास अग्निगर्भ (बंगला महश्वेता देवी)

कविता संग्रह कोच्चि के दरख्त (मलयालम के.जी.शंकरपिल्लै)

नाटक हयवदन (गिरीश कर्नाड)

इकाई–विभाजन		अंक विभाजन
इकाई–1 खंड एक		15 अंक
इकाई–2 खंड दो		15 अंक
इकाई–3 खंड तीन		15 अंक
इकाई–4 खंड चार		15 अंक
इकाई–5 लघुत्तरीय प्रश्न	(5X4)	20 अंक
इकाई–6 वस्तुनिष्ठ प्रश्न/अति लघुत्तरीय प्रश्न	(20X1)	20 अंक

पाठ्य पुस्तक–

उपन्यास–1 अग्नि गर्भ (बंगला) – महाश्वेता देवी (प्रकाशक– किताब क्लब, राधाकृष्ण प्रकाशन)

कविता 2. कोच्चि के दरख्त (मलयालम) के.जी. शंकरपिल्लै (प्रकाशक वाणी प्रकाशन, 21 ए, नई दिल्ली दरियागंज) ।

नाटक 3. हयवदन (कन्नड़) गिरीश कर्न्नाड (प्रकाशक, राधाकृष्ण प्रकाशन, 2/38 अंसारी मार्ग, दरियागंज नई दिल्ली, 110002)

संदर्भ एवं सूची:–

1. इक्कीस बंगला कहानियॉ– नेशनल बुक ट्रस्ट, इंडिया ए–5, ग्रीन पार्क, नई दिल्ली, 110016,
2. समसामयिक हिन्दी कहानियॉ – डॉ. धनंजय वर्मा ।
3. मलयालम साहित्य – परख और पहचान, प्रो. आर. सुरेन्द्रन, हिन्दी विभाग, कालीकट, वि. वि. केरल ।
4. राष्ट्रीय चेतना और मलयालम साहित्य प्रो. आर. सुरेन्द्रन, हिन्दी विभाग, कालीकट वि.वि. केरल

5. मराठी भाषा और साहित्य –राज मल बोरा, प्रकाशक नेशनल पब्लिशिंग हाऊस, 2/35 अंसारी रोड, दरियागंज नई दिल्ली 110002 ।
6. मलयालम साहित्यकारों से साक्षात्कार – प्रो. आर.सुरेन्द्रन, हिन्दी विभाग, कालीकट वि.वि., केरल ।
7. बंगला भाषा और साहित्य का इतिहास – भारतीय भाषा संस्थान, इलाहाबाद ।
8. भारतीय साहित्य कोश – सं. डॉ. नगेन्द्र, नेशनल पब्लिशिंग हाऊस, नई दिल्ली ।
9. भारतीय साहित्य – सं. डॉ. नगेन्द्र नेशनल पब्लिशिंग हाऊस, नई दिल्ली ।
10. भारतीय साहित्य एनमाला सं. कृष्णदयाल भार्गव, वैज्ञानिक तथा तकनीकी शब्दावली आयोग, शिक्षा तथा युवक सेवा मंत्रालय भारत सरकार, नई दिल्ली ।
11. भारतीय साहित्य के इतिहास की समस्याएँ – डॉ. रामविलास शर्मा ।
12. भारतीय भाषाओं के साहित्य का इतिहास– केन्द्रीय हिन्दी निदेशालय, दिल्ली ।
13. भारतीय साहित्य अवधारणा समन्वय एवं सादृस्यता– जगदीश गुप्त (संघवी प्रकाशन)

पत्रिकाएँ–

1. सद्भावना दर्पण– सं. गिरीश पंकज, रायपुर
2. छत्तीसगढ़ टुडे, रायपुर
3. अक्षर पर्व– देशबंधु प्रकाशन, रायपुर
4. राष्ट्र सेतु – रायपुर

दशम प्रश्न पत्र
पत्रकारिता–प्रशिक्षण
(पेपर कोड– 0322)

प्रस्तावना–

पत्रकारिता आज जीवन–रामाज की धड़कन बन गई है । रिमटते विश्व में स्नायु–तंतुओं के समान काम कर रही है । समाचार पत्र से लेकर साप्ताहिक, पाक्षिक, त्रैमासिक, वार्षिक पत्रिकाओं, प्रिंट मीडिया, इलेक्ट्रॉनिक, इंटरनेट आदि में इसका विकसित रूवरूप देखा जा राकता है । इराके बिना आज आदमी का रहना कठिन है । रात्यि के साथ–साथ रोजगारपारकता की आकांक्षा की पूर्ति भी इससे होती है । पुनर्जागरण, स्वतंत्रता, समता, बंधुत्व नारी तथा दलित जागरण में इसकी क्रांतिकारी भूमिका रही है । अतः इराका अध्ययन आज की अनिवार्यता बन जाती है ।

पाठ्यविषयः–

1. पत्रकारिता का स्वरूप और प्रमुख प्रकार ।
2. विश्व पत्रकारिता का उदय, भारत में पत्रकारिता का आरंभ ।
3. हिन्दी पत्रकारिता का उद्भव और विकारा ।
4. समाचार पत्रकारिता के मूल तत्व– समाचार संकलन तथा लेखन के मुख्य आयाम ।

5. संपादन कला के सामान्य सिद्धांत– शीर्षकीकरण, पृष्ठ–विन्यास, आमुख और समाचार पत्र की प्रस्तुति प्रक्रिया ।
6. समाचार पत्रों के विभिन्न स्तंभों की योजना ।
7. दृश्य सामग्री (कार्टून, रेखाचित्र, ग्राफिक्स) की व्यवस्था और फोटो पत्रकारिता ।
8. रामाचार के विभिन्न स्त्रोत ।
9. संवाददाता की अर्हता, श्रेणी एवं कार्यपद्धति ।
10. पत्रकारिता से संबंधित लेखन– संपादकीय, फीचर, रिपोतार्ज, साक्षात्कार, खोजी रामाचार, अनुवर्तन (फालोअप) आदि की प्रविधि ।
11. इलेक्ट्रॉनिक मिडिया की पत्रकारिता – रेडियो, टी.वी. वीडियो, केबल, मल्टी मीडिया और इंटरनेट की पत्रकारिता ।
12. प्रिंट पत्रकारिता और मुद्रणकला, प्रूफ शोधन, ले आउट तथा पृष्ठ राज्जा ।
13. पत्रकारिता का प्रबंधन प्रशासनिक व्यवस्था, बिक्री तथा विवरण व्यवस्था ।
14. भारतीय संविधान, सूचनाधिकारी एवं मानवाधिकार ।
15. मुक्त प्रेरा की अवधारणा ।
16. लोक–संपर्क तथा विज्ञापन ।
17. प्रसारभारती तथा सूचना प्रौद्योगिकी ।
18. प्रेरा–रांबंधी प्रमुख कानून तथा आचार–रांहिता ।
19. प्रजातांत्रिक व्यवस्था में चतुर्थ स्तंभ के रूप में पत्रकारिता का दायित्व ।

इकाई–विभाजन			अंक विभाजन
इकाई–1	5 तक		15 अंक
इकाई–2	6 से 10 तक		15 अंक
इकाई–3	11 से 15 तक		15 अंक
इकाई–4	16 रो 19 तक		15 अंक
इकाई–5	5 लघुत्तरीय प्रश्न	5X4	20 अंक
इकाई –6	20 वस्तुनिष्ठ प्रश्न/अति लघुत्तरीय प्रश्न	20X1	20 अंक
		कुल	100 अंक

संदर्भ–सूची

1. पत्रकारिता के छह दशक – जगदीश प्रसाद चतुर्वेदी, साहित्य संगम इलाहाबाद
2. पत्रिका संपादन कला – डॉ. रामचंद्र तिवारी, आलेख प्रकाशन ।
3. समाचार पत्र, मुद्रण और साज–सज्जा – श्याम सुंदर शर्मा, म.प्र.हि.ग्रंथ अका. ।
4. हिन्दी पत्रकारिता का वृहद् इतिहास – अर्जुन तिवारी, वाणी प्रकाशन ।
5. समाचार पत्र/व्यवस्थापन – अनंत गोपाल शेवड़े, म.प्र.हि.ग्रंथ अका.
6. भाषायी पत्रकारिता और जनसंचार – डॉ. विष्णु पंकज, विवेक पब्लि. रायपुर
7. हिन्दी पत्रकारिता – कृष्ण बिहारी मिश्र, भारतीय ज्ञानपीठ प्रकाशन ।
8. पत्रकारिता का परिपेक्ष्य – जगदीश प्रसाद चतुर्वेदी, साहित्य संगम ।
9. हिन्दी पत्रकारिता के गौरव – बांके बिहारी भटनागर, हरिवंश राय बच्चन,

आत्माराम एंड सन्स, दिल्ली ।

10. भारतीय समाचार पत्रों का संगठन और प्रबंधन – डॉ. सुकमाल जैन
11. जनमाध्यम और पत्रकारिता – प्रवीण दीक्षित, सहयोगी साहित्य संस्थान ।
12. हिन्दी पत्रकारिता, राष्ट्रीय नव उद्‌बोधन – डॉ. श्री पाल शर्मा, युनि.प्रका. जयपुर
13. पत्रकारिता का इतिहास एवं जनसंचार माध्यम– डॉ. संजीव भनावत, युनि. प्रका. जयपुर
14. पत्रकारिता एवं प्रेस विधि – डॉ. बसंती लाल बाबे, सुविधा सा.हा. भोपाल
15. संपादन कला – डॉ. संजीव भनावत, युनि.प्रका.जयपुर ।
16. हिन्दी पत्रकारिता और जन संचार – डॉ. ठाकुर दत्त शर्मा, आलोक वाणी प्रकाशन ।
17. पत्रकारिता इतिहास और प्रश्न – कृष्ण बिहारी मिश्र, वाणी प्रकाशन ।
18. वृहद हिन्दी पत्र पत्रिका कोश – सूर्यप्रसाद दीक्षित, वाणी प्रकाशन ।
19. हिन्दी पत्रकारिता स्वरूप और संदर्भ – विनोद गोदरे, वाणी प्रकाशन ।
20. पत्रकारिता संदर्भ कोश – डॉ. सुधीन्द्र, डॉ. रामप्रकाश वाणी प्रकाशन ।
21. पत्रकारिता के विविध आयाम वेदप्रताप वैदिक
22. पत्रकारिता के विविध आयाम – वेद्रप्रताप वैदिक
23. जन माध्यम और पत्रकारिता – डॉ. पी.दीक्षित
24. छत्तीसगढ़ के पंच रत्न – रमेश नायर (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
25. छत्तीसगढ़ के नव रत्न – रमेश नायर (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
26. छत्तीसगढ़ के युग पुरूष : माधव राव सप्रे रमेश नायर (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)
27. छत्तीसगढ़ के युगपुरूष : पं. सुंदरलाल शर्मा – रमेश नायर (शताक्षी प्रकाशन, चौबे कालोनी, रायपुर)

Diploma in European and Asian Languages – French 2017-18

Paper - I

Texts and Grammar 100 Marks

* The French Speech Sounds.
* Word Building and Vocabulary.
* Sentence Construction.
* Grammar and Text.

Prescribed Book :

1. Hugo's French in Three Months.

Paper - II

Translation and Comprehension 100 Marks

* Translation of a simple passage in the French language into English and vice-versa.
* Unseen Passage : Understanding a passage in the French Language and answering.
* Simple questions thereon.
* Simple questions of general nature.
* Name of day and months.
* Writing in words the cardinal numbers upto 1000.

Prescribed Book :

1. Hugo's French in Three Months.

Diploma in European and Asian Languages – English 2017-18

Paper - I

Sounds and Grammar 100 Marks

* English Vowels and Diphthongs (10 Marks)
* English Consonants (10 Marks)
* Phonetic Transcription of English Words (10 Marks)
* Parts of Speech, their Grammatical Formations (10 Marks)
* Sentence Construction, Sentence (Patterns) (10 Marks)
* Word Building and Vocabulary - Antonyms, Synonyms and Homonyms, Proverbs, and Idioms (10 Marks)
* Grammar Nouns - Countable and Uncountable (use of 'a', 'an', 'some' and 'any'), use of Articles, Pronouns, Verbs- Main and Auxiliary, Prepositions. Tenses- their forms and use, agreement of the verb with the subject, Active and Passive Voice, Non-Finites- The Gerund, Infinitive, and Participles, Kinds of Sentence, Statements, Commands, Negative, Questions; Simple, Complex, and Compound, Reported Speech and Direct Narration. (30 Marks)
* Correction of Common Errors (10 Marks)

Books Recommended:

(1) A Remedial English Grammar - F.T. Wood.

(2) An Intermediate Grammar and Composition - M.L. Tikkoo and Subramonyam.

(3) Living English Structure - S. Allen.

(4) English Pronouncing Dictionary - D. Jones.

Diploma in European and Asian Languages – English 2017-18

Paper - II

Translation and Comprehnsion 100 Marks

*	Translation of a Passage : English to Hindi and Vice-Versa	(20 Marks)
	Comprehension - Unseen Passage in English, and answering Simple Questions There on	(20 Marks)
*	Precis Writing	(20 Marks)
*	Letter Writing	(20 Marks)
*	Essay Writing	(20 Marks)

Books Recommended :

(1) A Remedial Course in English for Colleges (Book I) - B.K. Das and A. David (COEFL, O.U.P.)

(2) General English - Ganguli and Word

Certificate Course in Translation – 2017-18

Paper - I

Theory of Translation 100 Marks

(अनुवाद के सिद्धांत)

Translation Definition, Aim, Importance and Scope, Demerits, Limitation, Good Translation, Theories of Translation

अनुवाद की परिभाषा, अनुवाद का उद्देश्य, महत्व और व्यवहार–क्षेत्र, ए अनुवाद के दोष, अनुवाद की सीमाएँ, सफल अनुवाद, अनुवाद–सिद्धांत

Processor Translation- Nada's View, Nemark's View Bathgate's View, Conclusion

vuqokn izfØ;k& ukbMk dk fpru] U;ekd dk fpru] cFkxV dk fpru] fu"d"k

Types of Translation, Type of Extra Linguistic Translation, Types of Intra-Linguistic Translation, Types of Secondary Translation Type of Text

vuqokn dk izdkj & Hkk"kkckg; vuqokn & izdkj] Hkk"kkdfnr , vuqokn & izdkj] xkS.k vuqokn& izdkj ikBkUrj dk izdkj

Translation Work - Types of Translator, Abilities of Translator, Language of Translator, Methods of Translation, Evaluation, Lexical, Syntactical, Semantic Contextual, Teaching of Traslation in Monolingual and Bilingual Contexts

vuqokn dk;& vuqokn dk izdkj] vuqokn dh {kerk,a] vuqokn dh , Hkk"kk] vuqokn eY;kdu dh fof/k;k dk'kxr] okD;foU;klxr] vFkxr] lanHkxr] vuqokn f'k{k.k&leHkkf"kd lanHk esa vuqokn&f'k{k.k] nfoHkkf"kd lanHk esa] vuqokn&f'k{k.k

Books Recommended fu/kkfjr iLrd% :

(1) Aspects of Translation - L. Forster (Ed.) A.D. Booth (Sicker and Warberg, London).

(2) A Linguistic Theory of Translation - J.C. Catford (Oxford University Press, London).

(3) Towards A Science of Translating - E.A. Nida (Leiden, E.J. Brill).

(4) Translation and Translation - J.P. Postgate (London : Bell).

(5) अनुवाद सिद्धांत की रूपरेखा – सुरेश कुमार (वाणी प्रकाशन, दिल्ली).

(6) अनुवादकला सिद्धांत और प्रयोग – कैलाशचंद्र भाटिया (भारतीय ग्रंथ निकेतन, दिल्ली).

(7) अनुवाद विज्ञान – भोलानाथ तिवारी.

(8) अनुवाद : सिद्धांत और समस्याएँ – रवींद्र श्रीवास्तव एवं कृष्ण कुमार गोस्वामी.

(9) अनुवादकला और समस्याएँ – वैज्ञानिक अनुसंधान और संस्कृति मंत्रालय, भारत

(10) भारतीय भाषाओं से अनुवाद की समस्याएँ – भोलानाथ तिवारी एवं किरण बाला (शब्दकार, दिल्ली).

Certificate Course in Translation – 2017-18

Paper - II

Practice of Translation 100 Marks

There will be ten questions of equal marks based on the matter on the following topics. Each Topic will have two passages one for Hindi-English Translation and the other for English-Hindi Translation (Students can use dictionaries)

इस प्रश्न–पत्र में निम्नलिखित प्रकरणों पर आधारित समान अंकों वाले दस प्रश्न पूछे जाएँगे। प्रत्येक प्रकरण पर दो गद्यांश होंगे– पहला हिंदी–अँगरेजी अनुवाद के लिए और दूसरा अँगरेजी–हिंदी अनुवाद के लिए। छात्र शब्दकोश इस्तेमाल कर सकते हैं।

1.	News	-	समाचार
2.	Official Letter	-	कार्यालयीन पत्र
3.	Literary Essay	-	साहित्यिक निबंध
4.	Conversation	-	वार्तालाप
5.	Advertisement	-	विज्ञापन

Books Recommended निर्धारित पुस्तकें

(1) How to Translate in to English (Incorporating Spoken English) - R.P. Sinha, Bharat Bhawarn, Patna.

M. Phil
English
2017-18

PT. RAVISHANKAR SHUKLA UNIVERSITY
RAIPUR
CHHATTISGARH

SYLLABUS FOR 2017-18

M.PHIL ENGLISH

Aims and Objectives:

The main aim of this level is to prepare the learner for research programmes leading to a doctoral degree. Keeping with this goal the major aims and objectives of the M.Phil Programme would be as under.

1. Consolidating and reinforcing the aims and objectives envisaged at the M.A. level.
2. Introduction to research methodology, particularly to the area of research.
3. Introduction to technique of documentation and write up in English Studies.
4. Emphasizing different approaches to research; interdisciplinary, comparative.
5. Updating knowledge in areas of research through advanced courses pertinent to those areas.

M.Phil (English)

No.	Theory Paper	Marks
1.	Research Methodology	100
2.	Contemporary Literary Criticism	100
3.	Colonial & Post-Colonial Studies	100
4.	Seminar Based on Theory papers(1,2,3)	50
5	Dissertation- Script Writing - Seminar on Dissertation - Viva	75 50 25
	Grand Total	500

PAPER - I

RESEARCH METHODOLOGY

Time: 3 hour 100 Marks

The paper shall consist of five units and candidates are to answer five question, one from each.

Unit-I The research paper as a form of exploration

-Research Skills

-Aim and Scope of research

-Type of research

-Major theoretical approaches to linguistic research

-Research design

Unit-II Rudiments of Textual Criticism and

-Using the library and other information sources.

-The central cotalogue or Central information system.

-Type of reference works- indexes, bibliographics, collection of abstracts, guides to research, dicrionaries, encyclopedia, biographical sources, Yearbooks, Atlases, Gazeteers, Statistical data sources.

Unit-III Publication forms of reference works

-Print and electronic

-Online databases

-CD-ROM databases

-Location of library materials

-Other library resources and services

-Compiling a working bibliography

Unit-IV The Mechanics of Writing

-Taking notes

-Plagiarism

-Outlining, Thesis Statement and final outline

-Language and style

-The format of a research paper.

Unit-V Documentation

-Documenting Sources

-MLA style

-Style Sheet practice

-Other Systems of documentation

-Endnotes and footnotes

Book Recommended:

1. D.C.Greetham,Textual Scholarship: An Introduction(Garland Publishing,Hamden,1994)
2. James Thorpe, Principles of Textial Criticism(Huntington Library, Son Marino,1972)
3. Joseph Gibaldi, MLA Handbook for Writers of Research Papers(Affiliated East-West Press, New-Delhi,1995)
4. Anderson et al' Thesis and Assignment Writing.

PAPER -II

CONTEMPORARY LITERARY CRITICISM

Time:3 hours 100 Marks

The paper will be of five units and candidates are required to answer one question from each unit. Question number 1 from Unit-I will be a question on critical concepts and perspectives. Candidates are to attempt any four in about four hundred words each.

Unit-I Critical concepts and perspective

Affective fallacy
Allegory
Aporia
Binary opposition
Carnival
Contradiction
Conventions
Desire
Discourse
Empathy and Sympathy
Form and Conent
F.R. Leavis and
Marxist Criticism
Narratology
New Historicism
Hermeneutics and interpretation
Ideology
Intentional fallacy
Motif and Theme
Patriarchy
Readerly/Writerly
Semiotics
Structure
Syntax
Text
Feminist Criticism
Twentieth Century British Criticism

Phenomenological Criticism

Psychoanalytic Criticism

Reader Response Criticism

Russian Formalism

Structuralism and Post-Structuralism

Unit-II Modernism and Formalism

Prescribed Essays

Cleanthes Brooks: "The Language of Paradox"

W.K. Wimsatt, jr. and Monroe Beardsley:"The Intewtional Fallacy"

Viktor Shklovsky: ' Art as Technique

Rhetoric and Reader Response

Prescribed Essays

Stanley E.Fish, "Interpreting the Variorum"

Walth J.Ong, S.V.,"The Writers Audience is Always a Fiction"

Unit-III Structuralism and Semiotics

Prescribed Essays

Ferdinand de Saussure : "The Object of Linguistics

"Nature of the Linguistics Sign"

Julia Kristeve : 'Stabat mater'

Deconstruction and Poststructuralism

Jacques Derrida'Structure, Sign and play in the Discourse of Human Sciences"

Paul de man 'seniology and Rhetoric'.

Unit-IV Psychology and psychoanalusis

Prescribed Essays

Peter Brooks :'Freuds Masterplot"

Jacques Lacan : "Seminar on the purloined Letter"

Marxism and the new Historicism

Raymond Williams : Base and Superstructure in Marxist Cultural Theory

Terry Eagleton : "Brecht and Rhetoric"

Unit-V Feminism

Elaine Showlter : "Feminist Criticism in the Wo;derness"

Helene Cixous : "Castration or Decapitation"

(The Prescribed essays can be found in the anthology named " Contemporary literary criticism- Literary and Cultural Studies, eds. Robert con Davis and Ronald Schleiper, Longman New York, 1989)

Paper Reading

1. a kidge(ed) Twentieth Century Literary Criticism: A Reader(London: Longman72)
2. Dennis Walder(ed), Literature in the Modern World, Criticsal Essays and Dowments(Oxford:Oxford Univ.press,1990)
3. Cleagth Brooks, The Well Wrought Urn(New York:Harcourt Brace,1947)
4. F.R.Leavis,New Bearings in English Poetry(London;Chatto & Windus,1933)
5. I.A.Richards, Principles of Literary criticism(London:kegan Paul,Trench,Trubnes,1924)

6. Tony Bennett,Formalism and Marxism(London: Tetheun,1979)

7. Northrop Frye, Anatomy of Criticism(Princeton:Princeton University Press,1957)

8. Jonatham Culler, Saussure(Glasgow:Collins,1976)

9. David Robey(ed),Structuralism: An Introduction(Oxford Elarendon Press,1973)

10. Geogrey Hartman(ed),Dexonstruction and Criticism(London:...)

11 Mary Eapleton(ed), Feminist Literary Criticism (london:Longman,1991)

12. Sandra Gilbut and Sasan Gubar, The Maduroman in the Altic:

The Women Writes and the mineteenth century Literary Imajination(New haven L Yale University Press,1979)

13. Julia Kristeva, Desire in Language:a Semiotic Approach to Literature and Art(New York:Columbia University Press,1980)

14. Kate Millett, Sexual Politics(London:Virago,1969)

15. Elaine Showalter, A Literature of their own: British women novelists from bronte to lessing.(Priacetom:Priaceton University Press,1977)

16. M.M.Bakhtin, The Dialogic Imagination(Austin:University of Taxas Press, 1981)

17. Wollgang Iser, The Implied Reader(Baltimore;Ishns Hopkins University Press,1974)

18. Jane P. Tompkins(ed), Reader -Response Criticism(BAltimore Iohns Hopkins University Press,1980)

19. Michael Foucault, Madness and Civilization(London:Tavisto1976)

20. Gayalri Chakravorty Spivak, In other worlds: Essays in cultural politics(London:Methuen,1987)

21. Soshana Felman,lacques Lacon and the Adventue of lasight:Psychoanalysis and Contemporary Culture(Compridge Harvard University Press, 1987)

22. Elizabeth Wright, Psychoanalytic Criticism: Theory in Prac(london:Methen,1984)

PAPER- III

COLONIAL AND POST - COLONIAL STUDIES

Unit-I

1. B. Ashcroft, G Griffiths & H. Tiffin, The Empire Writes Back(Routledge, London,1989)

2. Homi Bhabha,Nation and Narration(Routledge, London,1990)

3. Harish Trivedi, Colonial Transactions(Papyrus, Calcutta,1993)

Unit-II

1. Edward Said, Orientalism (Routledge and Kegan Paul, London,1978)

2. Ngugi wa thiongo, Homecoming(Heinemann,London,1972)

Unit-III

Forster	: A Passage to India
Kipling	: Kim
Orwell	: Nineteen eighty four

Unit-IV

Chinua Achebe	:Thing Fall Apart
Ngugi wa thiongo	: A grain of Wheat

Alan Paton :Cry the Beloved Country

Unit-V

Tagore :Gora

R.K.Narayan : Waitingh for the Mahatma

Salman Rushdie : Midnight's Children

Note: Based on the texts prescribed in each unit, candidates are required to answer on from each unit, a total fo five.

PAPER- IV

DISSERTATION

The scheme of marking shall be as follows:

A. Dissertation	200 marks(100internal and 100 External)
B. Seminar	40 marks
C. Viva-Voce	60 marks
Total	300 marks

The topics for dissertation shall be from the following areas.

1. Twenty century English Literature

a) Poetry b) drama

c)Fiction d)Criticism

2. Nineteenth and Twentieth Century American Literature.

a) Poetry b) drama

c)Fiction d)Criticism

3. New Literatures in English

a)Australian Literature b)African Literature

c) Caribbean Literature

4. Indian Writing in English

5. History of English Language

6. Popular Literature in English

a) Detective Fiction b)The Trilles

c)Popular romantic fiction d)Humour

e) The Comic strip, Comic books and Cartoons.

7. Literature and Science a) The Science Fiction

8. Literature and Gender

9. Literature and Film

a)The adaption of literature to film: Theory and analysis

b) The historical relation between film and literature: their interaction and mutual influence.

10. The Literature of Indo-European Encounters

11. Native Literature in Translation.

12. Literature and Race

13. Marginalized Literature.

एम.फिल.
हिन्दी पाठ्यक्रम
2017.18 से प्रभावी

प्रस्तावना

fo'ofo|ky;hu 'kks/k lLFkkuksa dk lokZf/kd egRoiw.kZ inS; gS & 'kks/k dk;Z A bl 'kks/k dk;Z dks 0;ofLFkr djus ds fy;s ,e-fQy- ikB~;Øe ds vUrxZr 'kks/k&izfof/k dk fof/kor~ izf'k{k.k fn;k tkuk vko';d gS A bl ikB~;Øe ds varxZr ,sls ikB~; fo"k;ksa dk lekos'k fd;k tk jgk gS] tks 'kks/kkFkhZ ds fy, vko';d gS] fdUrq ftudk lKku mls igys ugha djk;k tk ldk gS A

ikB~; fo"k;

bl ikB~;Øe esa nks lS)kfUrd iz'u Ik=] ,d iLrkfor 'kks/k&dk;Z ls lEcfU/kr iz'u Ik=] ,d y?kq 'kks/k&izcU/k ys[ku vkSj ekSf[kdh dk izko/kku fd;k x;k gS A lEiw.kZ ijh{kk 500 vadksa dh gksxh A bldh vof/k ,d o"kZ j[kh x;h gS A

Ø-	fo"k;	iz'ui= dk 'kh"kZd	lS)kfUrd	lehuk	;ksx
1-	lS)kfUrd&1	vuqla/kku dh izfof/k vkSj izfØ;k	80	20	100
2-	lS)kfUrd&2	fgUnh lkfgR; dh oSpkfjd i`"BHkwfe	80	20	100
3-	'kks/k&dk;Z	'kks/k&vkys[k	80	20	100
			dqy vad		300
4-	y?kq 'kks/k izcU/k	Script Writing			100
		y?kq'kks/k izcU/k ij vk/kkfjr lehuk			40
		ekSf[kdh			60
			dqy vad		200
			egk;ksx		500

प्रश्नपत्र–1
अनुसंधान की प्रविधि और प्रक्रिया

1- vuqla/kku dk Lo:Ik A
2- vuqla/kku vkSj vkykspuk A
3- vuqla/kku ds ewy rRo A
4- vuqla/kku ds izdkj A
5- fo"k;&fuokZpu A
6- lkexzh& ladyu% gLrys[kksa dk ladyu vkSj mi;ksx A
7- 'kks/k&dk;Z dk foHkktu] v/;k;&mi'kh"kZd vkSj vuqikr A

8- :Ikj[kk] fo"k;&lph] iLrkouk] Hkkfedk] lgk;d xzFkka dh lph] lnHkZ&mYys[k] ikn&fVIi.kh A
9- lkfgfR;d vuqla/kku esa ,sfrgkfld rF;ksa vkSj i)fr;ksa dk mi;ksx A
10- lkfgfR;d vuqla/kku esa lekt'kkL=h; i)fr;ksa dk mi;ksx A
11- fgUnh vuqla/kku ls lac) fo"k;ksa dh Hkwfedk A
12- ikBkykspu ds egÙo; fl)kar A
13- Hkk"kk oSKkfud vuqla/kku A

सहायक ग्रंथ–

1- 'kks/k vkSj fl)kar & MkW- uxsUnz] uS'kuy ifCyf'kax] ubZ fnYyh A
2- 'kks/k&rU= vkSj fl)kar & MkW- 'kSy dqekjh] ykdok.kh idk'ku] fnYyh A
3- 'kks/k vkSj leh{kk& MkW- ijes'ojyky xqIrk] cjcbZ] 1990
4- 'kks/k&rRo vkSj [kksa t& MkW- jkes'ojyky [kMsyoky] cYYHk fo|k uxj xqtjkr] 1968
5- 'kks/k vkSj leh{kk & MkW- lqjs'kpUnz xqIrk] vkxjk] 1967
6- 'kks/k izfØ;k ,oa foojf.kdk& MkW- luukj flag 'kek] 1964] y[kuÅ
7- vuqla/kku Lo:Ik ,oa izfof/k & MkW- jkexksiky 'kekZ fnus'k] jktLFkku fgUnh xzaFk vdkneh] t;iqj 1994-
8- uohu 'kks/k foKku& fryd flag] iadk'ku laLFkku] fnYyh
9- uxsUnz uS'kuy ifCyf'kax] ubZ fnYyh A
10- QkMkseVy vkSQ dEI;ksVj & iaKk idk'ku A
11- Hkkjrh;rk ds vej Loj & laikn % /kuat; oekZ] e-iz- fgUnh xzaFk vdkneh A

प्रश्न पत्र 2

हिन्दी साहित्य की वैचारिक पृष्ठभूमि

पाठ्यविषय

fopkj/kkjk vkSj lkfgR;
e/;;qxhu cks/k dk Lo:Ik
fofHkUu /keZ lk/kuk,¡ vkSj o".ko /keksZUnksyu
e/;;qxhu&cks/k vkSj vk/kqfud &cks/k esa lkE;&oS"kE;
vk/kqfudrk&cks/k vkSj vkS|ksfxd &lHkdfr
jk"Vªh;rk vkSj vUrjk"Vªh;rk
iqutkZxj.k] iqu:RFkku vkSj fgUnh yksd&tkxj.k

fgUnh lkfgR; l lc) fof'k"V erokn] xk/khokn] ekDlokn] eukfo'y"k.kokn] vfLrRookn] mRrj&vk/kfudrkokn
ijEijk vkj vk/kfudrk
jk"Vh; Lokr=; vkUnksyu
Hkkjrh; lo/kkfud 0;oLFkk&ykdr=] lektokn] iFkfuji{krk] nfyr&pruk] L=h&foe'k vkpfydrk vkj egkuxj&ck/k A
lkfgR; dk vrfo/kkijd] v/;;u&lkfgR; dk lekt'kkL=] bfrgkl&n'ku] eukoKkfud v/;;u] lkLdfrd v/;;u] Hkk"kk oKkfud fooepu] Hkk"kk iks|kfxdh ck/k A

सहायक ग्रंथ–

1- lkfgR; vkj fopkj/kkjk& vkeiidk'k xtoky] ipdyk] 1904 gfj;k.kk
2- bfrgkl vkj vkykpuk&ukeojflg] jktdey iidk'ku] ubfnYyh 1962
3- lkfgR; dk Lo:Ik& unfd'kkj vkpk;] okXnoh iidk'ku chdkuj
4- vk/kfudrkokn& nxkiilkn xIrk] vkdk'knhi iidk'ku] ubl fnYyh
5- vk/kfudrk vkj fgUnh lkfgR; & bUnukFk enku
6- vk/kfudrk dh ckj e rhu v/;k;& Mk- /kut ; oek] fo|k iidk'ku] fnYyh
7- vkykpuk dh lkjkckj & Mk- /kut ; oek] lkfgR; dyk HkkMkj] bykgkckn
8- ledkyhu lkfgR;; & u;k ifjn'; & jkeLo:Ik prqoinh vuHkfr iidk'ku] bykgkckn
9- lkUn;'kkL=h; leh{kk& ,l&Vh ujflEgkpkjh&ok.kh iidk'ku] ubl fnYyh
10- L=h% mif{krk & flekun okmokj] vuqokn& Mk- iHkk [krku] fdrkc?kj ubfnYyh
11- L=h% lkjkckj& vklkjkuh okjk] fdrkc?kj iidk'ku] ubfnYyh
12- gfjtu l nfyr] jktfd'kkj] liknd & fdrkc?kj iidk'ku ubl fnYyh
13- nfyr lkfgR; lkUn;'kkL=& 'kj.kdekj fyEcky] ok.kh iidk'ku] ubl fnYyh
14- lLdfr dh pkj v/;k;& jkek/kkjh flg fnudj
15- Hkk"kk vkj lekt & jkefoykl 'kekl] ixfr iidk'ku] ubl fnYyh
16- lkfgR; vkj lkekftd ifjorlu & cnhukjk;.k] ok.kh iidk'ku] ubfnYyh
17- lkfgR; dh cfu;knh ljkckj & Mk- d.kflg pkgku& ok.kh iidk'ku ubfnYyh

प्रश्नपत्र–3
शोध – आलेख

bl i'ui= d vrxr fuEufyf[kr oxk e l fdlh ,d ox l lcf/kr fo"k; ij xgu v/;;u fd;k tk,xk A bldk v/;kiu foHkkxh; fo"k; fo'k"kK }kjk ;k lehukj d :Ik e fd;k tkuk pkfg, A fo"k; dk vkcVu foHkkxh; 0;oLFkk d vrxr fd;k tk,xk A blh fo"k; dk ifjfoLrkj fo|kFkh prFk i'ui= e fu/kkfjr y?k 'kk/k&icf/k d :Ik e vkj blh fo"k; dk foLrkfjr djd ih-,p-Mh- mikf/k gr 'kk/k icf/k Hkh iLrr dj ldrk g A

1- vkfndkyhu fgUnh lkfgR;
2- e/;dkyhu fgUnh lkfgR;
3- vk/kfud fgUnh lkfgR;
4- ykd&lkfgR; rFkk tuinh; lkfgR;
5- Hkk"kk foKku ,o i;ktue yd fgUnh
6- dk0;'kkL= rFkk leh{kk fl)kr

;g vko';d g fd 'kk/k fo"k; dk p;u mi;kfxrk ,o ekfydrk d vk/kkj ij fd;k tk, A fo|kFkh d ekxn'ku gr fo'k"kK ik/;kidk dk funi'ku lyHk djk;k tk, A d{kk/;kiu@lehukj dh mfpr 0;oLFkk vif{kr g A

bl 'kk/k&vky[k dk eY;kdu mRrjifLrdk d :Ik e 80 vdk e l fd;k tk,xk A

संदर्भ ग्रंथ–

1- fgUnh lkfgR; dk bfrgkl & vkpk; jkepUn 'kDy] lkfgR; lEeyu i;kx
2- fgUnh lkfgR; dk bfrgkl& vkpk; gtkjh ilkn f}onh
3- fgUnh lkfgR; dk ogn bfrgkl & Mk- uxUn & u'kuy idk'ku
4- vk/kfud lkfgR;&vkpk; uUnnykj ckti;h&ykdHkkjrh] bykgkckn
5- u;k lkfgR;&u; i'u&vkpk; uUnnykj ckti;h& Hkkjrh Hk.Mkj] bykgkckn
6- vk/kfudrk d ifr :Ik & Mk- /kut ; oek& fo|k idk'ku fnYyh
7- leko'kh vk/kfudrk & Mk- /kut ; oek& fo|k idk'ku fnYyh
8- gLr{ki & Mk- /kut ; oek& fo|k idk'ku fnYyh
9- dk0; 'kkL= & vkpk; gtkjh ilkn f}onh] vkxjk
10- ik'pkR; leh{kk dh :ijs[kk & lkfgR; 'kkL=&jkelkxj nkl xIrk] jktd ekj] t ;ij
11- lkfgR; 'kkL=& Hkkjrh; ,o ik'pkR; & jkelkxj nkl xIrk] jktd ekj] t ;ij

12- Hkkjrh; leh{kk fl)kr & l;ukjk;.k f}osnh] okjk.klh 1976
13- lkfgR; bfrgkl % fl)kr ,oa Lo:Ik & fot ; 'kDy] bykgkckn] 1978
14- leh{kk dh ifreku & Mk- xxpj.k f=ikBh] fHkykb
15- leh{kk dh u;h ifreku & l[kchj flx] r{kf'kyk] ubl fnYyh

प्रश्न पत्र– 4
लघुशोध– प्रबंध

bl d vrxr yxHkx 100 ¼lk½ Vfdr Ik”Bk dk y?kq ‘kk/k&ic/k ijh{k.kkFkh iLrqr fd;k tk,xk A fo”k; dk vkcVu fo’ofo|ky; d fgUnh foHkkx }kjk fd;k tk,xk A foHkkx gh fo’k”kK@funs’kd dh 0;oLFkk djxk A bl y?kq ‘kk/k&ic/k dk eY;kdu 100 vdk dk djk;k tkuk vfHk”V g] ftl dk eY;kdu ckg; fo’k”kK ijh{kd d }kjk djk;k tkoxk A

मौखिकी

y?kq’kk/k ic/k ij lehukj 40 vdk dk rFkk ekf[kdh 60 vdk dk gkxk A 40 vdk dh ijh{kk ¼lehukj½ funs’kd ,o de l de ,d f’k{kd tk fo”k; l lcf/kr gk d }kjk yh tkoxh A 60 vdk dh ekf[kd ijh{kk vkrfjd ,o ckg; ijh{kd d }kjk yh tkoxh A

एम.फिल. (भाषाविज्ञान) 2017–18
M.Phil. (Linguistics) 2017-18

क्र.	सैद्धांतिक प्रश्न पत्र	कुल अंक
1.	शोध–प्रविधि **Research Methodology**	100
2.	व्याकरण : सिद्धांत और व्यवहार **Grammar Theoretical & Practical**	100
3.	भाषाशिक्षण–विधियाँ **Language Teaching Methods**	100
4.	सेमिनार –सैद्धांतिक प्रश्नपत्रों पर आधारित **Seminar - Based on Theory**	50
5.	लघुशोध–प्रबंध – लघुशोध–प्रबंध पर आधारित सेमिनार **Seminar Based on Dissertation**	50
लेखन	**Script Writing**	75
मौखिकी	**Viva-Voce**	25
कुल अंक	**Total Marks**	200
कुल योग	**Grand Total**	500

प्रश्नपत्र प्रथम

शोध–प्रविधि **Research Methodology**

1.	शोध का तात्पर्य, लक्ष्य तथा महत्व	Meaning of Research, Aims and importance.
	शोध के प्रकार	Types of Research.
	भाषिक शोध की प्राचीन परंपराएँ	Old Tradition of Linguistic Research.
	भाषिक शोध के प्रमुख उपागम वर्णनात्मक, ऐतिहासिक, तुलनात्मक	Major Theoretical Approaches in Linguistic.Research-Descriptive,Historical, Comparative.
2.	शोध–विषय का चयन तथा नियमन	Selection of Topic of Research and Formulation of Research Problem.
	शोध–प्रारूप	Research-Design.
	सामग्री–संकलन के उपागम– एकभाषिक एवं द्विभाषिक	Approaches of Data-Collection-Monolingual and Bilingual.
	सामग्री–संकलन के उपागम– सूचक, शब्द–वाक्य–लिस्ट, कार्ड तथा यांत्रिक प्रश्नावली	Tools of Data-Collection- Informant, Word-Sentence-List, Cards, and Other Equipments.Questionnaire
3.	सामग्री–संकलन के स्रोत– जनगणना–अभिलेख, पुरातात्विक अभिलेख (जैसे– शिलालेख, ताम्रपत्र, पांडुलिपि, ताड़पत्र लेख, मुहर, आदि)	Secondary Sources of Data-Collection-Sensus-Records, Archaeological Records.
	भाषा में अतिरेक	Redundancy in Language.

4.	सामग्री–संकलन में अन्य भाषा–व्याघात	Other Language Interference in Data-Collection.
	सामग्री–चुनाव, पद्धति तथा आकार	Selection, Method and Size.
	सामग्री–विश्लेषण एवं लेखन	Analysis of Data and Writing.
	प्रलेखन तथा संदर्भ–विधान	Documentation and System of Reference.

निर्धारित पुस्तकें **Prescribed Books :**

1.	नवीन शोधविज्ञान	:	तिलक सिंह (प्रकाशन संस्थान, दिल्ली)
2.	अनुसंधान विधियाँ	:	एच.के. कपिल
3.	अनुसंधान के मूलतत्व	:	विश्वनाथ प्रसाद (क.मु. हिंदी तथा भाषाविज्ञान विद्यापीठ, आगरा)
4.	अनुसंधान परिचय	:	पारसनाथ राय (लक्ष्मीनारायण लाल, आगरा)
5.	सामाजिक सर्वेक्षण की प्रविधियाँ	:	जयप्रकाश एवं गोविंद तिवारी (लक्ष्मीनारायण लाल, आगरा)
6.	भाषा–भूगोल	:	कैलाशचंद्र भाटिया (हिंदी समिति, लखनऊ)
7.	भाषाविज्ञान का इतिहास	:	महेश प्रसाद जायसवाल (म.प्र. हिंदी ग्रंथ अकादमी भोपाल)
8.	भारतीय भाषाशास्त्रीय चिंतन	:	विद्या निवास मिश्र (जयपुर)
9.	आधुनिक भाषाविज्ञान	:	मोतीलाल गुप्त एवं भटनागर (जयपुर)
10.	Research Methodology	:	C.R. Kothari (Wiley Eastern Ltd. New Delhi)
11.	Methods and Techniques	:	Leon Fastinger and Daniel Kats (Amerind Pub. Ltd. New Delhi)
12.	An Introduction to Historical and Comparative Linguistics	:	Raima Anttia
13.	Field Linguistics	:	William Samann (Holt, Rinehart and Winston, New York)
14.	Morphology	:	E.A. Nida (Ann Arbor, Michigan University Press, U.S.A.)
	Writing the Research Paper	:	A Hand Book-Anthony C. Winkel and Jo Ray Macuen (Harcourt Brace Jovanovich, New York)
15.	A Course in Modern Linguistics	:	C.F. Hockett (The Macmillan Co., New York)
16.	An Introduction to	:	J. Jeffery Auer (Harper and Row, New Delhi)
17.	Language Two	:	Hoidi Dulay, Marine Burt, Stephen Kroshan.

प्रश्नपत्र द्वितीय

व्याकरण : सिद्धांत और व्यवहार — Grammar : Theoretical and Practice

1.	व्याकरण : अर्थ, प्रकृति, व्याप्ति एवं प्रकार	Grammar : Meaning, Nature, Scope and Types.
2.	पारंपरिक व्याकरण : ग्रीक परंपरा, रोमन/लैटिन परपराएँ, भारतीय परंपरा	Traditional Grammar : Greek Tradition, Roman/Latin Tradition, Indian Tradition.
3.	सस्यूर की भाषा एवं वाक् की अवधारणा	Saussure's Concept of Language and Parole.
	वर्णनात्मक/संरचनात्मक व्याकरण : अमरीकी संरचनावाद, निकटस्थ अवयव–विश्लेषण, अंतःकेन्द्रिक एवं बहिकेन्द्रिक रचना	Descriptive Structural Grammar, Immediate Constituent Analysis, Endocentric and Exocentric Construction.
4.	रूपांतरणपरक–प्रजनक व्याकरण की रूपरेखा भाषा–सामर्थ्य एवं भाषा–व्यवहार आंतरिक एवं बाह्य संरचना	Transformational-Generative Grammar, Competence and Performance. Deep and Surface Structure.
5.	प्रजनक अर्थविज्ञान की अवधारणा कारक व्याकरण और संप्रेषण व्याकरण का परिचय भाषा–प्रकार्य की अवधारणा	Generative Semantics : Case-Grammar. Communicative Grammar Concept of Language Function.

निर्धारित पुस्तकें **Prescribed Books :**

1.	सैद्धांतिक भाषाविज्ञान	:	जॉन ल्यंस (अनु. सत्यकाम वर्मा)
2.	भाषाविज्ञान एवं भाषा	:	कपिलदेव द्विवेदी (विश्वविद्यालय प्रकाशन, नई दिल्ली)
3.	आधुनिक भाषाविज्ञान	:	भोलानाथ तिवारी (लिपि प्रकाशन, नई दिल्ली)
4.	आधुनिक भाषाविज्ञान का इतिहास	:	महेश प्रसाद जयसवाल (म.प्र. हिंदी ग्रंथ अकादमी भोपाल)
5.	आधुनिक भाषाविज्ञान	:	कृपाशंकर सिंह और चतुर्भुज सहाय (नेशनल पब्लिशिंग हाउस, नई दिल्ली)
6.	संप्रेषणपरक–व्याकरण : सिद्धांत और प्रारूप	:	सं. सुरेश कुमार (केंद्रीय हिंदी संस्थान, आगरा)
7.	हिंदी का नवीनतम बीज–व्याकरण	:	रमेश चंद्र महरोत्रा एवं चित्त रंजन कर (पहचान प्रकाशन)
8.	भारतीय भाषाशास्त्रीय चिंतन	:	सं. विद्यानिवास मिश्र आदि (राजस्थान हिंदी ग्रंथ अकादमी, जयपुर)
9.	A Short History of Linguistics	:	R.H. Robin (Longmans)
10.	Lexical-Functional Grammar	:	George M. Morn (Mouton)
11.	Language and Linguistics	:	John Lyons (Combridge University Press)
12.	Halliday : System and Function in Language	:	(Ed.) Gunther Kress (Oxfort University Press)
13.	A Communicative Grammar of English	:	G.N. Leech and Jan Syartrik (Long man)

प्रश्नपत्र तृतीय

भाषाशिक्षण–विधियाँ **Language Teaching Methods**

1.	भाषाशिक्षण एवं भाषार्जन भाषाशिक्षण का उद्देश्य और महत्व भाषा–संस्कृति	Language Teaching and Language Acquisition Aims and Importance of Language-Teaching. Language Skills.
2.	भाषा–प्रशिक्षण शिक्षण विधियाँ त्रुटि विश्लेषण मातृभाषा का आघात	Language Testing Teaching Methods Error-Analysis Impact of Mother Tongue
3.	व्यतिरेक विश्लेषण साँचा अभ्यास द्वितीय भाषा के रूप में हिंदी/अंग्रेजी का शिक्षण	Contrastive Analysis Pattern-Drill. Teaching of Hindi/English as a Second Language
4.	भाषाशिक्षण के सहायक उपकरण भाषा प्रयोगशाला आधुनिक भाषाशिक्षण	Language Testing Aids Language-Laboratory Modern Language-Testing

निर्धारित पुस्तकें **Prescribed Books :**

1.	हिंदी भाषाशिक्षण	:	भोलानाथ तिवारी एवं कौशल चंद्र भाटिया (लिपि प्रकाशन, अंसारी रोड नई दिल्ली)
2.	द्वितीय भाषाशिक्षण भाषावैज्ञानिक विधि	:	मोहब्बत सिंह मानसिंह चौहान एवं लक्ष्मीनारायण शर्मा (बाहरी पब्लिकेशंस, नई दिल्ली)
3.	भाषाशिक्षण तथा भाषाविज्ञान	:	(संपा.) ब्रजेश्वर वर्मा एवं अन्य (केंद्रीय हिंदी संस्थान, आगरा)
4.	अन्य शिक्षण	:	महावीर सरन जैन (विनोद पुस्तक मंदिर, आगरा)
5.	हिंदी भाषाशिक्षण	:	मनोरमा गुप्त (केंद्रीय हिंदी संस्थान, आगरा)
6.	मानक हिंदी और बांगरू का व्यतिरेकी विश्लेषण	:	सोमदत्त बंसल (हरियाणा साहित्य अकादमी, चंडीगढ़)
7.	हिंदी शिक्षण–पद्धति	:	वैद्यनाथ वर्मा (बिहार हिंदीग्रंथ अकादमी, पटना)
8.	पंजाबी–हिंदी क्रियापदबंध व्यतिरेकी विश्लेषण	:	भारत भूषण (केंद्रीय हिंदी संस्थान, आगरा)
9.	त्रुटि–विश्लेषण : सिद्धांत और व्यवहार	:	रामकमल पांडे (केंद्रीय हिंदी संस्थान, आगरा)
10.	भाषाशिक्षण	:	रविन्द्रनाथ श्रीवास्तव (मैकमिलन, दरियागंज, नई दिल्ली)
11.	हिंदी–संरचना का अध्ययन–अध्यापन	:	लक्ष्मीनारायण शर्मा (केंद्रीय हिंदी संस्थान, आगरा)
12.	अन्य भाषाशिक्षण के कुछ पक्ष	:	(संपा.) अमर बहादुर सिंह (केंद्रीय हिंदी संस्थान, आगरा)
13.	हिंदी शिक्षण विधि	:	रघुनाथ सफाया (पंजाब किताब घर, जालंधर)
14.	भाषाविज्ञान की अधुनातन प्रवृत्तियाँ	:	शिवेन्द्र किशोर वर्मा (केंद्रीय हिंदी संस्थान,

	और द्वितीय भाषा के रूप में हिंदी भाषाशिक्षण		आगरा)
15.	व्यतिरेकी भाषाविज्ञान	:	विजय राघव रेड्डी (विनोद पुस्तक मंदिर, आगरा)
16.	अनुप्रयुक्त भाषाविज्ञान	:	(संपा.) रविन्द्रनाथ श्रीवास्तव एवं अन्य (आलेख प्रकाशन, नई दिल्ली)
17.	Modern Language-Teaching	:	(Ed.) Hars Jalling (Oxford University Press)
18.	Language Teaching	:	Robert Lado (Megrow-Hill Pub. Co. Ltd. Bombay)
19.	Linguistics in Language Teaching Street,	:	D.A. Wilkin (Edward Arnold Ltd., 25 Hill London.
20.	Papers in Contrastive Linguistics University	:	(Ed.) Gerhard Hickel (Combridge Press)
21.	Problems Principles in Language Study	:	Devid Abercrombie (Longman)
22.	Outline Guide for the Practical Study of Foreign	:	Bloomfield (Linguistic Society of America)
23.	English Conversation Practice Company, New	:	Grant Taylor (Tata Mc Graw Pub. Delhi)
24.	Introductions to English Language B.K. Teaching	:	Vol. I, II and III, R.N. Ghosh, H.N.L. Sastri, Das (OUP Madras)
25.	Lectures on Teaching English in India	:	Champion (OUP. Madras)
26.	Linguistics and English Grammar	:	H.A. Gleason (Holf, Rhiehart and Winston)

भाषाविज्ञान में पी–एच.डी. कोर्स का पाठ्यक्रम

(Syllabus for Ph.D. Course Work in Linguistics)

2017-18

इस कोर्स वर्क में दो प्रश्न–पत्र होंगे, प्रत्येक प्रश्न–पत्र में अधिकतम 100 अंक हैं।

प्रथम प्रश्न–पत्र : शोध–प्रविधि एवं कम्प्यूटर का आधारभूत ज्ञान।

Research Methodology & Computer Fundamentals

द्वितीय प्रश्न–पत्र : साहित्य का पुनरावलोकन एवं सेमीनार

Review of Literature & Seminar

प्रथम प्रश्न–पत्र : शोध–प्रविधि एवं कम्प्यूटर का आधारभूत ज्ञान।

Research Methodology & Computer Fundamentals

अधिकतम अंक–100

ईकाई 1 ..... 25 अंक

शोध का तात्पर्य, लक्ष्य तथा महत्व	Meaning of Research, Aims & Importance
शोध के प्रकार	Types of Research
भाषिक–शोध की प्राचीन परंपराएं	Old Traditions of Linguistics Research

ईकाई 2 ..... 25 अंक

भाषिक–शोध के प्रमुख उपागम ऐतिहासिक एवं तुलनात्मक	Major Theoratical Approaches in Linguistic Research&Descriptive, Historical & Comparative
शोध–विषय का चयन तथा नियमन	Selaction of Topic of Research & Formalation of Research Problem.

ईकाई 3 ..... 25 अंक

शोध–प्रारूप	Research&Design
सामग्री–संकलन के उपागम एकभाषिक एवं द्विभाषिक	Approches of Data-Collection – Monolingual & Bilingual
सामग्री–संकलन के उपकरण– सूचक शब्द–वाक्य–लिस्ट	Tools of Data- Collection, Informant, Word Sentence-List, Card & other Equipments

कार्ड तथा यांत्रिक–साम्रगी

प्रश्नावली–	Questionnaire
ईकाई 4	25 अंक
आई.सी.टी : अर्थ, लाभ एवं उपयोगिताएं	ICT : Meaning, Advantages & Uses
कम्प्यूटर : परिचय और अनुप्रयोग	Computer : Indtroduction & Application
इंटरनेट का सिद्धांत, सर्च इंजन	Besics of Internet, e-mailing, Using Search
का उपयोग जैसे–गूगल व याहू आदि	Engine- like Google and Yahoo etc.
साहित्य अनुसंधान एवं तकनीक	Literature Research & Techniques

द्वितीय प्रश्न–पत्र : साहित्य का पुनरावलोकन एवं सेमीनार

Review of Literature & Seminar

अधिकतम अंक–100

(अ) प्रस्ताविक पी–एच.डी. कोर्स हेतु साहित्य एवं सेमीनार के मूल सिद्धांतों का पुनरावलोकन।

Review of Literature – Writing review of literature in the area of the proposed Ph.D Programme..... 50 अंक

(ब) सेमीनार ..... Seminar..... 50 अंक

नोट – विद्यार्थियों को कोर्स वर्क के लिए न्यूनतम प्राप्तांक अंक 50 प्रतिशत प्राप्त करना अनिवार्य है।

Note :- The candidate must obtain minimum 50% Marks to quality in the Course Work)

Pt. Ravishankar Shukla University, Raipur Chhattisgarh

Pre Ph. D. Course Work in English

(2017-2018)

Scheme of Examination

There shall be two papers. The first will be a theory paper and the second will contain project work

S.No.	Particulars		Maximum Marks
1.	Theory Paper	Research methodology and computer Applications	100
2.	Project work	Dissertation/Project Script	50
		Seminar	30
		Viva	20
	Grand Total		200

Details of Syllabus

Paper I

Research Methodology and Computer Applications

Unit-I Research: Definition of Research, Aim and application of research: Types of research; Planning the assignment/thesis- Selection a topic; Reviewing the literature; Designing the Study.

Unit-II Conducting Research:

Using modern academic libraries and other information sources and services: The Central information system; Reference work- Indexes and Bibliographies, collection of abstracts; guides to research; dictionaries: Encyclopedia: biographical source, web sources.

Unit-III Referencing and plagiarism:

Reference systems, kinds of bibliography, compiling a working bibliography, evaluating sources: taking notes,

Plagiarism: Its definition, consequences of plagiarism, forms of plagiarism, copyright infringement.

Unit-IV The mechanics of Writing and Editing:

Outlining, writing drafts, the general format of a thesis, page and chapter format: the use of quotation, Documentation-preparing the list of works cited citing sources in the text according to MLA style: Editing evaluating the final product.

Unit-V Computer and Internet Basics:

MS-Word: Creating editing and formatting a document; Text entry, font, text style and alignment Understanding page layout, page set up header and footer, numbering pages; formatting paragraphs with paragraph spacing bullet and numbering; Using grammar and spell check utilities; Print preview, printing a document.

MS-Excel: Workbook, worksheets and cells; entering data in worksheet; editing and formatting data using formulas and function: generating graphs using graphs features.

MS-Power point: Working with basics for creating and delivering a power point presentation.

Introduction to Internet: Use of search engine, communication on Internet creating your e-mail address. Using e-mail facilities; surfing the Internet; Downloading and printing literature using the Internet.

Book Recommended

Anderson, Janothan, Berry H Durston andMillicent poole; Thesis and Assignment Writing, New Delhi Willey Eastern Limited 1991

Gupta Renu A course in Academic Writing New Delhi Orient Blackswan 2010

MLA Handbllk for Writers of Research papers New Delhi Affiliated East-West press Pvt. Ltd.

Nelson Stephen L The complete Reference Office Xp(TMH)

Oshima A and A Hougue Introduction to Academic Writing Addison Weseley Longman

Rajaram R Basic Computer Science and communication Engineering (SCITECH)

Swates J Genre Analysis English in Academic and research settings

Cambridge CUP 1990.

Williams J M Style: Ten Lesions in Clarity and Grace Harper Collins 1994.

Paper- II

Project work

marks

This paper will consist of research components specified in the Ph.D. regulation

(i) Dissertation/project work leading to PhD. Work 50

This will be completed with the involvement of the research guide. It should focus on certain tasks such as literature review covering different aspects of research the field of research and the research methodology employed for the research must be critically reviewed.

(ii) Seminar 30

The candidate will be required to participate in at least two seminars of relevance or will present a paper in at least on seminar or a combination of both within the duration of the course work.

(iii) Viva on Dissertation/Project 20

The presentation of the candidate will be assessed for its clarity of thought content and skill of expression.

P

पी-एच.डी. कोर्स वर्क का पाठ्यक्रम
विषय—हिन्दी

पूर्णांक-100

प्रथम प्रश्नपत्र :- अनुसंधान की प्रविधि, प्रक्रिया और कम्प्यूटर का अनुप्रयोग
(प्रत्येक इकाई से वैकल्पिक प्रश्न पूछे जायेगें)

ईकाई 1 — 25 अंक

- (1) अनुसंधान का स्वरूप, (2) अनुसंधान और आलोचना, (3) अनुसंधान के मूलतत्व (4) अनुसंधान के प्रकार

ईकाई 2 — 25 अंक

- विषय-निर्वाचन
- सामग्री- संकलन, हस्तलेखों का संकलन और उपयोग।
- शोध-कार्य का विभाजन, अध्याय-उपशीर्षक और अनुपात।
- रूपरेखा, विषय-सूची, प्रस्तावना, भूमिका, सहायक ग्रंथों की सूची, संदर्भ-उल्लेख, पाद-टिप्पणी।

ईकाई 3 — 25 अंक

- साहित्य अनुसंधान में ऐतिहासिक तथ्यों और पद्धतियों का उपयोग।
- साहित्यिक अनुसंधान में समाजशास्त्रीय प्रविधि का उपयोग।
- हिंदी अनुसंधान से सम्बद्ध; विषयों की भूमिका।
- पाठालोचन के मुख्य सिद्धांत।
- भाषा, वैज्ञानिक अनुसंधान।

ईकाई 4 — 25 अंक

- कम्प्यूटर परिचय, रूपरेखा, उपयोग तथा क्षेत्र।
- इंटरनेट-सम्पर्क उपकरणों का परिचय, प्रकार्यात्मक रखरखाव, वेब पब्लिशिंग।
- ई-मेल भेजना, प्राप्त करना, डाउनलोडिंग, अपलोडिंग और हिंदी सॉफ्टवेयर पैकेज।

टीप : उपरोक्त पाठ्यक्रम के अतिरिक्त निम्नलिखित विषयों पर जानकारी आवश्यक है।

- प्लाजियारिज्म (शब्द हरण) (शोध का नकल)
- साइटेशन इंडेक्स
- जनरल इंपेक्ट फैक्टर
- आर्ट एण्ड ह्यूमनेटिज साइटेंशन इंडेक्स जरनल
- रिसर्च एथिक्स
- वर्ड प्रोसेसिंग
- ICT (इन्फोर्मेशन कम्प्यूनिकेशन टेक्नालॉजी)

प्रश्नपत्र दो 100 अंक

संबंधित साहित्य का पुनरावलोकन, सेमिनार एवं प्रोजेक्ट कार्य

1. प्रस्तावित विषय से संबंधित लधु-शोध प्रबंध 50 अंक

या

स्तरीय शोध-पत्र में प्रकाशित किसी भी लेखक के दो आलेख का पुनरावलोकन, कोई एक पुस्तक का पुनरावलोकन।

2. प्रस्तावित विषय पर आधारित सेमिनार 50 अंक

= 0 =

8.12.2011

MBA

SYLLABUS

TWO YEARS MBA (FULL TIME) PROGRAMME

Academic Session: 2017-2018

INSTITUTE OF MANAGEMENT
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

INSTITUTE OF MANAGEMENT
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

TWO YEAR M.B.A. (FULL TIME) PROGRAMME
COURSE STRUCTURE
Academic Session: 2017-18

FIRST SEMESTER	**MARKS**		
	External	Internal	Total
111 Management Concepts and Process	70	30	100
112 Organisational Behavior	70	30	100
113 Quantitative Methods	70	30	100
114 Managerial Economics	70	30	100
115 Accounting for Managers	70	30	100
116 Information Technology with Computer Lab Work	70	30	100
117 Environment and Management	70	30	100
118 Business Legislations	70	30	100
119 Industry Based Project & Viva-I	70	30	100
			900
SECOND SEMESTER			
121 Managerial Communication	70	30	100
122 Management Science	70	30	100
123 Human Resource Management	70	30	100
124 Financial Management	70	30	100
125 Marketing Management	70	30	100
126 Production Management	70	30	100
127- Research Methodology	70	30	100
128 Business Ethics & Indian Ethos	70	30	100
129 Industry Based Project& Viva -II	70	30	100
			900

THIRD SEMESTER	MARKS		
231 Organizational Effectiveness & Change	70	30	100
232 International Business	70	30	100
233 Management Information System	70	30	100

- **Specialization -Group A: MARKETING (COMPULSORY)**

234 Marketing Research & Consumer Behavior	70	30	100
235 Sales & Advertising Management	70	30	100
236 Industrial & Service Marketing	70	30	100

- **Specialization Group B *(Any One Group is to be Opted)***

FINANCE

237F. Security Analysis and Portfolio Mgt.	70	30	100
238F. **Management of Financial Services**	70	30	100

HUMAN RESOURCE MANAGEMENT

237H. Human Resource Development	70	30	100
238H. Legal Framework of HRM	70	30	100

SYSTEM

237 S. System Analysis & Design	70	30	100
238 S. RDBMS & SQL Concepts	70	30	100
239 TRAINING REPORT & VIVA	**70**	**30**	**100**

900

FOURTH SEMESTER		MARKS	
241. Strategic Management	70	30	100
242. Retailing Management	70	30	100
243 Corporate Social Responsibility	70	30	100

- **Specialization- Group A : MARKETING (COMPULSORY)**

244 International Marketing	70	30	100

- **Specialization -Group B :(** ***Any One Group is to be Opted)***

FINANCE

245F.International Financial Mgt.	70	30	100
246F. Project Planning, Analysis & Mgt	70	30	100

HUMAN RESOURCE MANAGEMENT

245H. Compensation Management	70	30	100
246H. Mgt. of Industrial Relations	70	30	100

SYSTEM

245S. Business Process Re-Engineering & ERP	70	30	100
246S. Fundamentals of Computer Architecture	70	30	100

600

Note:

1. Specialization Group B has three functional specializations in the area of Finance HRM and System. Out of these three specializations, any one as a whole is to be opted. First two papers from the opted specialization are to be studied in the third semester and remaining two papers are to be studied in the fourth semester.

2. Comprehensive viva will be based on all the subjects studied during all the semesters.

MANAGEMENT CONCEPTS AND PROCESS (FT-111)

Concepts, nature, scope , significance, functions and principles of management ,historical evolutions of management thoughts

Management Process, System Approaches to Management

- Planning-concepts, components and steps involved in planning process, MBO, Individual and Group Decision Making.
- Organizing- principles , centralization, decentralizations, delegation, employees' empowerment, line & Staff Authority, Different types of organization structures, staffing.
- Directing and Coordinating Assumptions in directing, Principles of Directing, .
- Controlling, nature, scope, functions, steps and control techniques.

Suggested Readings:

1. Stoner and Freeman, **Management,** Prentice Hall, N. Delhi.
2. Koontz, O' Donnell Wechrich, **Principles of Management**, McGraw Hill, New York.
3. Peter F. Drucker, **The Practice of Management,** Allied Publishers.
4. Massie, **Essentials of Management,** AITBS, New Delhi.
5. Terry and Franklin,**Principles of Management**, AITBS, New Delhi.
6. Agrwal, R.D.**Organisation and Management**- TMH, New Delhi

ORGANISATIONAL BEHAVIOUR (FT-112)

- Understanding Human Behavior, Individual Differences, Personality, Attitudes, Values, Emotional Intelligence.
- Intra-personal Processes: Sensation, Perception, learning, Motivation. Inter-personal Process, stress management.
- Leadership, Socialization, Counselling, Mentoring.
- Group Behavior-Intra-group and Inter-group processes and behaviour, Team Development and Team Functioning
- Conflict Management - Intra and Inter personal conflict.

Suggested Readings:

1. Luthans Fred, Organisational **Behaviour**.,New York, McGraw Hill.
2. Robbins S.P., Organisational **Behaviour**, New Delhi, PHI.
3. Singh, Dalip, **Emotional Intelligence** at Work, Response Books, Sage Publications, Delhi.
4. Davis Keith, **Human Behaviour at Work**, TMH, New Delhi
5. Pareek Udai, **Organisational Behaviour,** Oxford, IBH, Mumbai
6. Hersey Paul and Blanchard, **Management of Organisational Behaviour**, Prentice Hall of India, New Delhi.
7. Uma Shekharan, **Organisation Behaviour**, TMH, New Delhi.
8. Dwivedi, R.S. **Human Relations and Organisational Behaviour,** Galgotia, New Delhi.

QUANTITATIVE METHODS (FT-113)

- Mathematical basis of Managerial Decision: Functions A.P. & G.P. and their Managerial Applications, Matrices, Markov chains.
- Frequency Distributions and their Analysis - Measures of Central Tendency and Dispersion.
- Probability Theory and Probability Distributions – Binomial, Poisson, Normal and exponential
- Correlation and Regression Analysis (Linear)
- Index Numbers, Time Series Analysis and Forecasting.

Suggested Readings:

1. Chadha, N.K. **Statistics for Behavioural and Social Scientists**, Reliance Publishing House, Delhi.
2. Gupta, S.P. and Gupta M.P. **Business Statistics**, New Delhi, Sultan Chand.
3. Kazmier, L.J. and Pohl, N.F. **Basic Statistics for Business and Economics**, New York, McGraw Hill.
4. Levin Richard I and Rubin David S. **Statistics for Management,** New Jersey, Prentics Hall Inc.
5. Terry, Sineich, **Business Statistics by Examples**. London, Collier Macmillan Publishers.
6. Roy, **"Business Statistics",** Pustak Bhawan, Allahabad.
7. Sharma, J. K. Business Statistics, Pearson Education Pte. Ltd.

MANAGERIAL ECONOMICS (FT-114)

- Nature and Scope of Managerial Economics, Fundamental Concepts in Managerial Economics, Role and Responsibilities of Managerial Economist.
- Law & Nature of Demand, Demand Determinants, Demand Forecasting, Demand Function, Elasticity of Demand, Consumer Surplus. Law of Returns and Production Functions and cost output relations, Market structure.
- Price-output decisions under different market conditions - Perfect and Imperfect Competition, Monopoly, Monopolistic Competition, Oligopoly, Non-Price Competition, Price Discrimination.
- Balance of Payment, Concept and measurement of National Income, Gross Domestic Savings, Gross Domestic Capital Formation.
- Nature and Concept of Profit, Theories of Profit, Business Fluctuations and Trade Cycles, Impact of Trade Cycle on Society.

Suggested Readings:

1. Adhikary,M. **Business Economics**., New Delhi, Excel Books.
2. Baumol, W.J. **Economic Theory and Operations Analysis**, New Delhi, Prentice Hall Inc.
3. Chopra, O.P., **Managerial Economics,** New Delhi, Tata Mcgraw Hill.
4. Keat Paul G & Philips K.Y. Young, **Managerial Economics**, Prentice Hall, New Jersey.
5. Koutsoyiannis, A. **Modern Micro Economics**, New York, Macmillan.
6. Milgrom, P and Roberts J. **Economics, Organisation and Management**. Englewood Cliffs, New Jersey, Prentice Hall Inc.
7. Mehta P.L., Analysis, **Problems & Cases,** Sultan Chand & Sons, New Delhi.

ACCOUNTING FOR MANAGERS (FT-115)

- Financial Accounting – Concept, Importance and Scope, Generally Accepted Accounting Principles, Preparation of Financial Statements with special reference to analysis of a Balance Sheet and Measurement of Business Income
- Financial Statement Analysis - Ratio Analysis, Funds Flow Analysis, The Statement of Cash Flows
- Management Accounting – Concept, Need, Importance and Scope; Basic Concepts in Cost Accounting – Material, Labour, Overheads, Job and Process Costing.
- Budget and Budgetary Control, Types of Budget – Flexible Budget, Cash Budget.
- Costing for Decision-making, Standard Costing, Cost Volume Profit Analysis, Responsibility Accounting.

Suggested Readings :

1. Anthony R N and Reece J S. **Accounting Principles**, Homewood, Lllinois, Richard D. Irwin.

2. Bhattacharya S K and Dearden J. **Accounting for Management** : Text and Cases. New Delhi, Vikas.
3. Heitger, L E and Matulich, Serge. **Financial Accounting.** New York, McGraw Hill.
4. Hingorani, N L. and Ramanathan, A.R. **Management Accounting**., New Delhi, Sultan Chand.
5. Horngren, Charles etc. **Principles of Financial and Management** Accounting. Englewood Cliffs, New Jersey, Prentics Hall Inc.
6. Needles, Belverd, etc. **Financial and Managerial Accounting.** Boston, Houghton Miffin Company.
7. Vij, Madhu. **Financial and Management Accounting**. New Delhi, Anmol Publications.

Information Technology (FT-116)

- Introductions to Computers- Hardware, Software, System software, Application software and packages, Introduction to embedded software
- Fundamentals of Operating System, DOS, Windows, Introduction to DBMS Concepts and integration of applications, Basics of data processing, Data hierarchy, Data file structures ,Emerging Communication Technologies
- Commonly used software Packages like Microsoft Word, Microsoft Excel, Microsoft Power Point, Tally etc.
- Types of Network- LAN, WAN and MAN, Introduction to Electronic Commerce and Electronic Business
- Introduction to World Wide Web- Internet Operations- Internet Browsers and Business Websites, Use of Search Engines and Google Applications, Use of internet as a medium of marketing, Managerial issues in reaching consumers / organizations through internet.
- **Lab Work:** The students are required to acquire the knowledge to deal in the following areas: MS-OFFICE, Oracle, Tally

Suggested Readings

1. Burch, John and Grudnitski Gary. **Information Systems** : Theory and Practice, New York, John Wiley.
2. David, Van Over. **Foundations of Business Systems.** Fort Worth, Dryden.
3. Eliason, A.L. **On-Line Business Computer Applications**., Chicago, Science Research Association.
4. Estrada, Susan. **Connecting to the Internet**. Sebastopol, C A, O'Reilly.
5. John, Moss Jones, **Automating Managers : the implications of Information Technology for Managers.** London, Pinter.
6. Long, L. **Computers,** Englewood Cliffs, New Jersey, Prentice Hall Inc.
7. Summer, M. **Computers Concepts and Uses.,** Englewood Cliffs, New Jersey, Prentice-Hall Inc.

ENVIRONMENT AND MANAGEMENT (FT-117)

- Business Environment: Nature, Scope and its relevance in Management Decision Making.
- State Participation in Business, Interaction between Government and Business, Socio-Cultural and Political Environment and its effect on Business.
- Government Control over price and distribution; Consumer Protection Act (CPA), New Industrial Policy of the Government, Monetary and Fiscal Policy.
- Industrial Ecology, Environmental Management System : EMS Standards, ISO 14000. Environmental Accounting and Auditing, Clearance/Permissions for establishing industry
- GATT/WTO origin and main section of WTO Agreement, Patents, IPRS, Industrial Pollution – Air, Water, Land Pollution and its effects on Business, Environmental Ethics.

Suggested Readings :

1. Francis Cherumilam, **Business Environment,** Himalaya Publishing House
2. Adhikari, M., **Economic Environment of Business**
3. Gupta, D., **Indian Government & Politics**
4. Ghosh P.K. & Kapoor, G.K. **Business & Society**
5. K.Aswathapa, **Essential of Business Environment,** PHI
6. Sidiqui, Saleem, **Business Environment,** Pearson Education Pte. Ltd

BUSINESS LEGISLATIONS (FT-118)

- The Indian Contract Act 1872, Essentials of a valid contract, Void agreements, Performance of Contracts & its remedies, Quasi-contracts. Agency, Bailment, Pldge, Guarantee and Indemnity.
- An overview of The Negotiable Instruments Act 1881. Holder-in-Due Course, Arbitration.
- The Companies Act, 1956 : Nature and Types of Companies. Formation. Memorandum and Articles of Association, Prospectus Allotment of Shares, Winding Up. .
- Consumer Protection Act and IT Laws.
- An Overview of Labour Legislations in India like Industrial Dispute Act, Trade Union Act, Employee (Workmens') Compensation Act.

Suggested Readings :

1. Tuteja S.K. **Business Law For Managers,** New Delhi, Sultan Chand.
2. Kapoor, N. D. Mercantile Law.
3. Datey, V. D. Business and Corporate Laws, Taxman
4. Padhi, P. K., Legal Aspects of Business, PHI
5. Kuchhal, M. C., Business Laws, Vikas Publishing House
6. Pandit, M. S. and Pandit, Sobha., Business Law, Himalaya Publishing House
7. Grover and Kapoor, Company and Business Law, S. Chand

Industry Based Project – I (FT-119)

Students will prepare Industry Based Projects individually on the basis of topics allotted to them. **The Industry Based Project submitted by the students will be evaluated by the external examiner and viva will be based on the Project.**

MBA - SECOND SEMESTER (Session: 2017-2018)

MANAGERIAL COMMUNICATION (FT-121)

- Importance and Nature of Business Communication, Channels and Media of Communication, Communication Networks, Effectiveness of Communication ; Process of Communication
- Barriers to Communication; Writing Business Reports
- Oral Communication, Resume preparations, public speaking and negotiations skills; Legal aspects of Business Communication
- Listening Skills, Presentation Skills, Non Verbal Communication
- Feedback Skills, Interview skills, Counselling Skills, Communication on Disciplinary Matters, Group Discussion and Meetings.

Suggested Readings :

1. Bowman, Joel P and Branchaw, Bernadine P. **Business Communication : From Process to Product**, Dryden Press, Chicago.
2. Hatch, Richard.:**Communicating in Business**., Science Research Associates, Chicago.
3. Murphy, Herta A and Peck, Charrles E. **Effective Business Communications**, Tata Mc Graw Hill, New Delhi.
4. Pearce, C Glenn etc. **Business Communications : Principles and Applications**, John Wiley, New York.
5. Treece, Maira. **Sucessful Business Communications**, Allyn and Bacon Boston.
6. Bahal, Sushil. **Business Communication,** Sage Publication
8. Rao, N. and Das R. P., Communication Skills, Himalaya Publishing House

MANAGEMENT SCIENCE (FT-122)

- Management Science – Basic Concepts and its Role in Decision Making, Linear Programming: Formulation, Graphical Method, Simplex Method, Concepts of Duality, Post Optimality Analysis.
- Integer Programming , Branch and Bound Algorithm, Transportation and Assignment Models, Routing Problems, Sensitivity Analysis.
- Queuing Theory; Inventory Management Techniques
- PERT and CPM, Decision Theory and Decision trees.
- Game Theory; Simulation, Markow Analysis, Goal programming.

Suggested Readings :

1. Gould, F.J.etc. **Introduction to Management Science**. Englewood Cliffs, New Jersey, Prentice Hall Inc.
2. Mathur, K and Solow, D. **Management Science**, Englewood Cliffs, New Jersey, Prentice Hall Inc.
3. Narag A.S. **Linear Programming and Decision Making**. New Delhi, Sultan Chand.
4. Sharma, J.K. **Operations Research : Theory and Applications**. New Delh, Macmillian India Ltd.
5. Taha, H.A. **Operations Research – An Introduction**. New York, Mc Millan.
6. Theirouf, R J and Klekamp, R.C. **Decision Making Through Operations Research,** New York, John Wiley.

HUMAN RESOURCE MANAGEMENT (FT-123)

- Concepts and Perspectives on Human Resource Management; Evolution and Philosophy of Human Resource Management, HR challenges in changing environment
- Human Resource Policy and Planning; Human Resource records and Audit, Job Analysis. Methods of , Job Analysis, Description , Job specification.
- Recruiting and Selecting Human Resources ,Placement , and Induction,
- Manpower Training and Development, Performance Appraisal and Potential Evaluation; Job Evaluation, Wage Determination and Compensation management.
- Employees' Welfare; Industrial Relations & Trade Unionism; Grievance Management, Exit Policy and Implications.

Suggested Readings :

1. Das, R.P. **Management of Industrial Relations**, Varanasi, MTC
2. Rao, N and Das R.P. **Cases in Human Resource Management**, Himalaya Publishing House, Mumbai.
3. Aswathappa, K. **Human Resource and Personnel Management** Tata McGraw Hill, New Delhi.
4. De Cenzo, D.A. & Robbins S P. **Human Resource Management**, New York, John Wiley.
5. Guy, V & Mattock J. **The New International Manager**, London, Kogan Page.
6. Holloway, J. ed. **Performance Measurement and Evaluation**. New Delhi, Sage.
7. Monappa, A. & Saiyadain M**. Personnel Management**., New Delhi, Tata Mc-Graw Hill.
8. Dwivedi, R.S**. HRM in Indian Organisation**, New Delhi, Galgotia.
9. Pareek, Udai. **Designing & Managing Human Resource System**, New Delhi, Oxford Pub. Co.
10. Stone, Lloyed and Leslie W.Rue, **Human Resource and Personnel Management** Richard D. Irwin, Lllionis.
11. Vohra, N. D. Quantitative Techniques for Managers

FINANCIAL MANAGEMENT (FT-124)

- Financial Management: An Overview, Acquisition of funds, allocation of funds and allocation of income, Nature and Scope, Profit Maximisation v/s Wealth Maximisation, Financial levarage, Operating leverage.
- Capital Budgeting : Concept and Significance, Derivative of Cash flow in a Capital Budgeting Situation, Techniques and methods of capital budgeting, conflicts between NPV and IPR, Cost of capital.
- Working Capital Management: overview, Management of Cash, Accounts receivables and inventories, Financing current assets. Cash Management Models.
- Retained earnings and Dividend Policy, Types of Dividend, Dividend Theories, Dividend Practices in India. Bonus Shares
- Sources of Long Term and Short-term Finance, Capital Structure Theories and Factors.

Suggested Readings :

1. Hampton, John. **Financial Decision Making**. Englewood Cliffs, New Jersey, Prentice Hall Inc.
2. Van Horner, James C. **Financial Management and Policy**, New Delhi, Prentice Hall of India.
3. Winger, Bornard and Mohan, Nancy. **Principles of Financial Management,** New York, Macmillan Publishing Company.
4. J.C. Van Horne, **Fundamentals of Financial Management**, PHI, New Delhi.
5. Weston Brigham, **Managerial Finance**, McGraw Hill, New York
6. I.M. Pandey, **Financial Management**, Vikas Pub.House, New Delhi.
7. P. Chandra, **Financial Management**, TMH, New Delhi.
8. S.C. Kuchhal, **Financial Management**, Chaityna Publishing House, Aligarh.
9. R.M. Srivastava, **Financial Decision Making**, Himalaya Publishing House, Mumbai.

MARKETING MANAGEMENT (FT-125)

- Marketing: Concept, Nature and scope. Marketing Environment Ps of Marketing, BCG Matrix
- Marketing Information & Research, Market Segmentation and Targeting, Buying Behaviour. Understanding Consumer & Industrial Markets
- Product Decisions- Types of Product, Product mix, Product Life Cycle, New Product Development Stages, Branding and Pricing Methods, Factors Influencing Pricing Decisions, Packaging , CRM including Concept of Relationship Marketing
- Channel Management, Sales Management, Promotion Management .
- Marketing Control. Specific Marketing Issues : Rural Marketing, Retail Marketing, Marketing of E-Business, Consumerism, Globalisation, Green Marketing, Brand ; Meaning and role , Brand Building strategies.

Suggested Readings :

1. Philip Kotler, **Marketing Management Analysis**, PHI, New Delhi.
2. R.S. Davar**, Modern Marketing Management**, Universal Book Sellers, New Delhi.

3. Stanton & Futrell, **Fundamentals of Marketing**, McGraw Hill, New York.
4. McCarthy, **Basic Marketing**, Universal Book Sellers, New Delhi.
5. Ramaswamy, V.S. I, **Marketing Management : Analysis,** Planning: Implementation & Control, Macmillan, Chennai.
6. Philip Kotler & Armstrong Jr., **Principles of Marketing** : PHI, New Delhi.
7. Ramswamy V.S. & Nama Kumari, S, **Marketing Management Planning, Implementation & Control**, McMillan India Ltd.

PRODUCTION MANAGEMENT (FT-126)

- Meaning, Nature, Significance and Scope / Role / Functions of Production Management, Relationship with other Management Functions, Different Production Systems : Continuous and Mass Production Intermittent Production, Batch / Job-Shop Production
- Product Design , Plant Location, Plant Layout, .
- Production Planning and control, Capacity Planning, Scheduling and Sequencing in the Context of Continuous and Intermittent Systems. TQM & SQC.
- Materials Management -Value Analysis, Waste and Scrap Disposal, Classification and Codification, Standardisation, Variety Reduction, Material Handling, JIT.
- Work study, Methods Study, Work Measurement, Industrial Safety and Safety Management, Maintenance Management.

Suggested Readings :

1. Adam, E E & Ebert, RJ. **Production & Operation Management.**, New Delhi, PHI.
2. Paneerselvam, Production Management, PHI
3. Ashwathapa, Production & Operations Management
4. Chunawala and Patel, Production Management
5. Buffa, E.S. **Modern Production Management**, John Wiley (New York).
6. Chary S.N. **Production and Operations Management**, New Delhi, TMH.
7. Dilworth, James B. **Operations Management : Design, Planning & Control for Manufacturing & Services**, Singapore, Mc Graw Hill.

RESEARCH METHODOLOGY (FT-127)

- Concepts of Research, Scientific Approach to Research, Types of Social Science Researches.. Research Process and Planning for Research, Formulation of Research Problem,
- Research Designs – Exploratory, Descriptive and Experimental Research Designs, Sampling Design, Sources and Methods of Data Collection, Observation Design, Interviewing for Research, Formulation of Questionnaire.
- Scaling Techniques, Techniques of Data Analysis (including Statistical Techniques) like ANOVA, Awareness of Software Packages relevant to Management Researches
- Interpretation of Data and Drawing Inferences, Research Report Writing, Research Publications.
- Applications in Marketing Research with special reference to Product Research, Service Research, Advertising Research and Sales Research.

Suggested Readings :

1. Bernet, Roger : **Management Research,** ILO.
2. Kothari, C. R. Research Methodology, New Age International
3. Fowler, Floyd J.Jr., **Survey Methods**, Sage Pub.
4. Salkind, Nell J., **Exploring Research**., Prentice Hall, NJ.
5. Dwivedi, R.S. Research Methodology in Behavioural Sciences- McMillian.

BUSINESS ETHICS AND INDIAN ETHOS (FT-128)

- Ethics: Nature, Scope , Purpose , Importance of Ethics and moral Standards. Religion and ethics, Source of Ethics, Ethics and Management system ,Ethical issues and Analysis in management. Personal Framework for ethical choices, Values.

- Business Ethics: Scope , Need, Importance**,** Factors influencing Business Ethics, Ethical Theories, Morality and ethics, Valve based organization , Ethical pressure in individual in organization.
- Management Ethics: Business Ethics and society, Society expectations from business, Values for Managers, Cultural Contradictions, Spirituality and leadership,
- Ethics in Business Functions: Marketing, Finance, Human Resource and Production, Environmental Ethics, Gender issues ecological consciousness**.**
- Business Ethos: Interaction between ethos, morality and law, Characteristics, Principles and issues of Business Ethos, Social Responsibility of Business Corporate Governance and Ethics**.**

Suggested Reading

1. S.K.Chakraborty Human Response in Organisation : Towards the Indian Ethos : TMH, New Delhi.
2. J. Petrick and J. Quinn Management Ethics: Integrity at work
3. S.K. Chakraborty QWL and Managing by Human Values ― TMH, New Delhi.

Industry Based Project - II
FT- 129

Students will prepare industry based projects individually on the basis of topics allotted to them.

The Industry Based Project submitted by the students will be evaluated by the external examiner and viva will be based on the Project.

MBA - THIRD SEMESTER (Session: 2017-2018)

ORGANISATIONAL EFFECTIVENESS AND CHANGE (FT-231)

- An overview of Organisational structure, Behavioural implication of organizational structure, factors influence in designing organizational structure and job design. Organizational Effectiveness-Approaches, need and significance
- Organisational development- nature, goals, process , Diagnosis methods and intervention mechanisms
- Organizational change- need, factors, change agents, resistance and approaches to manage changes.
- Organisational conflicts – causes, nature measures to resolve organisational conflicts.
- Organisational culture and climate, organizational learning, power and politics in the organization, integration and control.

Suggested Readings

1. S. P Robbins **Organisational Theory** PHI , New Delhi
2. S.P.Robbins **Organisational Behaviour** PHI, New Delhi
3. F.Luthans , **Organisational Behaviour** TMH, New Delhi
4. R.S. Dwivedi ,**Organisational Behaviour and Human Relations** McMillan, New Delhi.
5. Uma Sekharan, **Organisational Behaviour**, TMH, New Delhi.
5. French and Bell, **Organisational Development,** PHI, New Delhi.

INTERNATIONAL BUSINESS (FT – 232)

- Basics of International trade, Trade Theories, Porter's Generic Strategies; Global Entry Strategies; Balance of Payment Instruments of trade policy; tariffs, quotas; Indias Foreign Trade policy .
- Institutional set-up for export promotion in India, salient features of the current EXIM policy . Export procedure documentation. Multinationals (MNCs) in India: Role of Multinationals in the development of developing countries, Export promotion policies.
- Problems and Prospects of Indian Businesses in abroad, Anti – Dumping Duties, regulatory framework of International Trade, Policy and Performance of export zones and EOU , Export Incentives.Foreign Investments in India: Foreign Direct Investment (FDI) and Foreign Institutional Investment(FII) .
- Export marketing : Indian and Global context; WTO: Origin of WTO, Implications of enforcement of WTO on Indian Business.
- Trade agreement pertaining to trade in goods and services ,Multilateral Environmental agreement (MEAs)..International trade blocks , NAFTA, ASEAN, SAARC, EU, WTO and dispute settlement mechanism.

Suggested Reading :

1. Francis Cherunilam, **International Business**
2. Cherunilam, **Business Environment.**
3. Bhalla, V.K. and Shivramu **International Business Environment and business , New Delhi , Anmol.**
4. Eiteman, D.K. & Stopnehill**, Multinational business Finance ,** New York Wesley
5. Subba Rao, International Business, Himalaya Publishing House

MANAGEMENT INFORMATION SYSTEMS (MIS) (FT- 233)

- Management Information System. The System Approach and System View of Business, Introduction to the Process of M.I.S. Development.
- Management Information System Design - Defining the Problem, Set System Objectives, Determining information needs, sources, Development and selection of alternative design, Gross Design, Report.
- Implementation of MIS : Stages of Implementation ; Evaluating the system , maintenance of the system ,Technology monitoring, Emerging opportunity for global buisness
- Information system for Decision Making, Basic Information System Related to Finance, Production, Marketing and Human Resources.
- MIS and Decision Making - Phases of Decision making process- Intelligence, Design & choice. Programmed V/s Non-Programmed Decisions. Expert System and Decision Support System.

Suggested Readings :

1. Robert G. Murdic Joel E, Ross, James R. Clagget, **Information Systems for Modern Management**, PHI, New Delhi.
2. Gordon B Davis,M.H. Olson, **Management Information Systems,** Prentice Hall, New Jersey.
3. Jerome Kanter, **Management Oriented Management Information System,** PHI, New Delhi.
4. N. Subramaniam, **Introduction To Computers,** Himalaya, Mumbai.
5. P.K. Sinha, **Computer Fundamentals,** BPB, New Delhi.

SPECILISATION
COMPULSORY GROUP A - MARKETING

MARKETING RESEARCH AND CONSUMER BEHAVIOUR (FT- 234)

- Marketing Research – Concept, nature, scope, significance, advantages and limitations, steps involved in marketing research.
- Research design and its types, product pricing, promotion and advertising research, marketing research in India, data collection, sources of data, data analysis and interpretation , major techniques of marketing research and report writing.
- Consumer behavior(CB) - nature , concept ,scope, CB Models, significance of consumer behaviour Consumer vs customer and consumer decision making
- Internal factors influencing consumer behaviour - life style, motivation, attitude, learning, perception and personality.
- External factors influencing buying behaviour – family, groups, social class and cultural , cognitive dissonance, diffusion of innovation.

Suggested Reading :

1. D.D. Sharma, **Marketing Research**, Himalayan Pub. , Mumbai
2. G.C. Beri , **Marketing Research,** TMH, New Delhi
3. M.N. Mishra, **Marketing Research,** Sultanchand , New Delhi.
4. Peter D. Bennet and H.H. Kes, **Consumer Behaviour**
5. Walters and Paul, **Consumer Behaviour,** McGraw Hill, New York.
6. Shiffman, L.G. & Kanuk, LL., **Consumer Behaviour,** PHI, New Delhi
7. Balckwell, Engle and Kollat, Consumer Behaviour.
8. Pal, Sumitra, Consumer behavior, S. Chand
9. Nair, Suja. Consumer behavior, Himalayan Pub. , Mumbai
10. **Solomon,** Consumer Behaviour, Pearson

SALES AND ADVERTISING MANAGEMENT (FT- 235)

- Sales Management- Meaning, Significance, Functions of Sales Manager, Recruitment, Selection, Training and Motivation of
  Sales Personnel, Role of Technology in automation of sales function.
- Sales Organization - Theory of Selling, Allocation of Sales
  Territory, Sales Forecasting , Sales budgeting, Different tools in sales promotion and their specific advantages and limitation.
- Role of Advertising in Marketing Process, Legal, Ethical and Social Aspect of advertising , advertising media, types, strategy,. media selection.
- Purchase Proposition, Unique Selling Proposition, Measuring Advertising Effectiveness, Advertising Agency and its role .
- Determination of target audience, building of advertising programme – Message, Headlines, Copy Logo, Illustration Appeal, Layout.
  Campaign Planning, Media Planning, Budgeting, Evaluation.

Suggested Reading :

1. Still, Cundiff and Govani, **Sales Management**, PHI, New Delhi.
2. Charles Futrell, **ABC of Selling,** AITBS, New Delhi.
3. Ramaswamy, **Sales Management**, Sterling, New Delhi.
4. Bellur and Bekman, **Sales Management,** Himalaya, Mumbai.
5. Manendra Mohan, **Advertising Management,** TMH, New Delhi.
6. Aaker, Batra and Myers, **Advertising Management,** Prentice Hall of India, New Delhi.
7. Norris, **Advertising Management,** Prentice Hall of India, New Delhi.
8. B.S. Rathore, **Advertising Management,** Himalaya, Mumbai.

INDUSTRIAL AND SERVICE MARKETING (FT – 236)

- Nature and Scope of Industrial Marketing; Differences between Industrial Marketing and Consumer Marketing; Nature of Demand in Industrial Markets; Industrial Buyer Behaviour, Industrial Purchasing; Market Information Systems; Segmentation & Positioning of Industrial Markets.
- Technology and the Industrial Markets; Industrial Product Decisions and Strategies, Industrial Services; Industrial Pricing; Distribution and Channel Relationships;
- Concepts, Nature, Emergence, Growth and Importance of Services, Marketing Challenges, Service Classification
- Marketing Framework for Service Business, Understandings Service Market, Services and Consumer Behaviour, Segmentation of Marketing of Services.
- Marketing Mix in Service Marketing, Advertising, Branding of Services, Relationship Marketing, Retail Marketing.

Suggested Readings :

1. Corey, E. Raymond. **Industrial Marketing** : Cases and Concepts., Englewood Cliffs, New Jersey, Prentice Hall Inc..
2. Gross, A.C. etc. **Business Marketing**, Boston, Houghton Mifflin.
4. Hill, Richard etc. **Industrial Marketing**. Homewood Illinois, Richard D. Irwin.
5. Reeder, Robert R etc. **Industrial Marketing : Analysis, Planning and Control.** Englewood Cliffs, New Jersey, Prentice Hall Inc.
5. Webster, F.E. **Industrial Marketing Strategy**, New York, John Wiley.
6. Lovelock, Christopher H. **Managing Services : Marketing Operations and Human Resources.** Englewood Cliffs, New Jersey, Prentice Hall Inc.
7. Lovelock, Christopher H. **Service Marketing.** Englewood Cliffs, New Jersey, Prentice Hall Inc.
8. McDonald, Malcom and Payne, A. **Marketing Planning for Services.** Butterworth, Heinemann.
9. Newton M P Payne, A. **The Essence of Service Marketing.** New Delhi, Prentice Hall of India.
10. Verma, H V. **Marketing of Services.** New Delhi, Global Business Press.

SPECILISATION GROUP – B

(ANY ONE GROUP IS TO BE OPTED)

FINANCE AREA

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT (FT- 237 F)

- Investment Return and Risk, Cost of Investing in Securities; Mechanics of Investing; Markets and Brokers; Investment Companies; Objectives of Security Analysis; Investment Alternatives; Valuation Theories of Fixed and Variable Income Securities.
- The Return to Risk and the Investment Decision; Derivative markets, Fundamental and Technical Analysis, Efficient Market Theory.
- Portfolio Management – An Optimum Portfolio Selection Problem, Markowitz Portfolio Theory, The Mean Variance Criterion (MVC) – The Nature of Investment Risk, MVC and Portfolio Selection, the Investment in Liquid Assets, Portfolios of Two Risky Securities, A Three Security Portfolio, The relationship between the Unleveraged and Leveraged Portfolio.
- Sharpe Single Index Model; Application of Market Model in Portfolio Construction; Capital Asset Pricing Model, Factor Models and Arbitrage Pricing Theory.
- Optimum Portfolios – Constructing the Optimum Portfolio, Portfolio Investment Process; Bond Portfolio Management Strategies; Investment Timing and Portfolio Performance Evaluation.

Suggested Readings :

1. Amling, Frederic. **Investment Englewood Cliffs**, New Jersey, PHI .
2. Bhalla, V.K. **Investment Management : Security Analysis and Portfolio Management**,New Delhi, S.Chand.
3. Fischer, Donald E. and Joardan, Ronald J. **Security Analysis and Portfolio Management,** New Delhi, PHI.
4. Alexander, Gordon J. and Sharpe, Willliam F. **Fundamentals of Investments,** Englewood Cliffs, New Jersey, Prentice Hall Inc.
5. Elton, Edwin J and Gruber, Martin J. **Modern Portfolio Theory and Investment Analysis**. New York, John Wiley.
6. Lee, Cheng F. etc. **Security Analysis and Portfolio Management**. Scott, Foresman.
7. Markowitz, Harry M. Mean. **Variance Analysis in Portfolio Choice and Capital Markets**. London, Basic Blackwell.
8. Kevin, S. Security Analysis and Portfolio Management, PHI

MANAGEMENT OF FINANCIAL SERVICES (FT- 238 F)

- Financial System and Markets; Concept, Nature and Scope of Financial Services; Regulatory Framework for Financial Services; Management of Risk in Financial Services; Stock Exchange Operations.
- Mutual Funds; Merchant Banking Services : Managing of Issue Shares and Bonds, Hire Purchase; Debt Securitization;
- Housing Finance; Credit Rating; Venture Capital, Factoring, Forfeiting and Bill Credit Discounting, Insurance.
- Evaluation of an Acquisition, Takeover and Merger, Leasing and Financial Evaluation of a Lease.
- Call Money Market, Foreign Investment : FDI, FIIs investment Strategies, New Market Instruments. Corporate Risk Management.

Suggested Readings :

1. Bhalla, V.K. **Management of Financial Services**. Anmol, New Delhi.

2. Bhalla, VK. And Dilbag, Singh. **International Financial Centres**. New Delhi, Anmol.
3. Ennew C, Trevor Watkins & Mike Wright : **Marketing of Financial Services,** Heinemann Professional Pub.
4. Gordan, E and K. Natrajan, **Emerging Scenario of Financial Services,** Himalaya Publishing House.
5. Meidan, Arthur Brennet, M. **Option Pricing : Theory & Applications**. Toronto, Lexington Books.
6. Kim, Suk and Kim, Seung. **Global Corporate Finance : Text and Cases.** Miami Florida, Kolb.
7. P.R. Agrawal, **Mutual Funds**, Orient Law Huge, Allahabad.
8. Khan M. Y. Financial Services, TMH

HUMAN RESOURCE MANAGEMENT AREA

Human Resource Development(FT –237 H)

- HRM Vs HRD, HRD Philosophy and Goals of HRD, HRD Sub-systems/Process Mechanisms , HRD Intervention Mechanism.
- Effectiveness of Training : Identifying Training Needs, Organising Training Programmes, Evaluation and Follow-up of Training, Recent Development in Training System
- Performance Appraisal & Management, Potential Appraisal & Development, Feedback and Performance Counselling,
- HRD Climate and Practices in organizations, HRD Culture, HRD Audit, HRD Culture and Climate in Indian Organisations.
- Career & succession Planning & Development, Introduction to concept and Processes of Quality Management and continuous improvement processes,

Suggested Readings :

Sungara Raju, S.M., **Total Quality Management,** New Delhi, Tata McGraw-Hill Pub.Co.Ltd.
1. Pareek and Rao, **Designing and Managing Human Resource**, **Systems,** Oxford & IBH Pub. House
2. French and Bell, **Organisation Development**, PHI, New Delhi.
3. Rao, T.V., **Recent Experiences in HRD**, New Delhi. Oxford & IBH
4. Pareek, Udai, **Evaluation of HRD**, Jaipur, Rawat Publications
5. Rao T.V., **HRD Audit**, Oxford IBH, Mumbai.

LEGAL FRAMEWORK OF HUMAN RESOURCE MANAGEMENT (FT – 238 H)

- Emergence and Objectives of Labour Laws and their impact on Socio-Economic Environment. Employees Welfare Measure.
- Social Security Measures and Laws- Workmen's Compensation Act, Employees' State Insurance Act.
- Provident Fund Act , Payment of Gratuity Act and Maternity Benefits Act.
- Wage Legislations and Bonus Act – The Law of Minimum Wages, Payment of Wages Act, Payment of Bonus Act.
- Laws Relating to Working Conditions in Factories Act, Contract Labour (R &A) Act.

Suggested Readings :

1. Ghaiye, B R, **Law and Procedure of Departmental Enquiry in Private** and Public Sector. Lucknow, Eastern Law Company.
2. Malhotra, O P. **The Law of Industrial Disputes.** Vol.I and II. Bombay, N.M. Tripathi.
3. Malik, P L. **Handbook of Industrial Law**. Lucknow, Eastern Book.
4. Saini, Debi S. **Labour Judiciary, Adjudication and Industrial Justice.** New Delhi, Oxford.
5. Saini, Debi S. **Redressal of Labour Grievances, Claims and Disputes,** New Delhi, Oxford & IBH.
6. Seth, D.D. **Industrial Dispute Act, 1947**. Vol.I & II. Bombay, N.M. Tripathi.
7. Srivastava S.C. **Industrial Relations and Labour Law.** New Delhi, Vikas.
8. N.D. Kapoor, Mercantile Law Sultan Chand and Sons, New Delhi.

SYSTEM AREA
SYSTEMS ANALYSIS AND DESIGN(FT – 237 S)

- Overview of Systems Analysis and Design; Software applications today – the changing scenarios – Introduction to different methodologies and Structured System Analysis – Problem identification – requirement analysis : tools and techniques – feasibility analysis – operational. Technical and economical feasibility – details of SDLC approach. Business Systems Concept.
- System Development Life Cycle; Project Selection; Feasibility Study. Tool for Analysis and Design of Business Systems; Methodologies Available; Need for Structured Techniques; Structured Techniques Available. System Requirement Specification and Analysis; Data Flow Diagrams; Data Dictionaries; Process Organisation and Intersections; Decision Analysis; Decision Trees and Tables.
- Expansion, Explosion and Normalization, Detailed Design; Modulation; Module Specification; File Design; Data Base Design,
- System Control and Quality Assurance; Documentation Tools. Testing Techniques Available; System Controls and Audit Trails; System Administration and Training; Conversion and Operations Plan.
- Hardware and Software Selection; Hardware Acquisition; Benchmarking, Vendor Selection, Operating System Selection, Language Processors, Performance and Acceptance Testing Criteria. Managing Data Processing in an Organisation; Data Processing Setup; Project Management Techniques for Managing Software Projects.

Suggested Readings :

1. Award. Elias M. **Systems Analysis and Design.** 2nd ed., new Delhi. PHI
2. Coad, Peter and Edward, Yourdon. **Object-Oriented Analysis**. 2nd ed., Englewood Cliff, New Jersey, yourdon Press.
3. Whitten, J.L. etc. **System Analysis and Design Methods**. New Delhi. Galgotia.
4. Marco. T.D. **Structured Analysis & System Specification,** New Delhi, Yourdon press.
5. Rajaraman, V. **Analysis and Design of Systems.** New Delhi, PHI.

RDBMS & SQL CONCEPTS (FT – 238 S)

- Database - Definition, Concepts and Developments - Traditional file Oriented approach, Need for Database, Uses of Database, Design of Database, Distributed Data Processing System.
- RDBMS : Introduction - Database and DBMS Software, Three Layered Architecture, Advantages and Disadvantages of a Database, History; Data Modeling – Object Oriented and Record Based Models, E.R. Model and E-R Diagram Examples and Exercises, Hierarchical, Network, Relational Model, Normalisation Techniques - 1st , 2nd , 3rd normal form, Examples and Exercises, E.F. Codd's 12 Rules for a relational Database.
- Database Concepts – Transaction Management, Properties of a Transaction, Commit and Rollback, Concurrency, Locking, Access Control, Data Integrity, Integrity Constraints, Auditing, Backup and Recovery; Data Dictionary – System Catelogue, Distributed Database and Distributed Data Access.
- Introduction to Client – Server and ODBC connectivity. SQL : SQL Language – DML Commands – Select, Insert, Update, Delete – retrieving data, summarizing data, adding data to the database, updating data to the database and deleting data.
- Simple queries – use of WHERE, Arithmetic, Comparison and logical operators, ORDER BY, GROUP BY and Group Functions. Multi table queries, Sub-queries, Views; DDL Commands – Table and View Create, Alter, Drop Integrity Constraints; Transaction Processing – Commit, Rollback, Save point

Suggested Readings :

1. Coleman, Pat and Peter Dyson, **Internets BPB Publication**, New Delhi.
2. Keen, Peter and Mark McDonald, **The e-Process Edge**, Delhi. Tata McGraw Hill.
3. Oberoi, Sundeep **e-Security and You**, Delhi, Tata McGraw Hill.

4. Richart, Alberto Manuel and Stephen Asbury, **Active Server Pages** 3, IDG Books, Delhi.
5. Hansen G.W. & Hansen J.V. **Data Base Management & Design,** PH, Englewood Cliff, New Jersey.
6. Hawryszkiewyca I.T. **Database Analysis & Design,** Macmillan, New York. Weldon J. Database Administration, Plenum Press, New York

TRAINING REPORT AND VIVA (FT –239)

The training report submitted by the students will be evaluated by the external examiner and viva will be based on the training report.

MBA - FOURTH SEMESTER (Session: 2017-2018)

STRATEGIC MANAGEMENT (FT – 241)

- Nature, Purpose, Importance and historical evolution of Business Policy, Concept and applications of Corporate Strategy, Strategic Management : Definition, model and process for Strategy Formulation :Ansoff growth vector.
- Strategic Intent – Vision, Mission, Purpose and Objectives,
- Environmental Analysis : External environment and orgnisational Appraisal; Environmental threat and opportunity profile; competitive advantage of a firm, Core competency, strategic advantage profile; SWOT Analysis.
- Strategic Alternatives-merger, acquisition, diversification, mordernisation, integration, joint venture, turn around. Strategic Choice- objective and subjective considerations in strategic choice; Managing Cultural Diversity; Global Entry Strategy.
- Strategic Implementation, Activating Strategies, Structural Implementation, Functional Implementation, Leadership implementation, Behavioural Implementation, Strategy Evaluation, Strategic Control, Operational Control Techniques of Strategic Evaluation and Control.

Suggested Readings :

1. Azhar Kazmi, **Business Policy & Strategic Management,** TMH, New Delhi.
2. Keen, Peter and Mark McDonald, **The e-Process Edge**, Delhi. Tata McGraw Hill.
3. P.K. Ghosh, **Business Policy-Strategic Planning and Mgmt.,** Sultan Chand and Sons, New Delhi.
4. V.P. Michael, **Business Policy and Environment,** Sultan Chand and Sons, New Delhi.
5. R.M. Srivastava, **Corporate Strategy and Planning,** Himalaya, Mumbai.
6. R. Nanjundaiah, **Strategic Planning and Business Policy,** Himalaya, Mumbai.
7. Steiner, Miner, **Management Policy and Strategy,** MacMillan, London.
8. I. Ansoff, **Strategic Management,** MacMillan, London.
9. Peters Tom. **Business School in a Box,** New York, Macmillian.
10. Hamel G. & Prahallad C.K. **Competing for the Future,** Boston, HBS Press.

RETAILING MANAGEMENT (FT – 242)

- Retailing: Nature, Scope and opportunities, Types of retailers: merchandise retailers, non-store retail formats, service retailing; types of ownership, functions of retailers; FDI and retailing in India, Emerging issues of Retailing in India different kinds

- Customer Buying Behaviour: types of buying decisions, buying process, social factors influencing buying decisions in retailing.

- Retail Market Strategy: definitions, retail planning process, financial strategy, location strategy, human resource strategy, retail MIS.

- Retail Mix Strategies: buying merchandise, pricing, retail communication mix, multi channel retailing.

- Managing the store, store layout and design, space planning, merchandise presentation techniques, store ambience, customer service

CORPORATE SOCIAL RESPONSIBILITY (FT- 243)

- Corporate Social Responsibility: Concept, Historical Evolution of CSR, Developmental Phases of CSR ,Benefits and Criticisms, CSR in Emerging Economies of the world
- National voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business: Principles for Ethics, Transparency and Accountability in business practices, Products Life Cycle Sustainability , Employees' well-being, Stakeholder Engagement, Safety of Human Rights, Environment Protection, Policy Advocacy, Inclusive Growth for all stake holders, Customer Value
- SEBI Guidelines for Corporate Social Responsibility Reporting, Provisions for CSR in Companies Act 2013: Definition, CSR Activities, CSR Committees, CSR Policy, CSR Expenditure, CSR Reporting, Display of CSR activities on its website
- Understanding the thrust areas mentioned in schedule IV of the Companies Act 2013, Understanding the practices adopted by companies with respect to CSR Committees, activities and policy
- Impact of CSR Practices on Sustainable development, Generation of Employment, Promotion of Education, Gender Equality and women empowerment, Improvement of Health services

Suggested readings

1. Sanjay K. Agarwal, Corporate Social Responsibility in India, SAGE Publications.
2. Madhumita Chatterji, Corporate Social Responsibility, Oxford University Press

MARKETING AREA (COMPULSORY)

INTERNATIONAL MARKETING (FT –244)

- Nature, Scope and Significance of International Marketing, Foreign Trade Concepts and Theories.
- Analysis of International Marketing Environment. Trends in India's Foreign Trade, Governmental Agencies in International Marketing, Export Houses.
- International Marketing Intelligence and Marketing Research, Orgnaisational Structures in Foreign Market, Managing International Marketing Communication and its Sales Force.
- Planning for Overseas Market- Product Strategy, International Product Life Cycle, Pricing Decisions, Distribution Channel Decisions: Organization of Shipping ,Chartering Practices , Marine Cargo Insurance, and Promoting Products for Exports including Fairs and Exhibitions.
- Export finance, Methods of Payment, Letter of Credit, ECGC, Brief study of International Economic Institutions – World Bank, GATT, UNCTAD,IMF etc.

Suggested Readings :

1. Bhattacharya, B. **Export Marketing : Strategies for Success**, New Delhi, Global Business Press.
2. Johri, Lalit M. **International Marketing : Strategies for Success**. University of Delhi, Faculty of Management Studies.
3. Keegan, Warren. **Global Marketing Management. Englewood Cliffs,** New Jersey, Prentice Hall Inc.
4. Onkvisit, Sak and Shaw, J.J. **International Marketing : Analysis and Strategy** : New Delhi, Prentice Hall of India.
5. Terpstra, Vern and Sarthy, R. **International Marketing**. Orlando, Dryden Press.
6. Walter, I and Murphy, T. **Handbook of International Business,** New York, John Wiley.

FINANCE AREA

INTERNATIONAL FINANCIAL MANAGEMENT (FT –245 F)

- International Financial Management: Nature, Scope and Objectives, Domestic v/s International Financial Management, Theories of International Financial Management, International Financial System and institutions.
- Types of Foreign Exchange Markets and Transactions, Quoting Foreign Exchange Rates, Spread, Cross Rates, Forward Rates, Quoting Forward Rates; Organisation of the Foreign Exchange Markets; Foreign Exchange Risk.,
- Accounting and Transaction Exposures, Theory and Practice of Forecasting Exchange Rates. Forward Contracts; Future Contracts; Other Derivative Securities; Types of Traders; Futures Markets and the use of Futures in Hedging,
- Forward and Future Prices; Interest Rate Futures; Swaps; Options Markets; Properties of Stock Option Prices; Trading Strategies Involving Options; Options on Stock Indices; Currencies and Futures Contracts; General Approach to Pricing Derivatives Securities; Interest Rate Derivative Securities; Derivatives Market in India.
- International Receivables and Inventory Management, International Investment Strategy, International Cash Management, International Financial Strategies.

Suggested Readings :

1. Abdullah, F.A. **Financial Management for the Multinational Firm.** Englewood Cliffs, New Jersey, PHI.
2. Bhalla, V.K. **International Financial Management,** New Delhi, Anmol.
3. Buckley, Adrian, **Multinational Finance,** New York, PHI.
4. Kim, Suk and Kim, Seung. **Global Corporate Finance : Text and Cases,** Miami Florida, Kolb.
5. Shapiro, Alan C. **Multinational Financial Management,** New Delhi, PHI.
6. AbP.G. Apte, **International Financial Management,** TMH, New Delhi. Shaprio, **Multinational Financial Management,** PHI, New Delhi.

PROJECT PLANNING, ANALYSIS AND MANAGEMENT (FT – 246 F)

- Generation and Screening of Project Idea; Capital Expenditure; Importance and Difficulties; Market Demand and Situational Analysis; Technical Analysis; Financial

Analysis; Analysis of Project Risk; Firm Risk and Market Risk; Social Cost Benefit Analysis.

- Multiple Projects and Constraints; Network Techniques for Project Management, Problem of Time and Cost Overrun in Public Sector Enterprises in India; Assessment of the Tax Burden; Environmental Appraisal of Projects.
- Project Finance : Project Financing in India, Infrastructure Finance Vs. Project Finance, Business and Major Players (Global and India).
- Role of FI and banks and shift in Portfolio of FI and banks, Skills required for Career in Infrastructure Finance.
- Infrastructure Projects Appraisal in a Financial Institution : Appraisal process.

Suggested Readings :

1. Ahuja, G K & Gupta, Ravi. **Systematic Approach to Income Tax,** Allahabad, Bharat Law House.
2. Bhalla, V.K.Modern **Working Capital Management,** New Delhi, Anmol.
3. Bhalla, V.K. **Financial Management and Policy,** New Delhi, Anmol.
4. Chandra, Prasanna. **Projects : Preparation, Appraisal,** Budgeting and Implementation, New Delhi, Tata Mc Graw Hill.
5. Dhankar, Raj S. **Financial Management of Public Sector Undertakings.** New Delhi, Westville.

HRM AREA

COMPENSATION MANAGEMENT (FT- 245 H)

- Wage Determination : Wage concepts; minimum fair and living wages. Process and Theories of Wage Determination, job Evaluation and Job Pricing. Machinery for wage fixation, Managerial Remuneration in India. Job Evaluation Techniques.
- Human Resource Record and Audit; Rewards, Incentives and Wage Differentials: Types of rewards and incentives; different incentive plans, Dearness Allowance and other Allowances, Fringe Benefits. Wage Differentials , Profits – Sharing , Co Partnership & Payment of Bonus with special reference to India.
- Wage and Productivity : Concept of Productivity, Productivity of Labour and payment of Wages , the level of living of Indian Workers wages and earnings of Indian worker. Problem of low productivity in the Indian workforce.
- Wage regulations in India : Salient provisions of :
  Minimum Wages Act, 1948 , Payment of Wages Act, 1936
  Payment of Bonus Act, 1965, Equal Remuneration Act, 1976
- Wage Policies in India : Concept of wage policy: Objectives, Evolution and Development of wage policy and its constraints in Indian Organisations.

Suggested Readings :

1. E.B. Flippo , **Personnel Management** , TMH
2. Decenzo and Robbins , **Human Resource Management**, PHI, New Delhi.
3. N.D. Kapoor, **Mercantile Law**, Sultan Chand & Sons.
4. A.M. Sharma ,**Compensation Management,** Himalaya Publishing House, Mumbai.
5. Dewivedi, R.S. **Personnel and Human Resource Management – An Indian Experiences,** New Delhi, Galgotia.

MANAGEMENT OF INDUSTRIAL RELATIONS (FT – 246 H)

- Industrial Relations- concept, nature, scope, objectives. Industrial Relations system, Strategic choice theory of IR. Significance of IR in liberalization and globalisation of Indian economy. National Trade Union Management.
- Trade Unionism, Problems of Indian Trade Unions. Future of Indian Trade Unionism and Related Issues, Unfair Labour Practices, Grievance – Imp, Process and Practices Handling Procedures.
- Industrial Disputes – Causes & Remedies, Settlement Machinery, Industrial Relations Legislations-Industrial Disputes Act, Trade Unions Act, Standing Orders Act.
- Collective Bargaining stages; Negotiation, Process, Collective, Bargaining in Indian Organisations. New Trends in Collective Bargaining. Disciplinary Inquiries and actions: Domestic Enquiry ,Disciplinary action;, Employee Discipline: Importance , Causes and Forms.
- Workers' Participation in Management. Emerging Trends in Industrial Relations Management, Managing Union free organizations

Suggested Readings :

1. Das,R.P. **Management of Industrial Relations,** Varanasi, MTC.2002.
2. Kochan, T.A. and Katz Henry. **Collective Bargaining and IR,** Homewood Illinois Richard D. Irish.
3. Mamkoottam, K.Trade Unionism. **Myth and Reality.** New Delhi, Oxford University Press.
4. Niland J R etc. **The Future of Industrial Relations.** New Delhi, Sage.
5. Ramaswamy, E.A. **The Rayon Spinners The Strategic Management of Industrial Relations.** New Delhi, Oxford University Press.
6. Virmani, B.R. **Participative Management vs. Collective Bargaining .** New Delhi, Vision Books, Webb, Sidney & Webb, Beadtrice. Industrial Democracy. Melbourne, Longman.
7. **Modern Labour Law and IR**, Srikanta Mishra, Sultan Chand & Sons, New Delhi.
8. Dwivedi, R.S. **Industrial Relations**, Galgatia, New Delhi,
9. Monappa,Arun, **Industrial Relations**, TMH, New Delhi

SYSTEM AREA

BUSINESS PROCESS RE-ENGINEERING & ERP (FT – 245 S)

- Conceptual Foundation of Business Process Re-engineering; Role of Information Technology in BPR; Process Improvement and Process Redesign; BPR Experiences in Indian Industry;
- Process Identification and Mapping; Role/Activity Diagrams; Process Visioning and Benchmarking. Business Process Improvement. Business Process Redesign; Man Management for BPR Implementation; Re-organizing People and Managing Change.

- Enterprise Resources Planning : Evolution of ERP-MRP and MRP II problems of system islands need for system integration and interface early ERP Packages
- ERP products and Markets – Opportunities and problems in ERP selection and implementation; ERP implementation : identifying ERP benefits team formation – Consultant intervention-Selection ERP – Process of ERP
- E-Business : Introduction to 1 – Net technologies – Evolution of E-commerce, EDI and E-Business, Security and Privacy Issues – technologies for E-Business, Future and Growth of E-Business.

Suggested Readings :

1. Carr, D K and Johansson, H J. **Best Practices in Re-engineering**. New York, McGraw Hill.
2. Champy, James, **Re-engineering Management : The Mandate for New Leadership.** London, Harper Collins.
3. Coulson-Thomas, **C.Business Process Re-engineering : Myth & Reality.** London, Kogan Page.
4. Hammer, Michael. **Re-engineering the Corporation : A Menifesto for Business Revolution**. London, Nicholas Brealey.
5. Jayaraman, M S. et al. **Business Process Re-engineering.** New Delhi, Tata McGraw Hill.
6. Hammer, Micheal and Jamts Chamby, **Reengineering the Corporation.**
7. Ptak, Carol A. & Eli Schragenheim, **ERP**, St. Lucie Press, New York.

FUNDAMENTALS OF COMPUTER ARCHITECTURE (FT – 246 S)

- Fundamental of Data Processing and Input/Output
  Fundamental of OS, Types of OS-Batch, Time Sharing, Parallel, Real time, Networks, Client Server
- File Systems, Directory .Structure, Process Management, Switching, Scheduling
- Memory Management, Swapping, Segmentation, Paging, Virtual Memory
- Multi-programming and Multitasking System
- Parallel Processing, Virtual Storage, Open Systems

Suggested Readings :

1. Leon and Leon **, Fundamentals of IT**
2. Rajaramana , **Fundamentals of Computers**

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MPhil (Management)

SYLLABUS

M.Phil in Management (One Year)

Session : 2017-18

INSTITUTE OF MANAGEMENT

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

One Year M. Phil in Management (full time) programme

COURSE STRUCTURE

		MARKS
		Total
101	Organisation System and Structure	100
102	Corporate Evolution and Business Strategy	100
103	Research Methodology	100
104	**Dissertation and Viva**	**300**
		600

Note :

1. The scheme of the mark will be as per the relevant M.Phil ordinance of Pt. R.S. University, Raipur.
2. Research report has to be an empirical work. It is to be started from the beginning of the M.Phil Programme. A student before preparation the final dissertation has to make two presentations based on empirical work related to his area of interest. The topics of the research project is to be finalized with the consultation of the faculty guide, which has to be approved by the Director of the Institute in a seminar presentation.

ORGANIZATION SYSTEM AND STRUCTURE
(101)

- Organization – a conceptual overview- meaning, nature, forms functions and importance, principles of sound organization in brief, Theories in organization.
- The process of organizing various forms of organizational structures – Their relative strengths and weaknesses, suitability. Departmention, span of management, delegation and decentralization.
- Organizational development, organizational climate, organizational change, organizational effectiveness.
- Managing organizational change , group dynamics –managing organizational conflicts, Inter personal and organization communication.
- Organizing in the 21st century. Contingency design, the Burns and Stalker model, the Lawrence reengineered organizations. Changing shape of organization, Learing organization.

Suggested Readings :

1. Essentials of Management, Harold Korntz and Heinz Weihrich, TMH Edn.
2. Management, Stoner & Freeman. PHI.
3. Management, Robert Kreitner, AITBS.

CORPORATE EVOLUTION & BUSINESS STRATEGY
(102)

- Corporate Evaluation and provision strategy, Nature scope SM, Strategic Intent, Core competence, Capability for organizational learning, Process of strategic planning & Implementation Strategy, structure, Organizational values & Impact on strategy,

- Power game among competing players, Turnaround management, strategic change
- Strategic management in an international firm. Developing Strategic leader and strategic culture
- Tools of ethics- Management style assessment, qualitative decision making tools Ethics and integrity, Future of value based Management- trends in governance practices, comparative study of governance practices in major countries

- Merger & acquisition strategy and corporate evolution in Indian context, Strategic Evolution and control

Suggested Readings :

7. Stoner and Freeman, **Management,** Prentice Hall, N. Delhi.
8. Koontz, O' Donnell Wechrich, **Principles of Management**, McGraw Hill, New York.
9. Peter F. Drucker, **The Practice of Management,** Allied Publishers.
10. Azhar Kazmi, **Business Policy & Strategic Management,** TMH, New Delhi.
11. Keen, Peter and Mark McDonald, **The e-Process Edge**, Delhi. Tata McGraw Hill.
12. P.K. Ghosh, **Business Policy-Strategic Planning and Mgmt.**, Sultan Chand and Sons, New Delhi.
13. V.P. Michael, **Business Policy and Environment,** Sultan Chand and Sons, New Delhi.
14. R.M. Srivastava, **Corporate Strategy and Planning,** Himalaya, Mumbai.
15. R. Nanjundaiah, **Strategic Planning and Business Policy,** Himalaya, Mumbai.
16. Steiner, Miner, **Management Policy and Strategy,** MacMillan, London.

17. I. Ansoff, **Strategic Management,** MacMillan, London.
18. Peters Tom. **Business School in a Box,** New York, Macmillian.
19. Hamel G. & Prahallad C.K. **Competing for the Future,** Boston, HBS Press.

RESEARCH METHODOLOGY
(103)

- Concepts of Research, Scientific Approach to Research, Types of Social Science Researches.. Research Process and Planning for Research, Formulation of Research Problem,
- Research Designs – Exploratory, Descriptive and Experimental Research Designs, Sampling Design, Sources and Methods of Data Collection, Observation Design, Interviewing for Research, Formulation of Questionnaire.
- Techniques of Data Analysis, Parametric and non-parametric test, Awareness of Software Packages relevant to Management Researches
- Interpretation of Data and Drawing Inferences
- Research Report Writing, Research Publications.

Suggested Readings :

- Andrews, F.M. and S.B. Withey, **Social Indicators of Well Being,** Plenum Press, NY.
- Bernet, Roger : **Management Research,** ILO.
- Fowler, Floyd J.Jr., **Survey Methods,** Sage Pub.
- Fox,J.A. and P.E. Tracy : **Randomized Responses : A Method of Sensitive Surveys,** Sage Pub.
- Gupta S.P., **Statistical Methods,** Sultan Chand, New Delhi.
- Golden, Biddle, Koren and Karen D. Locke, **Comprising Qualitative Research,** Sage Publication.
- Salkind, Nell J., **Exploring Research.,** Prentice Hall, NJ.
- Dwivedi, R.S. Research Methodology in Behavioural Sciences- McMillian.

Dissertation
(104)

Pre-Ph.D. Course Work Syllabus (Session 2017-18)

Research Methodology (101)

Unit 1

- Concepts of Research, Research Process and Planning for Research, Formulation of Research Problem.

Unit 2

- Research Designs – Exploratory, Descriptive and Experimental Research Designs, Sampling Design.

Unit 3

- Hypothesis Testing: Parametric and Non-Parametric Tests, Data Analysis.

Unit 4

- Interpretation of Data and Drawing Inferences, Report Writing, Plagiarism and its prevention, Ethical issues in Social Sciences Research, Ethical Clearance. Nuances in publishing process in academic journals: Citation Index, h-Index, i10-Index, JIF and Journal Metrics.

Unit 5

- Basic knowledge of Microsoft Word, Excel, Power Point, Internet Resources, Use of SPSS.

Review of Literature and Seminar (102)

1. Project based on review of research work: use of literature, knowledge of national and International Journals, Impact factor, Citation index, SCI Journals. (To be supervised and evaluated by Guide concerned).

2. Seminars; Open seminar, evaluation will be done by member of DRC.

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-I)

2017-18 & Onward

There shall be five papers. Each paper shall have 100 marks. **Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (I)	80	20	-	100
II	Real Analysis (I)	80	20	--	100
III	Topology	80	20	--	100
IV	Advanced Complex Analysis (I)	80	20	--	100
V	Advanced Discrete Mathematics (I)	80	20	--	100

M.Sc./M.A. Course (First Semester)
PAPER -I

Advanced Abstract Algebra (I)

Max. Marks 80

Unit-I Groups - Normal and Subnormal series. Composition series. Jordan-Holder theorem. Solvable groups. Nilpotent groups.

Unit-II Field theory- Extension fields. Algebraic and transcendental extensions. Separable and inseparable extensions. Normal extensions.

Unit-III Perfect fields. Finite fields. Primitive elements. Algebraically closed fields.

Unit-IV Automorphisms of extensions. Galois extensions. Fundamental theorem of Galois theory.

Unit-V Solution of polynomial equations by radicals. Insolvability of the general equation of degree 5 by radicals.

Books Recommended:

1. P.B.Bhattacharya, S.K.Jain, S.R.Nagpaul: Basic Abstract Algebra, Cambridge University press
2. I.N.Herstein: Topics in Albegra, Wiley Eastern Ltd.
3. Vivek Sahai and Vikas Bist: Algebra, Narosa Publishing House, 1999.

References

1. M.Artin, Algeabra, Prentice -Hall of India, 1991.
2. P.M. Cohn, Algebra,Vols. I,II &III, John Wiley & Sons, 1982,1989,1991.
3. N.Jacobson, Basic Algebra, Vols. I , W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S.Lang, Algebra, 3rd edition, Addison-Wesley, 1993.
5. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.l-1996,Vol. II-1999)
6. D.S.Malik, J.N.Mordeson, and M.K.Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition,1997.
7. Quazi Zameeruddin and Surjeet Singh : Modern Algebra
8. I. Stewart, Galois theory, 2nd edition, chapman and Hall, 1989.
9. J.P. Escofier, Galois theory, GTM Vol.204, Springer, 2001..
10. Fraleigh , A first course in Algebra Algebra, Narosa,1982.

M.Sc./M.A. Course (First Semester)
PAPER-II

Real Analysis (I)

Max. Marks 80

Unit-I Sequences and series of functions, pointwise and uniform convergence, Cauchy criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence, uniform convergence and continuity, definition and simple properties of Riemann-Stieltjes integral, uniform convergence and Riemann-Stieltjes integration, uniform convergence and differentiation, Weierstrass approximation theorem.

Unit-II Power series, uniqueness theorem for power series, Abel's and Tauber's theorems. Rearrangements of terms of a series, Riemann's theorem.

Unit-III Functions of several variables, linear transformations, Derivatives in an open subset of R^n, Chain rule, Partial derivatives, interchange of the order of differentiation, Derivatives of higher orders, Taylor's theorem, Inverse function theorem, Implicit function theorem.

Unit-IV Jacobians, extremum problems with constraints, Lagrange's multiplier method, Differentiation of integrals.

Unit-V Partitions of unity, Differential forms, Stoke's theorem.

Recommended Books:

1. Principle of Mathematical Analysis By Walter Rudin (3rd edition) McGraw-Hill, Kogakusha, 1976, International student edition.
2. Real Analysis By H.L.Roydon, Macmillan Pub.Co.Inc.4th Edition, New York .1962.

References

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi,1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar,Inc. New York,1975.

3. A.J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co.,Inc.,1968.
4. G.de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
6. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I.P. Natanson, Theory of Functions of a Real Variable. Vol. l, Frederick Ungar Publishing Co., 1961.
8. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc.1977.
9. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
10. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
11. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
12. T.G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
13. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
14. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
15. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
16. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.
17. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing Co.Ltd. New Delhi, 1966.

M.Sc./M.A. Course (First Semester)
PAPER-III

Topology

Max. Marks 80

Unit-I Countable and uncountable sets. Infinite sets and the Axiom of Choice. Cardinal numbers and its arithmetic. Schroeder-Bernstein theorem. Cantor's theorem and the continuum hypothesis. Zorn's lemma, well-ordering theorem. Definition and examples of topological spaces. Closed sets. Closure. Dense subsets. Neighbourhoods. Interior, exterior and boundary. Accumulation points and derived sets. Bases and sub-bases. Subspaces and relative topology.

Unit-II Alternate methods of defining a topology in terms of terms of Kuratowski Closure Operator and Neighbourhood Systems. Continuous functions and homeomorphism. First and Second Countable spaces. Lindelof's theorems. Separable spaces. Second countability and separability.

Unit-III Separation axioms; their Characterizations and basic properties. Urysohn's lemma, Tietze extension theorem.

Unit-IV Compactness. Continuous functions and compact sets. Basic properties of Compactness. Compactness and finite intersection property. Sequentially and countably compact sets. Local compactness and one point compactification. Stone-Cech compactification.

Unit-V Compactness in metric spaces. Equivalence of compactness, countable compactness and sequential compactness in metric space. Connected spaces. Connectedness on the real line. Components. Locally connected spaces.

Recommended Books:

1. James R.Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi,2000.
2. K.D.Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.

References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F.Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J.Hocking and G Young, Topology, Addison-Wiley Reading, 1961.
4. J.L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York,1995.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W.Thron, Topologically Structures, Holt, Rinehart and Winston, New York,1966.
7. N. Bourbaki, General Topology Part I (Transl.),Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York,1964.
10. E.H.Spanier, Algebraic Topology, McGraw-Hill, New York,1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W.Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day,Inc.1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M.J. Mansfield, Introduction to Topology, D.Van Nostrand Co. Inc.Princeton,N.J.,1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston,1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York,1963.
18. S.S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z.P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd.,Groningen, 1963.
20. K. K. Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

M.Sc./M.A. Course (First Semester)
PAPER-IV

Complex Analysis (I)

Max. Marks 80

Unit-I Complex integration, Cauchy-Goursat. Theorem. Cauchy's integral formula. Higher order derivatives. Morera's Theorem. Cauchy's inequality and Liouville's theorem. The fundamental theorem of algebra. Taylor's theorem. Laurent's series. Isolated singularities. Meromorphic functions.

Unit-II Maximum modulus principle. Schwarz lemma. The argument principle. Rouche's theorem Inverse function theorem.

Unit-III Residues. Cauchy's residue theorem. Evaluation of integrals. Branches of many valued functions with special reference to arg z, logz and z^a.

Unit-IV Bilinear transformations, their properties and classifications. Definitions and examples of Conformal mappings.

Unit-V Spaces of analytic functions. Hurwitz's theorem. Montel's theorem Riemann mapping theorem.

Recommended Books:

1. Complex Analysis By L.V.Ahlfors, McGraw - Hill, 1979.
2. J.B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House,1980.

References

1. H.A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Complex Function Theory By D.Sarason
3. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
4. S. Lang, Complex Analysis, Addison Wesley, 1977.
5. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.
6. Mark J.Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.
7. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
8. W.H.J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D.Van Nostrand Co., 1967.

9. C.Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
10. M.Heins, Complex Function Theory, Academic Press, 1968.
11. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
12. S.Saks and A.Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
13. E.C Titchmarsh, The Theory of Functions, Oxford University Press, London.
14. W.A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
15. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.

M.Sc./M.A. Course (First Semester)

PAPER-V

Advanced Discrete Mathematics (I)

Max. Marks 80

Unit-I Formal Logic-Statements. Symbolic Representation and Tautologies. Quantifiers, Predicates and Validity. Propositional Logic. Semigroups & Monoids-Definitions and Examples of Semigroups and monoids (including those pertaining to concatenation operation).

Unit-II Homomorphism of semigroups and monoids. Congruence relation and Quotient Semigroups. Subsemigroup and submonoids. Direct Products. Basic Homomorphism Theorem.

Unit-III Lattices-Lattices as partially ordered sets. Their properties. Lattices as Algebraic Systems. Sublattices, Direct products, and Homomorphisms. Some Special Lattices e.g., Complete, Complemented and Distributive Lattices. Boolean Algebras-Boolean Algebras as Lattices. Various Boolean Identities. The Switching Algebra example. Subalgebras,

Unit-IV Direct Products and Homomorphisms. Join-Irreducible elements, Atoms and Minterms. Boolean Forms and Their Equivalence. Minterm Boolean Forms, Sum of Products Canonical Forms. Minimization of Boolean Functions. Applications of Boolean Algebra to Switching Theory (using AND,OR & NOT gates). The Karnaugh Map Method.

Unit-V Grammars and Languages-Phrase-Structure Grammars. Rewriting Rules. Derivations. Sentential Forms. Language generated by a Grammar. Regular, Context-Free, and Context Sensitive Grammars and Languages. Regular sets, Regular Expressions and the Pumping Lemma. Kleene's Theorem. Notions of Syntax Analysis, Polish Notations. Conversion of Infix Expressions to Polish Notations. The Reverse Polish Notation.

Recommended Books:

1. Elements of Discrete Mathematics By C.L.Liu
2. J.P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.

References

1. J.L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
2. Seymour Lepschutz, Finite Mathematics (International) edition (1983), McGraw-Hill Book Company, New York.
3. S.Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
4. J.E. Hopcroft and J.D Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
5. C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
6. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India
7. K.L.P.Mishra and N.Chandrashekaran, Theory of Computer Science PHI(2002)

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-II)

2017-18 & Onward

There shall be five theory papers. Each paper shall have 100 marks. **Overall tally of marks will be 500.**

Paper	Description	Theory	Sessional	Practical	Total Marks
I	Advanced Abstract Algebra (II)	80	20	-	100
II	Real Analysis (II)	80	20	--	100
III	General and Algebraic Topology	80	20	--	100
IV	Advanced Complex Analysis (II)	80	20	--	100
V	Advanced Discrete Mathematics (II)	80	20	--	100

M.Sc./M.A. Course (Second Semester)
PAPER-I
Advanced Abstract Algebra (II)

Max. Marks 80

Unit-I Modules - Cyclic modules. Simple modules. Semi-simple modules. Schuler's Lemma. Free modules. Noetherian and artinian modules and rings-Hilbert basis theorem. Wedderburn Artin theorem. Uniform modules, primary modules, and Noether-Lasker theorem.

Unit-II Linear Transformations - Algebra of linear transformation, characteristic roots, matrices and linear transformations.

Unit-III Canonical Forms - Similarity of linear transformations. Invariant subspaces. Reduction to triangular forms. Nilpotent transformations. Index of nilpotency. Invariants of a nilpotent transformation. The primary decomposition theorem. Jordan blocks and Jordan forms.

Unit-IV Smith normal form over a principal ideal domain and rank. Fundamental structure theorem for finitely generated modules over a Principal ideal domain and its applications to finitely generated abelian groups.

Unit-V Rational canonical from. Generalised Jordan form over any field.

Books Recommended:

1. P.B.Bhattacharya, S.K.Jain, S.R.Nagpaul : Basic Abstract Algebra, Cambridge University press
2. I.N.Herstein : Topics in Albegra, Wiley Eastern Ltd.
3. Quazi Zameeruddin and Surjeet Singh : Modern Algebra

References

1. M.Artin, Algeabra, Prentice -Hall of India, 1991.
2. P.M. Cohn, Algebra,Vols. I,II &III, John Wiley & Sons, 1982,1989,1991.
3. N.Jacobson, Basic Algebra, Vols. I & II,W.H. Freeman, 1980 (also published by Hindustan Publishing Company).
4. S.Lang, Algebra, 3rd edition, Addison-Wesley, 1993.

5. I.S. Luther and I.B.S. Passi, Algebra, Vol. I-Groups, Vol.II-Rings, Narosa Publishing House (Vol.l-1996,Vol. II-1999)
6. D.S.Malik, J.N.Mordeson, and M.K.Sen, Fundamentals of Abstract Algebra, Mc Graw-Hill, International Edition,1997.
7. K.B. Datta, Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi,2000.
8. S.K.Jain,A. Gunawardena and P.B Bhattacharya, Basic Linear Algebra with MATLAB, Key College Publishing (Springer-Verlag),2001.
9. S.Kumaresan, Linear Algebra, A Geometric Approach, Prentice-Hall of India, 2000.
10. Vivek Sahai and Vikas Bist, Algebra, Narosa Publishing House, 1999.
11. I. Stewart, Galois theory, 2nd edition, chapman and Hall, 1989.
12. J.P. Escofier, Galois theory, GTM Vol.204, Springer, 2001.
13. T.Y. Lam, lectures on Modules and Rings, GTM Vol. 189, Springer-Verlag,1999.
14. D.S. Passman, A Course in Ring Theory, Wadsworth and Brooks/Cole Advanced Books and Softwares, Pacific groves. California, 1991.
15. Fraleigh , A first course in Algebra Algebra, Narosa,1982.

M.Sc./M.A. Course (Second Semester)
PAPER-II

Real Analysis (II)

Max. Marks 80

Unit-I Definition and existence of Riemann-Stieltjes integral, Properties of the Integral, integration and differentiation, the fundamental theorem of Calculus, integration of vector-valued functions, Rectifiable curves.

Unit-II Lebesgue outer measure. Measurable sets. Regularity. Measurable functions. Borel and Lebesgue measurability. Non-measurable sets. Integration of Non-negative functions. The General integral. Integration of Series.

Unit-III Measures and outer measures, Extension of a measure. Uniqueness of Extension. Completion of a measure. Measure spaces. Integration with respect to a measure. Reimann and Lebesgue Integrals.

Unit-IV The Four derivatives. Lebesgue Differentiation Theorem. Differentiation and Integration.

Unit-V Functions of Bounded variation. The L^p-spaces. Convex functions. Jensen's inequality. Holder and Minkowski inequalities. Completeness of L^p, Convergence in Measure, Almost uniform convergence.

Recommended Books:

1. Principle of Mathematical Analysis by W. Rudin
2. Real Analysis by H. L. Roydon

References

1. T.M. Apostol, Mathematical Analysis, Narosa Publishing House, New Delhi,1985.
2. Gabriel Klambauer, Mathematical Analysis, Marcel Dekkar,Inc. New York,1975.
3. A.J. White, Real Analysis; an introduction, Addison-Wesley Publishing Co.,Inc.,1968.
4. G.de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
5. E. Hewitt and K. Stromberg. Real and Abstract Analysis, Berlin, Springer, 1969.
6. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited Published, New Delhi, 1986 Reprint 2000).
7. I.P. Natanson, Theory of Functions of a Real Variable. Vol. l, Frederick Ungar Publishing Co., 1961.

9. Richard L. Wheeden and Antoni Zygmund, Measure and Integral: An Introduction to Real Analysis, Marcel Dekker Inc.1977.
10. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
11. A. Friedman, Foundations of Modern Analysis, Holt, Rinehart and Winston, Inc., New York, 1970.
12. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
13. T.G. Hawkins, Lebesgue's Theory, of Integration: Its Origins and Development, Chelsea, New York, 1979.
14. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
15. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
16. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1969.
17. Inder K. Rana, An Introduction to Measure and Integration, Norosa Publishing House, Delhi, 1997.

M.Sc./M.A. Course (Second Semester)
PAPER-III

General and Algebraic Topology

Max. Marks 80

Unit-I Tychonoff product topology in terms of standard sub-base and its characterizations. Projection maps. Separation axioms.

Unit-II Product spaces. Connectedness and product spaces. Compactness and product spaces (Tychonoff's theorem). Countability and product spaces.

Unit-III Embedding and metrization. Embedding lemma and Tychonoff embedding. The Urysohn metrization theorem. Metrization theorems and Paracompactness-Local finiteness. The Nagata-Smirnov metrization theorem. Paracompactness. The Smirnov metrization theorem.

Unit-IV Nets and filter. Topology and convergence of nets. Hausdorffness and nets. Compactness and nets. Filters and their convergence. Canonical way of converting nets to filters and vice-versa. Ultra-filters and Compactness.

Unit-V The fundamental group and covering spaces-Homotopy of paths. The fundamental group. Covering spaces. The fundamental group of the circle and the fundamental theorem of algebra

Recommended Books:

1. James R.Munkres, Topology, A First Course, Prentice Hall of India Pvt. Ltd., New Delhi,2000.
2. K.D.Joshi, Introduction to General Topology, Wiley Eastern Ltd., 1983.

References

1. J. Dugundji, Topology, Allyn and Bacon, 1966 (reprinted in India by Prentice Hall of India Pvt. Ltd.).
2. George F.Simmons, Introduction to Topology and modern Analysis, McGraw-Hill Book Company, 1963.
3. J.Hocking and G Young, Topology, Addison-Wiley Reading, 1961.
4. J.L. Kelley, General Topology, Van Nostrand, Reinhold Co., New York,1995.
5. L. Steen and J. Seebach, Counter examples in Topology, Holt, Rinehart and Winston, New York, 1970.
6. W.Thron, Topologically Structures, Holt, Rinehart and Winston, New York,1966.

7. N. Bourbaki, General Topology Part I (Transl.),Addison Wesley, Reading, 1966.
8. R. Engelking, General Topology, Polish Scientific Publishers, Warszawa, 1977.
9. W. J. Pervin, Foundations of General Topology, Academic Press Inc. New York,1964.
10. E.H.Spanier, Algebraic Topology, McGraw-Hill, New York,1966.
11. S. Willard, General Topology, Addison-Wesley, Reading, 1970.
12. Crump W.Baker, Introduction to Topology, Wm C. Brown Publisher, 1991.
13. Sze-Tsen Hu, Elements of General Topology, Holden-Day,Inc.1965.
14. D. Bushaw, Elements of General Topology, John Wiley & Sons, New York, 1963.
15. M.J. Mansfield, Introduction to Topology, D.Van Nostrand Co. Inc.Princeton,N.J.,1963.
16. B. Mendelson, Introduction to Topology, Allyn & Bacon, Inc., Boston,1962.
17. C. Berge, Topological Spaces, Macmillan Company, New York,1963.
18. S.S. Coirns, Introductory Topology, Ronald Press, New York, 1961.
19. Z.P. Mamuzic, Introduction to General Topology, P. Noordhoff Ltd.,Groningen, 1963.
20. K.K.Jha, Advanced General Topology, Nav Bharat Prakashan, Delhi.

M.Sc./M.A. Course (Second Semester)
PAPER-IV

Advanced Complex Analysis (II)

Max. Marks 80

Unit-I Weierstrass' factorisation theorem. Gamma function and its properties. Riemann Zeta function. Riemann's functional equation. Runge's theorem. Mittag-Leffler's theorem.

Unit-II Analytic Continuation. Uniqueness of direct analytic continuation. Uniqueness of analytic continuation along a curve. Power series method of analytic continuation Schwarz Reflection Principle. Monodromy theorem and its consequences.

Unit-III Harmonic functions on a disk. Harnack's inequality and theorem. Dirichlet Problem. Green's function.

Unit-IV Canonical products. Jensen's formula. Poisson-Jensen formula. Hadamard's three circles theorem. Order of an entire function. Exponent of Convergence. Borel's theorem. Hadamard's factorization theorem.

Unit-V The range of an analytic function. Bloch's theorem. The Little Picard theorem. Schottky's theorem. Montel Caratheodory and the Great picard theorem. Univalent functions. Bieberbach's conjecture (Statement only) and the "1/4-theorem.

Recommended Books:

1. L.V. Ahlfors, Complex Analysis, MCGraw - Hill, 1979.
3. J.B. Conway, Functions of one Complex variable, Springer-Verlag, International student-Edition, Narosa Publishing House,1980.

References

1. H.A. Priestly, Introduction to Complex Analysis, Clarendon Press, Oxford 1990.
2. Liang-shin Hahn & Bernard Epstein, Classical Complex Analysis, Jones and Bartlett Publishers International, London, 1996.
3. S. Lang, Complex Analysis, Addison Wesley, 1977.
4. Mark J.Ablowitz and A.S. Fokas, Complex Variables: Introduction and Applications, Cambridge University press, South Asian Edition, 1998.

5. E. Hille, Analytic Function Theory (2 Vols.) Gonn & Co., 1959.
6. W.H.J. Fuchs, Topics in the Theory of Functions of one Complex Variable, D.Van Nostrand Co., 1967.
7. C.Caratheodory, Theory of Functions (2 Vols.) Chelsea Publishing Company, 1964.
8. M.Heins, Complex Function Theory, Academic Press, 1968.
9. Walter Rudin, Real and Complex Analysis, McGraw-Hill Book Co., 1966.
10. S.Saks and A.Zygmund, Analytic Functions, Monografic Matematyczne, 1952.
11. E.C Titchmarsh, The Theory of Functions, Oxford University Press, London.
12. W.A. Veech, A Second Course in Complex Analysis, W.A. Benjamin, 1967.
13. S.Ponnusamy, Foundations of Complex Analysis, Narosa Publishing House, 1997.
14. D. Sarason, Complex Function Theory, Hindustan Book Agency, Delhi, 1994.

M.Sc./M.A. Course (Second Semester)
PAPER-V

Advanced Discrete Mathematics (II)

Max. Marks 80

Unit-I Graph Theory-Definition of (Undirected) Graphs, Paths, Circuits, Cycles, & Subgraphs. Induced Subgraphs. Degree of a vertex. Connectivity. Planar Graphs and their properties. Trees. Euler's Formula for connected planar Graphs. Complete & Complete Bipartite Graphs. Kuratowski's Theorem (statement only) and its use.

Unit-II Spanning Trees, Cut-sets, Fundamental Cut -sets, and Cycle. Minimal Spanning Trees and Kruskal's Algorithm. Matrix Representations of Graphs. Euler's Theorem on the Existence of Eulerian Paths and Circuits. Directed

Unit-III Graphs. In degree and Out degree of a Vertex. Weighted undirected Graphs. Dijkstra's Algorithm.. strong Connectivity & Warshall's Algorithm. Directed Trees. Search Trees. Tree Traversals.

Unit-IV Introductory Computability Theory-Finite State Machines and their Transition Table Diagrams. Equivalence of finite State Machines. Reduced Machines. Homomorphism.

Unit-V Finite Automata. Acceptors. Non-deterministic Finite Automata and equivalence of its power to that of Deterministic Finite Automata. Moore and mealy Machines. Turing Machine and Partial Recursive Functions.

Recommended Books:

1. Elements of Discrete Mathematics By C.L.Liu
2. Graph Theory and its application By N.Deo
3. Theory of Computer Science By K.L.P.Mishra and N.Chandrashekaran

References

1. J.P. Tremblay & R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw-Hill Book Co., 1997.
2. J.L. Gersting, Mathematical Structures for Computer Science, (3rd edition), Computer Science Press, New York.
3. Seymour Lepschutz, Finite Mathematics (International) edition 1983), McGraw-Hill Book Company, New York.

4. S.Wiitala, Discrete Mathematics-A Unified Approach, McGraw-Hill Book Co.
5. J.E. Hopcroft and J.D Ullman, Introduction to Automata Theory, Languages & Computation, Narosa Publishing House.
6. C.L Liu, Elements of Discrete Mathematics, McGraw-Hill Book Co.
7. N. Deo. Graph Theory with Application to Engineering and Computer Sciences. Prentice Hall of India.

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-III)

2017-18 & Onward

There shall be five theory papers. Two compulsory and three optional. Each paper shall have 100 marks. Out of these five papers, the paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper		Description	Theory	Sessi-onal	Practi cal	Remark
Compulsory Papers						
I		Integration Theory and Functional Analysis (I)	80	20	--	--
II		Partial Differential Equations & Mechanics (I)	80	20	--	--
Optional Papers						
III	A	Fundamentals of Computer Science (Object Oriented Programming and Data Structure)	70	--	30	For regular students only
	B	General Relativity and Cosmology (I)	80	20	--	--
	C	Fuzzy Set Theory & Its Applications (I)	80	20	--	--
	D	Mathematical Biology (I)	80	20	--	--
IV	A	Operations Research (I)	80	20	--	--
	B	Wavelets (I)	80	20	--	--
V	A	Programming in C (with ANSI Features) (I)	70	--	30	For regular students only
	B	Graph Theory (I)	80	20	--	--
	C	Algebraic Number Theory (I)	80	20	--	--

M.Sc./M.A. Course (Third Semester)

PAPER -I

Integration Theory and Functional Analysis (I)

Max. Marks 80

Integration Theory:

Unit-I Signed measure. Hahn decomposition theorem, mutually singular measures. Radon-Nikodym theorem. Labesgue decomposition. Riesz representation theorem. Extension theorem (Caratheodory).

Unit-II Lebesgue-Stieltjes integral, product measures, Fubini's theorem. Differentiation and Integration. Decomposition into absolutely continuous and singular parts.

Unit-III Baire sets. Baire measure, continuous functions with compact support. Regularity of measures on locally compact spaces. Integration of continuous functions with compact support, Riesz-Markoff theorem.

Functional Analysis :

Unit-IV Normed linear spaces. Banach spaces and examples. Quotient space of normed linear spaces and its completeness, equivalent norms. Riesz Lemma, basic properties of finite dimensional normed linear spaces and compactness.

Unit-V Weak convergence and bounded linear transformations, normed linear spaces of bounded linear transformations, dual spaces with examples.

Books Recommended :

1. P.R. Halmos, Measure Theory, Van Nostrand, Princeton, 1950.
2. B.Choudhary and S.Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
3. H.L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4'h Edition, 1993.

References

1. S.K. Berberian, Measure and integration, Chelsea Publishing Company, New York, 1965.
2. G. de Barra, Measure Theory and Integration, Wiley Eastern Limited, 1981.
3. P.K. Jain and V.P. Gupta, Lebesgue Measure and Integration, New Age International (P) Limited, New Delhi, 2000.
4. Richard L. Wheeden and Antoni Zygmund, Measure and Integral : An Introduction to Real Analysis, Marcel Dekker Inc. 1977.
5. J.H. Williamson, Lebesgue Integration, Holt Rinehart and Winston, Inc. New York. 1962.
6. T.G. Hawkins, Lebesgue's Theory of Integration: Its Origins and Development, Chelsea, New York, 1979.
7. K.R. Parthasarathy, Introduction to Probability and Measure, Macmillan Company of India Ltd., Delhi, 1977.
8. R.G. Bartle, The Elements of Integration, John Wiley & Sons, Inc. New York, 1966.
9. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
10. Inder K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, Delhi, 1997.
11. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
12. Edwin Hewitt and Korl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
13. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.
14. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
15. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
16. R.E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
17. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
18. P.K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
19. R.B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
20. K.K. Jha, Functional Analysis, Students' Friends, 1986.
21. L.V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
22. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
23. B.K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
24. A.H.Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi

25. B.V. Limaye, Functional Analysis, Wiley Eastern Ltd.
26. L.A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
27. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
28. A.E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
29. K.Yosida, Functional Analysis, 3'" edition Springer-Verlag, New York, 1971.
30. J.B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
31. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
32. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
33. J. Tinsley Oden & Leszek F. Dernkowicz, Applied Functional Analysis, CRC Press Inc., 1996.

M.Sc./M.A. Course (Third Semester)

PAPER -II

Partial Differential Equations and Mechanics (I)

Max. Marks 80

Partial Differential Equations

Unit-I Examples of PDE. Classification. Transport Equation-Initial value Problem. Non-homogeneous Equation. Laplace's Equation-Fundamental Solution, Mean Value Formulas, Properties of Harmonic Functions, Green's Function, Energy Methods.

Unit-II Heat Equation-Fundamental Solution, Mean Value Formula, Properties of Solutions, Energy Methods. Wave Equation-Solution by Spherical Means, Non-homogeneous Equations, Energy Methods.

Analytical Dynamics:

Unit-III Generalized coordinates. Holonomic and Non-holonomic systems. Scleronomic and Rheonomic sytems. Generalized potential. Lagrange's equations of first kind. Lagrange's equations of second kind. Uniqueness of solution. Energy equation for conservative fields. Hamilton's variables. Donkin's theorem. Hamilton canonical equations. Cyclic coordinates. Routh's equations.

Unit-IV Poisson's Bracket. Poisson's Identity. Jacobi-Poisson Theorem. Motivating problems of calculus of variations, Shortest distance. Minimum surface of revolution. Brachistochrone problem. Isoperimetric problem. Geodesic. Fundamental lemma of calculus of variations. Euler's equation for one dependent function and its generalization to (1) 'n' dependent functions, (ii) higher order derivatives. Conditional extremum under geometric constraints and under integral constraints.

Gravitation:

Unit-V Attraction and potential of rod, disc, spherical shells and sphere. Surface integral of normal attraction (application & Gauss' theorem). Laplace and Poisson equations. Work done by selfattracting systems. Distributions for a given potential. Equipotential surfaces. Surface and solid harmonics. Surface density in terms of surface harmonics.

Books Recommended :

1. L.C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R.C.Mondal, Classical Mechanics, Prentice Hall of India
4. S.L. Loney, An Elementary Treatise on Statics, Kalyani Publishers, New Delhi, 1979.

References

1. Books on Partial differential equation by 1.N. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A.S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.
7. A.S. Ramsey, Newtonian Gravitation, The English Language Book Society and the Cambridge University Press.

M.Sc./M.A. Course (Third Semester)

PAPER-III (A)

Fundamentals of Computer Science-Theory and Practical (Object Oriented Programming and Data Structure)

Max. Marks. 100
(Theory-70 +Practical-30)

Unit-I Object Oriented Programming-Classes and Scope, nested classes, pointer class members; Class initialization, assignment and destruction.

Unit-II Overloaded functions and operators; Templates including class templates; class inheritance and virtual functions.

Unit-III Data Structures-Analysis of algorithms, q, W, 0, o, w notations ; Sequential and linked representations, Lists, Stacks, and queues;

Unit-IV Trees: Binary tree- search tree implementation, B-tree (concept only);

Unit-V Sorting: Insertion sort, shell sort, quick-sort, heap sort and their analysis; Hashing-open and closed.

Books Recommended :

1. S.B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C.J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritehie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M.A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

Practical Examination Scheme

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks(10 marks each)
Viva	05 Marks
Sessional	05 Marks

M.Sc./M.A. Course (Third Semester)

PAPER-III (B)

General Relativity & Cosmology (I)

Max Marks – 80

Unit-I General Relativity-Transformation of coordinates. Tensors. Algebra of Tensors. Symmetric and skew symmetric Tensors. Contraction of tensors and quotient law. Reimannian metric. Parallel transport. Christoffel Symbols. Covarient derivatives, intrinsic derivatives and geodesies.

Unit-II Riemann Christoffel curvature tensor and its symmetry properties. Bianchi identities and Einstein tensor. Review of the special theory of relativity and the Newtonian Theory of gravitation.

Unit-III Principle of equivalence and general covariance, geodesic principle, Newtonian approximation of relativistic equations of motion. Einstein's field equations and its Newtonian approximation.

Unit-IV Schwarzschild external solution and its isotropic form. Planetary orbits and anologues of Kepler's Laws in general relativity. Advance of perihelion of a planet. Bending of light rays in a gravitational field, vitational redshift of spectral lines. Radar echo delay.

Unit-V Energy-momentum tensor of a perfect fluid. Schwarzschild internal solution. Boundary conditions. Energy momentum tensor of an electromagnetic field. Einstein-Maxwell equations. Reissner-Nordstrfim solution.

REFERENCES:

1. C.E. Weatherbum, An Introduction to Riemannian Geometry and the lensor Calculus, Cambridge University Press, 1950.
2. H. Stepheni, General Relativity: An Introduction to the theory of the gravitational field, Cambridge University Press, 1982.
3. A.S. Eddinglon, The Mathematical Theory of Relativity, Cambridge University Press, 1965.

4. J.V. Narlikar, General Relativity and Cosmology, The Macmillan Company of India Limited, 1978.
5. R. Adiev, M. Bazin, M. Schiffer, Introduction to general relativity, McGraw Hill Inc., 1975.
6. B.F. Shutz, A first course in general relativity, Cambridge University Press,1990.
7. S. Weinberg, Gravitation and Cosmology: Principles and applications of the general theory of relativity, John Wiley & Sons, Inc. 1972.
8. R.K. Sachs and H. Wu., General Relativity for Mathematician, Springer Verlag, 1977.
9. J.L. Synge, Relativity: The general theory. North Holland Publishing Company, 1976.

M.Sc./M.A. Course (Third Semester)

PAPER-III (C)

Fuzzy Set Theory and Its Applications (I)

Max Marks – 80

UNIT-I Fuzzy sets-Basic definitions, α-level sets. Convex fuzzy sets. Basic operations on fuzzy sets. Types of fuzzy sets. Cartesian products, Algebraic products. Bounded sum and difference, t-norms and t-conorms.

UNIT-II The Extension Principle- The Zadeh's extension principle. Image and inverse image of fuzzy sets. Fuzzy numbers. Elements of fuzzy arithmetic.

UNIT-III Fuzzy Relations on Fuzzy sets, Composition of Fuzzy relations. Min-Max composition and its properties.

UNIT-IV Fuzzy equivalence relations. Fuzzy compatibility relations. Fuzzy relation equations. Fuzzy graphs, Similarity relation.

UNIT-V Possibility Theory-Fuzzy measures. Evidence theory. Necessity measure. Possibility measure. Possibility distribution. Possibility theory and fuzzy sets. Possibility theory versus probability theory.

REFERENCES :

1. H.J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G.J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.

M.Sc./M.A. Course (Third Semester)
PAPER-III (D)
Mathematical Biology (I)

Max. Marks - 80

UNIT-I

Population Dynamics

Malthusian growth model, Logistic equation, model of species competition, Linear and Nonlinear First Order Discrete Time Models, Biology of Insect Population Dynamics, Model for Insect Population Dynamics with Competition, Differential Equation Models.

UNIT-II

Age Structured Population Dynamics

Evolutionary Aspects, Harvesting and Fisheries, Metapopulations, Delay Effects, Fibonacci's Rabbits, golden ratio, Age-structured Population s in Discrete Time, continuous age-structured populations, Euler-Lotka Equations.

UNIT-III

Population Dynamics of Interacting Species

Host-parasitoid Interactions, Lotka-Volterra Prey-predator Equations, Modelling the Predator Functional Response, Ecosystems Modelling, Interacting Metapopulations, Competition, Predation, Predator-mediated Coexistence of Competitors, Effects of Habitat Destruction.

UNIT-IV

Population Genetics and Evolution

Mendelian Genetics in Populations with Non-overlapping Generations, Haploid genetics, Spread of a favored allele, Mutation-selection balance, Diploid genetics, Sexual reproduction, Spread of a favored allele, Mutation-selection balance, Heterosis, Frequency-dependent selection, Linkage equilibrium, Random genetic drift, Evolution of the Genetic System.

UNIT-V

Infectious Disease

Simple Epidemic and SIS Diseases, SIR Epidemics, SIR epidemic disease model, SIR Endemics, SIR endemic disease model, No Disease-related Death, Including Disease-related Death, Vaccination, Evolution of virulence, Vector -borne Diseases, Basic Model for Macroparasitic Diseases.

Recommended Books

1. Jeffrey R. Chasnov, Mathematical Biology, Lecture Notes for MATH(365), The Hong Kong University of Science and Technology (2010)
2. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
3. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3rd Edition.
4. J.D.Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3rd Edition.

M.Sc./M.A. Course (Third Semester)
PAPER –IV (A)
Operations Research (I)

Max. Marks 80

Unit-I Operations Research and its Scope. Necessity of Operations Research in Industry. Linear Programming-Simplex Method. Theory of the Simplex Method. Duality and Sensitivity Analysis.

Unit-II Other Algorithms for Linear Programmrng-Dual Simplex Method.

Unit-III Parametric Linear Programming. Upper Bound Technique. Interior Point Algorithm. Linear Goal Programming.

Unit-IV Transportation and Assignment Problems.

Unit-V Network Analysis-Shortest Path Problem. Minimum Spanning Tree Probiem. Maximum Flow I Problem. Minimum Cost Flow Problem. Network Simplex Method. Project Planning and Control I with PERT-CPM.

Books Recommended :

1. F.S. Hillier and G.J. Ueberman. Introduction to Operations ResBareft (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadly, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H.A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New Yark.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.

References

1. S.S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupla and D.S. Hira, Operations Research-An Introduction. S. Cliand & Company Ltd., New Delhi.

3. N.S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R.K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A.D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S.W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. UNDOSystems Products (Visit websHe htlp://www.Hndo.com/productsf.html)
   (i) UNDO (the linear programming solver)
   (ii) UNDO Callable Library (the premier optimisation engine)
   (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
   (i) What's Best I (the spreadssheet add-in that solves linear, non-linear, and integer problems).

   All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.
   (i) Optimisation Modelling with UNDO (8" edition) by Linus Schrage.
   (ii) Optimisation Modelling with LINGO by Unus Schrage.
   More details available on the Related Book page York, 1979.

M.Sc./M.A. Course (Third Semester)
PAPER-IV (B)
Wavelets (I)

Max Marks – 80

Unit-I. Preliminaries-Different ways of constructing wavelets- Orthonormal bases generated by a single function: the Balian-Low theorem. Smooth projections on $L^2(R)$.

Unit-II. Local sine and cosine bases and the construction of some wavelets. The unitary folding operators and the smooth projections.

Unit-III. Multiresolution analysis and construction of wavelets. Construction of compactly supported wavelets and estimates for its smoothness. Band limited wavelets.

Unit-IV. Orthonormality. Completeness. Characterization of Lemarie-Meyer wavelets and some other characterizations. Franklin wavelets and Spline wavelets on the real line.

Unit-V. Orthonormal bases of piecewise linear continuous functions for L^2 (T). Orthonormal bases of periodic splines. Periodization of wavelets defined on the real line.

REFERENCES:

1. Eugenic HernBndez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C.K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I.Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, I 1992.
4. Y.Meyer,Wavelets, algorithms and applications (Tran.by R.D. Rayan,SIAM, 1993.
5. M.V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.

M.Sc./M.A. Course (Third Semester)

PAPER –V (A)

Programming in C (with ANSI features) Theory and Practical (I)

Max. Marks. 100
(Theory-70 +Practical-30)

Unit-I An overview of programming. Programming language, Classification. C Essentials-Program Development. Functions. Anatomy of a C Function. Variables and Constants. Expressions. Assignment Statements. Formatting Source Files. Continuation Character. The Preprocessor.

Unit-II Scalar Data Types-Declarations, Different Types of Integers. Different kinds of Integer Constants. Floating-Point Types. Initialization. Mixing Types. Explicit Conversions-Casts. Enumeration Types. The Void Data Type. Typedefs. Finding the Address of an object. Pointers.

Unit-III Control Flow-Conditional Branching. The Switch Statement. Looping. Nested Loops. The break and continue Statements. The goto statement. Infinite Loops.

Unit-IV Operators and Expressions-Precedence and Associativity. Unary Plus and Minus operators. Binary Arithmetic Operators. Arithmetic Assignment Operators. Increment and Decrement Operators. Comma Operator. Relational Operators. Logical Operators. Bit - Manipulation Operators. Bitwise Assignment Operators. Cast Operator. Size of Operators. Conditional Operator. Memory Operators.

Unit-V Arrays -Declaring an Array. Arrays and Memory. Initializing Arrays. Encryption and Decryption.

Books Recommended :

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

Practical Examination Scheme

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks(10 marks each)
Viva	05 Marks
Sessional	05 Marks

M.Sc./M.A. Course (Third Semester)
PAPER-V (B)
Graph theory (I)

Max. Marks - 80

Unit-I: Operations on graphs, matrices and vector spaces: Topological operations, Homeomerphism, homomorphism, contractions, derived graphs, Binary operations.

Unit-II: Matrices and vector spaces: Matrices and vector spaces : The adjacency matrix, The determinant and the spectrum, Spectrum properties, The incidence matrix, cycle space and Bond space, Cycle bases and cycle graphs.

Unit-III: Colouring packing and covering: Vertex coverings, critical graphs, Girth and chromatic number, uniquely colourable graphs, edge-colourings, Face colourings and Beyond, The achromatic and the Adjoint Numbers.

Unit-IV: Combinational formulations: Setting up of combinational formulations, the classic pair of duals, Gallai, Norman-Rabin Theorems, Clique parameters, The Rosenfeld Numbers.

Unit-V: Perfect Graphs: Introduction to the "SPGC", Triangulated (Chordal) graphs, Comparability graphs, Interval graphs, permutation graphs, circular arc graphs, split graphs, weakly triangulated graphs.

REFERENCES :

1. K.R.Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited , 1994.
2. R.J.Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Hararary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.

M.Sc./M.A. Course (Third Semester)
PAPER-V (C)
Algebraic Number Theory (I)

Max Marks – 80

UNIT-I

Elementary Number Theory: Primes and factorization, Division Algorithm, Congruence, Congruence and Modular Arithmetic, Euler phi function, Primitive roots of Unity, Quadratic law of Reciprocity, Arithmetical functions, Mobius Inversion Formula, The Diophantine Equations, Farey Sequences.

UNIT-II

Algebraic Numbers: Algebraic Numbers, Conjugates and Discriminants, Algebraic Integers, Integral Bases, Rings of Integers.

UNIT-III

Special Fields: Calculations for Quadratic fields, cubic fields, biquadratic fields and sextic fields.

UNIT-IV

Localization: Localization, Integral closure, Prime ideals, Chinese remainder theorem, Galois extensions. **Rings:** Dedekind rings, Discrete valuation rings, Explicit factorization of a prime.

UNIT-V

Completions: Definitions and completions, Polynomials in complete fields, Structure of complete discrete valuation ring, extension of complete fields.

References:

1. Serge Lange: Algebraic Number Theory, Springer-Verlag, 1986.
2. Jean-Pierre Serre: Local Fields, Springer-Verlag, 1979
3. M. Ram Murty, Jody Esmonde: Problems in Algebraic Number Theory (2nd ed.), Springer, 2005.
4. H. P. F. Swinnerton-Dyer: A Brief Guide to Algebraic Number Theory, Cambridge University Press, 2001
5. A. Frohlich , M.J. Taylor: Algebraic Number Theory, Cambridge University Press, 1991.
6. Ian Stewart, David Tall : Algebraic Number Theory and Fermat's Last Theorem (3rd ed.), A K Peters, Natick, Massachusetts, 2002.
7. Ethan D. Bolker: Elementary Number Theory, An Algebraic Approach, W. A. Benjamin, Inc., New York, 1970
8. Jurgen Neukirch: Algebraic Number Theory, Springer-Verlag, 1999
9. William Stein: Algebraic Number Theory, a Computational Approach, Cambridge University Press, 1991.
10. G.A. Jones and J. M. Jones, Elementary Number Theory, Springer, 1998.

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-IV)

2017-18 & Onward

There shall be six papers. Two compulsory and three optional papers. Each paper shall have 100 marks. The paper which has theory and practical both, the theory part shall have 70 marks and practical part shall have 30 marks. **Overall tally of marks in theory and practical will be 500.**

Paper	Description		Theory	Sessi-onal	Practic al	Remark
Compulsory Papers						
I	Functional Analysis (II)		80	20	--	--
II	Partial Differential Equations & Mechanics (II)		80	20	--	--
Optional Papers						
III	A	Operating System and Database Management System	70	--	30	For regular students only
	B	Cosmology (II)	80	20	--	--
	C	Fuzzy Set Theory & Its Applications (II)	80	20	--	--
	D	Mathematical Biology(II)	80	20	--	--
IV	A	Operations Research (II)	80	20	-	--
	B	Wavelets (II)	80	20	-	--
V	A	Programming in C (with ANSI Features) (II)	70	--	30	For regular students only
	B	Graph Theory (II)	80	20	--	
	C	Algebraic Number Theory (II)	80	20	--	

M.Sc./M.A. Course (Fourth Semester)

PAPER -I

Functional Analysis (II)

Max. Marks 80

Unit-I Uniform boundedness theorem and some of its consequences. Open mapping and closed graph theorems.

Unit-II Hahn-Banach theorem for real linear spaces, complex linear spaces and normed linear spaces. Reflexive spaces. Weak Sequential Compactness. Compact Operators. Solvability of linear equations in Banach spaces. The closed Range Theorem.

Unit-III Inner product spaces. Hilbert spaces. Orthonormal Sets. Bessel's inequality. Complete orthonormal sets and Parseval's identity.

Unit-IV Structure of Hilbert spaces. Projection theorem. Riesz representation theorem. Adjoint of an operator on a Hilbert space. Reflexivity of Hilbert spaces.

Unit-V Self-adjoint operators, Positive, projection, normal and unitary operators. Abstract variational boundary-value problem. The generalized Lax-Milgram theorem.

Books Recommended :

1. B.Choudhary and S.Nanda, Functional Analysis with Applications. Wiley Eastern Ltd. 1989.
2. H.L. Royden, Real Analysis, Macmillan Publishing Co. Inc., New York, 4'h Edition, 1993.

References

1. Serge Lang, Analysis I & II, Addison-Wesley Publishing Company, Inc. 1967.
2. Walter Rudin, Real & Complex Analysis, Tata McGraw-Hill Publishing.
3. Edwin Hewitt and Korl Stromberg, Real and Abstract Analysis, Springer-Verlag, New York.
4. Edwin Hewitt and Kenneth A. Ross, Abstract Harmonic Analysis, Vol. 1, Springer-Verlag, 1993.

5. G. Bachman and L. Narici, Functional Analysis, Academic Press, 1966.
6. N. Dunford and J.T. Schwartz, Linear Operators, Part I, Interscience, New York, 1958.
7. R.E. Edwards, Functional Analysis, Holt Rinehart and Winston, New York, 1965.
8. C. Goffman and G. Pedrick, First Course in Functional Analysis, Prentice Hall of India, New Delhi, 1987.
9. P.K. Jain, O.P. Ahuja and Khalil Ahmad, Functional Analysis, New Age International (P) Ltd. & Wiley Eastern Ltd., New Delhi, 1997.
10. R.B. Holmes, Geometric Functional Analysis and its Applications, Springer-Verlag, 1975.
11. K.K. Jha, Functional Analysis, Students' Friends, 1986.
12. L.V. Kantorovich and G.P. Akilov, Functional Analysis, Pergamon Press, 1982.
13. E. Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
14. B.K. Lahiri, Elements of Functional Analysis, The World Press Pvt. Ltd., Calcutta, 1994.
15. A.H.Siddiqui, Functional Analysis with Applications, Tata McGraw-Hill Publishing Company Ltd. New Delhi
16. B.V. Limaye, Functional Analysis, Wiley Eastern Ltd.
17. L.A. Lustenik and V.J. Sobolev, Elements of Functional Analysis, Hindustan Publishing Corporation, New Delhi, 1971.
18. G.F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill Book Company, New York, 1963.
19. A.E. Taylor, Introduction to Functional Analysis, John Wiley and Sons, New York, 1958.
20. K.Yosida, Functional Analysis, 3'" edition Springer-Verlag, New York, 1971.
21. J.B. Conway, A Course in Functional Analysis, Springer-Verlag, New York, 1990.
22. Walter Rudin, Functional Analysis, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1973.
23. A. Wilansky, Functional Analysis, Blaisdell Publishing Co., 1964.
24. J. Tinsley Oden & Leszek F. Dernkowicz, Applied Functional Analysis, CRC Press Inc., 1996.

M.Sc./M.A. Course (Fourth Semester)

PAPER -II

Partial Differential Equations and Mechanics (II)

Max. Marks 80

Partial Differential Equations

Unit-I Nonlinear First Order PDE-Complete Integrals, Envelopes, Characteristics, HamiltonJacobi Equations (Calculus of Variations, Hamilton's ODE, Legendre Transform, Hopf-Lax Formula, Weak Solutions, Uniqueness), Conservation Laws (Shocks, Entropy Condtion, LaxOleinik formula, Weak Solutions, Uniqueness, Riemann's Problem, Long Time Behaviour)

Unit-II Representation of Solutions-Separation of Variables, Similarity Solutions (Plane and Travelling Waves, Solitons, Similarity under Scaling), Fourier and Laplace Transform, Hopf-Cole Transform, Hodograph and Legendre Transforms, Potential Functions.

Unit-III Asymptotics (Singular Perturbations, Laplace's Method, Geometric Optics, Stationary Phase, Homogenization), Power Series (Non-characteristic Surfaces, Real Analytic Functions, Cauchy-Kovalevskaya Theorem).

Analytical Dynamics:

Unit-IV Hamilton's Principle. Principle of least action. Poincare Cartan Integral invariant. Whittaker's equations. Jacobi's equations. Lee Hwa Chung's theorem, canonical transformations and properties of generating functions.

Unit-V Hamilton-Jacobi equation. Jacobi theorem. Method of separation of variables. Lagrange Brackets. Condition of canonical character of a transformation in terms of Lagrange brackets and Poisson brackets,

invariance of Lagrange brackets and Poisson brackets under canonical transformations.

Books Recommended :

1. L.C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Volume 19, AMS, 1998.
2. F. Gantmacher, Lectures in Analytic Mechanics, MIR Publishers, Moscow, 1975.
3. R.C.Mondal, Classical Mechanics, Prentice Hall of India

References

1. Books on Partial differential equation by 1.N. Sneddon, F. John, P. Prasad and R. Ravindran, Amarnath etc.
2. A.S. Ramsey, Dynamics Part II, The English Language Book Society and Cambridge University Press, 1972.
3. H. Goldstein, Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
4. I.M. Gelfand and S.V. Fomin, Calculus of Variations, Prentice Hall.
5. Narayan Chandra Rana & Pramod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.
6. Louis N. Hand and Janet D. Finch, Analytical Mechanics, Cambridge University Press, 1998.

M.Sc./M.A. Course (Fourth Semester)

PAPER-III (A)

Operating System and Database Management System - Theory and Practical

Max. Marks. 100

(Theory-70 +Practical-30)

Unit-I Database Systems-Role of database systems, database system architecture and data modeling.

Unit-II Introduction to relational algebra and relational calculus.

Unit-III Intoduction to SQL: Basic features including views; Integrity constraints; Database design-normalization up to BCNF.

Unit-IV Operating Systems- Overview of operating system, user interface, processor management, memory management.

Unit-V I/O management, concurrency and Security, network and distributed systems.

Books Recommended :

1. S.B. Lipman, J. Lajoi: C++ Primer, Addison Wesley.
2. B. Stroustrup; The C++ Programming Language, Addison Wesley.
3. C.J. Date : Introduction to Database Systems, Addison Wesley.
4. C. Ritehie: Operating Systems-Incorporating UNIX and Windows, BPB Publications.
5. M.A. Weiss, Data Structures and Algorithm Analysis in C++, Addison Wesley.

Practical Examination Scheme

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks(10 marks each)
Viva	05 Marks
Sessional	05 Marks

M.Sc./M.A. Course (Fourth Semester)
PAPER-III (B)
Cosmology (II)

Max Marks – 80

Unit-I: Cosmology-Mach's principle, Einstein modified field equations with cosmological term.

Unit-II: Static Cosmological models of Einstein and De-Sitter, their derivation, properties and comparison with the actual universe.

Unit-III:Hubble's law. Cosmological principles. Weyl's postulate. Derivation of Robertson-Walker metric. Hubble and deceleration parameters. Redshift. Redshift versus distance relation. Angular size versus redshift relation and source counts in Robertson-Walker space-time.

Unit-IV: Friedmann models. Fundamental equations of dynamical cosmology. Critical density. Closed and open Universes. Age of the Universe. Matter dominated era of the Universe.

Unit-V: Einstein-deSitter model. Particle and even horizons. Eddington-Lamaitre models with I-term. Perfect cosmological principle. Steady state cosmology.

REFERENCES:

1. J.V. Narlikar, General Relativity and Cosmologyi Ths Macmillan Company of India Urnited, 1978.
2. S. Weinberg, Gravitation and Cosmology: Principles and applications of the general theory of relativity, John Wiley & Sons, Inc. 1972.
3. J.V. Narlikar, Introduction to Cosmology, Cambridge University Press, 1993.
4. LD. Landau and E.M. Lilshitz, The classical theory of Fields, Pergamon Press, 1980.

M.Sc./M.A. Course (Fourth Semester)
PAPER-III (C)
Fuzzy Set Theory & Its Applications (II)

Max Marks – 80

Unit-I Fuzzy Logic-An overview of classical logic, Multivalued logics, Fuzzy propositions. Fuzzy quantifiers. Linguistic variables and hedges. Inference from conditional fuzzy propositions, the compositional rule of inference.

Unit-II Approximate Reasoning-An overview of Fuzzy expert system. Fuzzy implications and their selection. Multiconditional approximate reasoning. The role of fuzzy relation equation.

Unit-III An introduction to Fuzzy Control-Fuzzy controllers. Fuzzy rule base. Fuzzy inference engine. Fuzzification.

Unit-IV Defuzzification and the various defuzzitication methods (the centre of area, the centre of maxima, and the mean of maxima methods).

Unit-V Decision Making in Fuzzy Environment-Individual decision making. Multiperson decision making. Multicriteria decision making. Multistage decision making. Fuzzy ranking methods. Fuzzy linear programming.

REFERENCES :

1. H.J. Zmmemann, Fuzzy set theory and its Applications, Allied Publishers Ltd. New Delhi, 1991.
2. G.J. Klir and B. Yuan- Fuzzy sets and fuzzy logic, Prentice-Hall ol India, New Delhi, 1995.

M.Sc./M.A. Course (Fourth Semester)
PAPER-III (D)
Mathematical Biology (II)

Max. Marks - 80

UNIT-I

Tumor Modelling: Phenomenological Models, Nutrients: the Diffusion-limited Stage, Moving Boundary Problems, Growth Promoters and Inhibitors, Vascularisation, Metastasis, Immune System Response.

UNIT-II

Growth and Control of Brain Tumours: Basic Mathematical Model of Glioma Growth and Invasion, Tumour Spread *In Vitro*: Parameter Estimation, Tumour Invasion in the Rat Brain, Tumour Invasion in the Human Brain, Modelling Tumour Resection in Homogeneous Tissue, Analytical Solution for Tumour Recurrence After Resection, Modelling Surgical Resection with Brain Tissue Heterogeneity, Modelling the Effect of Chemotherapy on Tumour Growth, Modelling Tumour Polyclonality and Cell Mutation.

UNIT-III

Dynamics of Infectious Diseases: Historical Aside on Epidemics, Simple Epidemic Models and Practical Applications, Modelling Venereal Diseases, Multi-Group Model for Gonorrhea and Its Control, Bovine Tuberculosis Infection in Badgers and Cattle, Modelling Control Strategies for Bovine Tuberculosis in Badgers and Cattle.

UNIT-IV

Modelling of Immunodeficiency Virus: AIDS: Modelling the Transmission Dynamics of the Human Immunodeficiency Virus (HIV), HIV: Modelling Combination Drug Therapy, Delay Model for HIV Infection with Drug Therapy, Modelling the Population Dynamics of Acquired Immunity to Parasite Infection, Age-Dependent Epidemic Model and Threshold Criterion, Simple Drug Use Epidemic Model and Threshold Analysis.

UNIT-V

Geographic Spread and Control of Epidemics: Simple Model for the Spatial Spread of an Epidemic, Spread of the Black Death in Europe, Brief History of Rabies, Spatial Spread of Rabies Among Foxes: Background and Simple Model, Three-Species (*SIR*)Model. Control Strategy Based on Wave Propagation into a Nonepidemic Region: Estimate of Width of a Rabies Barrier, Analytic Approximation for the Width of the Rabies, Effect of Fox Immunity on the Spatial Spread of Rabies.

Recommended Books

1. Jeffrey R. Chasnov, Mathematical Biology, Lecture Notes for MATH(365), The Hong Kong University of Science and Technology (2010)
2. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
3. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3rd Edition.
4. J.D.Murray, Mathematical Biology II. Spatial Models and Biomedical Application, Springer-Verlag (2003) 3rd Edition.

M.Sc./M.A. Course (Fourth Semester)

PAPER –IV (A)

Operations Research (II)

Max. Marks 80

Unit-I Dynamic Programming-Deterministic and Probabilistic Dynamic programming.

Unit-II Game Theory-Two-Person, Zero-Sum Games. Games with Mixed Strategies. Graphical . Solution. Solution by Linear Programming.

Unit-III Integer Programming-Branch and Bound Technique.

Unit-IV Applications to Industrial Problems-Optimal product mix and activity levels. Petroleumi. refinery operations. Blending problems. Economic interpretation of dual linear programming. problems. Input-output analysis. Leontief system. Indecomposable and Decomposable economies.

Unit-V Nonlinear Programming-One/and Multi-Variable Unconstrained Optimization. Kuhn-Tucker Conditions for Constrained Optimization. Quadratic Programming. Separable Programming. I Convex Programming. Non-convex Programming.

Books Recommended :

1. F.S. Hillier and G.J. Ueberman. Introduction to Operations ResBareft (Sixth Edition), McGraw Hill International Edition, Industrial Engineering Series, 1995. (This book comes with a CD containing tutorial software).
2. G. Hadley, Linear Programming, Narosa Publishing House, 1995.
3. G. Hadly, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H.A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New Yark.
5. Kanti Swarup, P.K. Gupta and Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi
6. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali, Linear Programming and Network flows, John Wiley & Sons, New York, 1990.

References

1. S.S. Rao, Optimization Theory and Applications, Wiley Eastern Ltd., New Delhi.
2. Prem Kumar Gupla and D.S. Hira, Operations Research-An Introduction. S. Cliand & Company Ltd., New Delhi.
3. N.S. Kambo, Mathematical Programming Techniques, Affiliated East-West Press Pvt. Ltd., New Delhi, Madras
4. R.K. Rathy, An Introduction to Fluid Dynamics, Oxford and IBH Publishing Company, New Delhi, 1976.
5. A.D. Young, Boundary Layers, AIAA Education Series, Washington DC, 1989.
6. S.W. Yuan, Foundations of Fluid Mechanics, Prentice Hall of India Private Limited, New Delhi, 1976.
7. UNDOSystems Products (Visit websHe htlp://www.Hndo.com/productsf.html)
   (i) UNDO (the linear programming solver)
   (ii) UNDO Callable Library (the premier optimisation engine)
   (iii) LINGO (the linear, non-linear, and integer programming solver with mathematical modelling language)
   (i) What's Best I (the spreadssheet add-in that solves linear, non-linear, and integer problems).

   All the above four products are bundled into one package to form the Solver Suite. For more details about any of the four products one has to click on its name.
   (i) Optimisation Modelling with UNDO (8" edition) by Linus Schrage.
   (ii) Optimisation Modelling with LINGO by Unus Schrage.
   More details available on the Related Book page York, 1979.

M.Sc./M.A. Course (Fourth Semester)
PAPER-IV (B)
Wavelets (II)

Max Marks – 80

Unit-I Characterizations in the theory of wavelets-The basic equations and some of its applications.

Unit-II Characaterizations of MRA wavelets, low-pass filters and scaling functions. Non- existence of smooth wavelets in $H^2(R)$.

Unit-III Frames - The reconstruction formula and the Batian-Low theorem for frames. Frames from translations and dilations. Smooth frames for $H^2(R)$.

Unit-IV Discrete transforms and algorithms-The discrete and the fast Fourier transforms. The discrete and the fast cosine transforms.

Unit-IV The discrete version of the local sine and cosine bases. Decomposition and reconstruction algorithms for wavelets.

REFERENCES:

1. Eugenic HernBndez and Guido Weiss, A First Course on Wavelets, CRC Press, New York, 1996.
2. C.K. Chui, An Introduction to Wavelets, Academic Press, 1992.
3. I.Daubechies, Ten Lectures on Wavelets, CBS-NSF Regional Conferences in Applied Mathematics, 61, SIAM, I 1992.
4. Y.Meyer,Wavelets, algorithms and applications (Tran.by R.D. Rayan,SIAM, 1993.
5. M.V. Wickerhauser, Adapted wavelet analysis from theory to software, Wellesley, MA, A.K. Peters, 1994.

M.Sc./M.A. Course (Fourth Semester)
PAPER –V (A)
Programming in C (with ANSI features) (II)
Theory and Practical

Max. Marks. 100
(Theory-70 +Practical-30)

Unit-I Storage Classes-Fixed vs. Automatic Duration. Scope. Global variables. The register Specifier. ANSI rules for the syntax and Semantics of the storage-class keywords.

Unit-II Pointers Pointer Arithmetic. Passing Pointers as Function Arguments. Accessing Array Elements through Pointers. Passing Arrays as Function Arguments. Sorting Algorithms. Strings. Multidimensional Arrays. Arrays of Pointers. Pointers to Pointers.

Unit-III Functions-Passing Arguments. Declarations and Calls. Pointers to Functions. Recursion. The main Function. Complex Declarations.The C Preprocessor-Macro Substitution. Conditional Compilation. Include Facility. Line Control.

Unit-IV Structures and Unions-Structures. Dynamic Memory Allocation. Linked Lists. Unions, enum Declarations.

Unit-V Input and Output-Streams, Buffering. The <Stdio.h> Header File. Error Handling. Opening and Closing a File. Reading and Writing Data. Selecting an I/O Method. Unbuffered I/O Random Access. The standard library for Input/Output.

Books Recommended :

1. Peter A. Darnell and Philip E. Margolis, C: A Software Engineering Approach, Narosa Publishing House (Springer International Student Edition) 1993.
2. Samuel P. Harkison and Gly L. Steele Jr., C : A Reference Manual, 2nd Edition, Prentice Hall, 1984.
3. Brian W. Kernighan & Dennis M. Ritchie, The C Programme Language, 2nd Edition (ANSI Features), Prentice Hall 1989.

Practical Examination Scheme

Max. Marks – 30	Time Duration – 3 Hrs.
Practical (two)	20 Marks(10 marks each)
Viva	05 Marks
Sessional	05 Marks

M.Sc./M.A. Course (Fourth Semester)
PAPER-V (B)
Graph theory-II

Max. Marks - 80

Unit-I: Ramsey Theory: Perpectness-preserving operations, Forbidden Subgraph orientations, Ramsey numbers and Ramsey graphs.

Unit-II: Groups: Permutation groups, The automorphism group, graphs with given group, symmetry concepts, pseudo-similarity and stability, spectral studies of the Automorphism group.

Unit-III: Polynomials and Graph Enumeration: The colour polynomials, The chromatic polynomial, The bivariate colouring polynomials.

Unit-IV: Graph Enumeration: Co-chromatic (co-dichromatic) graphs and chromatically unique graphs, Graph Enumeration.

Unit-V: Digraphs & Networks: Digraphs, Types of connectedness, Flows in Networks, Menger's and Konig's Theorem, Degree sequences.

REFERENCES :

1. K.R.Parthasarathy, Basic graph theory, Tata Mc graw Hill publishing company limited , 1994.
2. R.J.Wilson, Introduction to graph theory, Longman Harlow, 1985.
3. John Clark, Derek Allon Holton, A first look at graph Theory, World Scientific Singapore, 1991.
4. Frank Hararary, Graph Theory Narosa, New Delhi, 1995.
5. Ronald Gould and Benjamin Cummins, Graph Theory, California.
6. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, Prentice-Hall of India Private Limited, New Delhi, 2002.

M.Sc./M.A. Course (Fourth Semester)
PAPER-V (C)
Algebraic Number Theory (II)

Max Marks – 80

UNIT-I

Extensions: Decomposition and ramification, Unramified extensions, Tamely ramified extensions.

UNIT-II

The Different and Discriminant: Complementary modules, The different and ramification, The discriminant.

UNIT-III

Cyclotomic Fields): Roots of unity, Quadratic fields, Gauss sums, Relations in ideal classes, Fermat's last theorem.

UNIT-IV

The Structure of Units: Dirichlet's Unit Theorem, Units in Real Quadratic Fields, Pell's equation.

UNIT-V

Zeta Functions: The Riemann Zeta Function, Dedekind Zeta Function

References:

1. Serge Lange: Algebraic Number Theory, Springer-Verlag, 1986.
2. Jean-Pierre Serre: Local Fields, Springer-Verlag, 1979
3. M. Ram Murty, Jody Esmonde: Problems in Algebraic Number Theory (2nd ed.), Springer, 2005.
4. H. P. F. Swinnerton-Dyer: A Brief Guide to Algebraic Number Theory, Cambridge University Press, 2001
5. A. Frohlich , M.J. Taylor: Algebraic Number Theory, Cambridge University Press, 1991.
6. Ian Stewart, David Tall : Algebraic Number Theory and Fermat's Last Theorem (3rd ed.), A K Peters, Natick, Massachusetts, 2002.
7. Ethan D. Bolker: Elementary Number Theory, An Algebraic Approach, W. A. Benjamin, Inc., New York, 1970
8. Jurgen Neukirch: Algebraic Number Theory, Springer-Verlag, 1999
9. William Stein: Algebraic Number Theory, a Computational Approach, Cambridge University Press, 1991.

Pt. Ravishankar Shukla University, Raipur
M.Phil. (Mathematics) (code – 619)
2017-18 & Onward

Scheme of Examination

There shall be three theory papers , one dissertation and seminar in M.Phil.(Mathematics). All are compulsory. Each theory paper will have 100 marks. The course content of each paper has been divided into five units. However, there will be internal choice in each Unit. Dissertation will be of 200 marks ((Script -100+ Viva Voce 100). Seminar will be of 100 marks (On dissertation -50 + On Theory Papers -50).

S.No.	Particulars			Max. Marks	
1	Theory Papers	Paper-I	Research Methodology, Quantitative techniques and Computers (Code 101)	100	300
		Paper-II	Cryptography (Code 102)	100	
		Paper-III	Nonlinear Analysis and Topological Structures (Code 103)	100	
2	Dissertation (Code 104)		Script	100	200
			Viva Voce	100	
3	Seminar (Code 105)		On dissertation	50	100
			On Theory Papers	50	
Grand Total					600

Guidelines of activities/academic calendar for M.Phil. Students:

1. The subject of dissertation will be provided by supervisor in the first week of September.
2. The dissertation has to be submitted by the end of first week of March. Thereafter supervisor will take no responsibility for delay in the submission of the dissertation.
3. Students are requested to complete the typing work (preferably in AMS-Tex/Latex) of their dissertation by the last week of February.
4. Every week on student will present his/her seminar using OHP/LCD based on the theory papers/on the subject assigned in the dissertation.

Details of Syllabus

Paper I

Research Methodology, Quantitative techniques and Computers

M.M. 100

Unit I – Research Methodology:
Introduction to research methodology, Meaning, objectives, types, significance of Research. Identification, Selection of Research problem, Formulation of research objectives, Research design, components, importance and typology, Quantitative and qualitative methodology, hypotheses. Research ethics.

Unit II - Scientific Writing : Importance of Science Writing , Meaning and nature of Scientific Style , Writing effective scientific prose, Effective word selection in Science writing, Common mathematical functions and their abbreviations, Symbols, Operators Commonly used in Mathematics, Greek, Roman letters used in mathematics, Mathematical Theorems and properties, Mathematics Journals and their abbreviations.

Unit III - Style and Usage for Mathematics :
Review : Mathematics Subject Classifications (MSC). Mathematical Review, MathSciNet and other E-Resources.
Manuscript Preparation :
Structure of a Standard Mathematics Paper (in brief), Other Forms of Mathematics Manuscripts.
Usage : Mathematical Expressions, Alphabets used in Mathematical Expressions, Bracketing, Limits, Fractions, Multiplication, Vectors, Tensors, and n-forms, Summations, Products, Unions, and Integrals.

Unit IV - Typesetting Mathematical Text with LATEX :
Sample Document, Type Style, Environments, Lists, Centering, Tables, Verbatim, Vertical and Horizontal Spacing. Equation Environments, Fonts, Hats, and Underlining, Braces, Arrays and Matrices, Customized Commands, Theorem-like Environments, Math Styles, Document Classes and the Overall Structure, Titles for Documents, Sectioning Commands, Packages, Inputting Files, Inputting Pictures, Making a Bibliography, Making an Index, Slides.

Unit V - MATLAB :
Arithmetic Operations, built-in-MATH functions, scalar variables, Creating Arrays, built-in-functions for handling arrays, Mathematical Operations with Arrays, Script Files, Two dimensional plots, programming in MATLAB, Polynomial, curve fitting, and interpolation, Three-dimensional plots.
Books recommended :

1. C.R.Kothari, Research Methodology, New Age International Publishers (2004)
2. Michael Davis : Ethics and the University. Routledge (1999)
3. Harold Rabinowitz, Suzanne Vogel : The Manual of Scientific Style. Academic Press (2009)
4. Laslie Lamport : LATEX. Addison Wesley Publication Company (1994)
5. David F. Griffiths, Desmond J. Higham : Learning LATEX. Society for Industrial and Applied Mathematics, Philadelphia (1997)
6. Amos Gilat : MATLAB : An Introduction with Applications. John Wiley & Sons, INC (2004)

Paper -II

CRYPTOGRAPHY

Note: Each unit will be given weightage of 20 marks. Student will attempt one question from each unit. There will be internal choice in each unit.

M.M. 100

UNIT 1:Fundamental concepts:

Elements of number theory: Greatest Common Divisor, divisibility and Euclidean algorithm, Congruences, Semi-Groups, Groups, Residue Class Rings, Fields, Analysis of Operation in the Residue Class Rings, Fermat's Little Theorem, Fast Exponentiation, The Chinese Remainder Theorem ,Time estimates for doing arithmetic, Polynomial time. Factoring concept.

Unit 2 – **Encryption process** :

Encryption, decryption and key generation. Symmetric and Asymmetric Crypto systems, Cryptanalysis, Alphabets and Words, Permutations, Block Ciphers, Multiple Encryption, Use of Block Ciphers, Stream Ciphers, Affine Ciphers, Matrices and Linear Maps, Affine Linear Block Ciphers, Vigenere, Hill and Permutation Ciphers, Cryptanalysis of Affine Linear Block Ciphers

Unit 3- **Public key cryptosystems** :

Probability and perfect secure, Various One Time Rabin System, ElGamal System, Enciphering matrices, the idea of public key cryptography, design of RSA, some important properties of RSA, Discrete logarithm problem, public key cryptosystem based on Knapsack problem , the concept of zero knowledge transfer.

Unit 4- **Primality and factoring**:

Trial Division, Carmichael number, Millor-Rabin Test, p-1 Method, pseudo primes, the rho methods, Fermat factorization and factor basis, the continued fraction method, the quadratic sieve method.

Unit 5- **Elliptic curves** :

Basic facts and application of elliptic curve in cryptography, elliptic curve cryptosystem, elliptic curve primality test, elliptic curve factorization. Digital Signatures: RSA Signature, Signature from Public Key Systems, ElGamal Signature.

Books recommended :

1.A course in number theory and cryptography by N. Koblitz. Springer 2002.
2.An introduction to cryptography by J. A. Buchmman. Springer.2001.
3.Introduction to Cryptography by Hans Delfs and H.Knebl. Springer 2001.
4. Modern cryptography by O.Goldrich. Springer. 1999
5. Modern cryptography: theory and practice by Wenbo Mao. HP. 2004.

Paper III

Nonlinear Analysis and Topological Structures

M.M. 100

Note: Each unit will be given weight-age of 20 marks. Student will attempt one question from each unit. There will be internal choice in each unit.

Unit I Calculus in Banach spaces : Various forms of continuity, geometry in normed spaces and duality mapping, Nemytskii, hammerstein and Uryshon operators, Gateaux and Frechet derivatives , properties of the derivative, Taylor's theorem, inverse function theorem and implicit function theorem.

Unit II Monotone operators and its applications : Basic study of - Monotone operators, surjectivity theorems, constructive solutions of operator equations, subdifferential and monotonocity, generalizations of monotone operators.

Unit-III Dynamical Systems, Manifolds and Complexes- The role of topology in Chaos and dynamical systems- *History of Chaos, examples, notions of Chaos*. Identification spaces and compactness. Cantor sets. Application of compact sets in *population dynamics and Fractals,* Manifolds. Triangulations. Classification of surfaces. Euler Characteristics. Topological groups. Group actions and Orbit spaces. Application of manifold in *Robotic coordination and configuration spaces*, *geometry of manifolds, the topology of the Universe.*

Unit-IV Homotopy, Winding Numbers and Vector Field- Homotopy and paths. The winding number. Degrees of maps. The Brouwer fixed point theorem. The Borsuk-Ulam Theorem.. Vector fields and the Poincare Index Theorem. Applications in *the fundamental theorem of algebra, Sandwiches, Game theory and Nash equilibria, Vector fields, Path integrals and the winding number, Vector fields on surfaces, Index theory for n-symmetry fields.*

Unit-V The Topological Degree Axiomatic Definition of the Brouwer Degree in $\mathbf{R}^n$. Application of the Brouwer Degree. Brouwer Theorem, Perron-Frobenius Theorem, Surjective Maps, Hedgehog Theorem. The Leray-Schauder degree. Borsuk's Antipodal Theorem. Compact Linear Operators. Application of topological degree in *Fixed Point Theory.*

Books recommended :

1. M. C. Joshi and R. K. Bose, Some topics in nonlinear functional analysis, Wiley Eastern Limited, New Delhi 1985.
2. E. Zeidler, Nonlinear functional analysis and its applications I: Fixed Point Theorems, Springer, Heidelberg 1986.
3. K. Deimling, Nonlinear functional analysis and its applications I: Fixed Point Theorems, Springer, Heidelberg 1985.
4. William F. Basener, Topology and its applications, Wiley-InterScience, 1973.
5. R. Akerkar, Nonlinear functional analysis, Narosa Publishing House, New Delhi.
6. C. Robinson, Dynamical Systems, Stability, Symbolic Dynamics and Chaos, CRC Press, 1995.
7. S. Willord, General Topology, Dover, 2004.
8. R. L. Devancy, An Introduction to Chaotic Dynamical Systems, Persues Publicating Co., 1989.

Ph.D. Course Work
Paper I
2017-18 & Onward

Research Methodology, Quantitative techniques and Computers

M.M. 100

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6. Amos Gilat : MATLAB : An Introduction with Applications. John Wiley & Sons, INC (2004)

Pt. Ravishankar Shukla University, Raipur
Ph.D. Course Work (Mathematics)
2011-12 & Onward

Scheme of Examination

There shall two papers, one theory paper and one project work. Each of 100 marks.

S.No.	Particulars		Max. Marks	
1	Theory Paper	Research Methodology, Quantitative techniques and Computers	100	100
2	Project Work	Dissertation/Project Script	50	100
		Seminar	20	
		Viva Voce	30	
Grand Total				200

Details of Syllabus

Paper I

Research Methodology, Quantitative techniques and Computers

M.M. 100

Unit I – Research Methodology:

Introduction to research methodology, Meaning, objectives, types, significance of Research. Identification, Selection of Research problem, Formulation of research objectives, Research design, components, importance and typology, Quantitative and qualitative methodology, hypotheses. Research ethics.

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4. Laslie Lamport : LATEX. Addison Wesley Publication Company (1994)
5. David F. Griffiths, Desmond J. Higham : Learning LATEX. Society for Industrial and Applied Mathematics, Philadelphia (1997)
6. Amos Gilat : MATLAB : An Introduction with Applications. John Wiley & Sons, INC (2004)

Paper II
Project Work

M.M. 100

This paper will consist of three components

(i)	Dissertation/Project work leading to Ph.D. Work	50
(ii)	Seminars (two)	20
(iii)	Viva-Voce on Dissertation	30

Pt. Ravishankar Shukla University,
RAIPUR (C.G.) 492 010

B. Pharm.

(A Four Year Degree Programme)
Semester System

ORDINANCE
&
SYLLABUS

(W. E. F. Academic Session 2016-2017)

UNIVERSITY INSTITUTE OF PHARMACY
FACULTY OF TECHNOLOGY
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

First Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
1-T-1	Introduction to Pharmaceutics	3	30	70	100	40	3
1-P-1	Introduction to Pharmaceutics	3	30	70	100	40	4
1-T-2	Pharmaceutical Chemistry Physical	3	30	70	100	40	3
1-P-2	Pharmaceutical Chemistry Physical	3	30	70	100	40	4
1-T-3	Pharmaceutical Chemistry Inorganic	3	30	70	100	40	3
1-P-3	Pharmaceutical Chemistry Inorganic	3	30	70	100	40	4
1-T-4	Pharmaceutical Biology	3	30	70	100	40	3
1-P-4	Pharmaceutical Biology	3	30	70	100	40	4
1-T-5	Computer Application	3	30	70	100	40	3
1-P-5	Computer Application	3	30	70	100	40	4

Second Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
2-T-1	Physical Pharmacy	3	30	70	100	40	3
2-P-1	Physical Pharmacy	3	30	70	100	40	4
2-T-2	Pharmaceutical Engineering- I	3	30	70	100	40	3
2-T-3	Pharmaceutical Engineering- II	3	30	70	100	40	3
2-P-3	Pharmaceutical Engineering- II	3	30	70	100	40	4
2-T-4	Pharmaceutical Jurisprudence	3	30	70	100	40	3
2-T-5	Human Anatomy and Physiology-I	3	30	70	100	40	3
2-P-5	Human Anatomy and Physiology-I	3	30	70	100	40	4

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

Third Semester Examination for the Degree of Bachelor of Pharmacy

SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
3-T-1	Modern Dispensing Pharmacy	3	30	70	100	40	3
3-P-1	Modern Dispensing Pharmacy	3	30	70	100	40	4
3-T-2	Pharmaceutical Chemistry Organic-I	3	30	70	100	40	3
3-T-3	Pharmaceutical Chemistry Organic-II	3	30	70	100	40	3
3-P-3	Pharmaceutical Chemistry Organic-II	3	30	70	100	40	4
3-T-4	Pharmaceutical Analysis- I	3	30	70	100	40	3
3-P-4	Pharmaceutical Analysis- I	3	30	70	100	40	4
3-T-5	Human Anatomy and Physiology-II	3	30	70	100	40	3
3-P-5	Human Anatomy and Physiology-II	3	30	70	100	40	4

Fourth Semester Examination for the Degree of Bachelor of Pharmacy

SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
4-T-1	Pharmaceutical Technology- I	3	30	70	100	40	3
4-P-1	Pharmaceutical Technology- I	3	30	70	100	40	4
4-T-2	Pharmaceutical Analysis- II	3	30	70	100	40	3
4-P-2	Pharmaceutical Analysis- II	3	30	70	100	40	4
4-T-3	Pharmaceutical Bio- Chemistry	3	30	70	100	40	3
4-P-3	Pharmaceutical Bio- Chemistry	3	30	70	100	40	4
4-T-4	Pharmacognosy –I	3	30	70	100	40	3
4-P-4	Pharmacognosy –I	3	30	70	100	40	4
4-T-5	Applied Mathematics	3	30	70	100	40	3

Fifth Semester Examination for the Degree of Bachelor of Pharmacy

SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
5-T-1	Pharmaceutical Technology- II	3	30	70	100	40	3
5-P-1	Pharmaceutical Technology- II	3	30	70	100	40	4
5-T-2	Pharmaceutical Microbiology	3	30	70	100	40	3
5-P-2	Pharmaceutical Microbiology	3	30	70	100	40	4
5-T-3	Pharmaceutical Analysis- III	3	30	70	100	40	3
5-P-3	Pharmaceutical Analysis- III	3	30	70	100	40	4
5-T-4	Medicinal Chemistry -I	3	30	70	100	40	3
5-P-4	Medicinal Chemistry -I	3	30	70	100	40	4
5-T-5	Pharmacology – I	3	30	70	100	40	3
5-P-5	Pharmacology – I	3	30	70	100	40	4

Sixth Semester Examination for the Degree of Bachelor of Pharmacy

SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
6-T-1	Pharmaceutical Technology- III	3	30	70	100	40	3
6-P-1	Pharmaceutical Technology- III	3	30	70	100	40	4
6-T-2	Medicinal Chemistry -II	3	30	70	100	40	3
6-P-2	Medicinal Chemistry -II	3	30	70	100	40	4
6-T-3	Pharmacology – II	3	30	70	100	40	3
6-P-3	Pharmacology – II	3	30	70	100	40	4
6-T-4	Pharmacognosy –II	3	30	70	100	40	3
6-P-4	Pharmacognosy –II	3	30	70	100	40	4
6-T-5	Hospital And Community Pharmacy	3	30	70	100	40	3
6-P-5	Project Work	--	100	--	100	40	--

Seventh Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
7-T-1	Bio-Pharmaceutics	3	30	70	100	40	3
7-T-2	Medicinal Chemistry -III	3	30	70	100	40	3
7-P-2	Medicinal Chemistry -III	3	30	70	100	40	4
7-T-3	Pharmacology – III	3	30	70	100	40	3
7-P-3	Pharmacology – III	3	30	70	100	40	4
7-T-4	Pharmacognosy –III	3	30	70	100	40	3
7-P-4	Pharmacognosy –III	3	30	70	100	40	4
7-T-5	Chemistry of Natural Products	3	30	70	100	40	3

Eighth Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
8-T-1	Cosmetic Technology	3	30	70	100	40	3
8-P-1	Cosmetic Technology	3	30	70	100	40	4
8-T-2	Pharmaceutical Biotechnology	3	30	70	100	40	3
8-P-2	Pharmaceutical Biotechnology	3	30	70	100	40	4
8-T-3	Medicinal Chemistry -IV	3	30	70	100	40	3
8-T-4	Pharmacognosy –IV	3	30	70	100	40	3
8-P-4	Pharmacognosy –IV	3	30	70	100	40	4
8-T-5	Industrial Management and Accountancy	3	30	70	100	40	3

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B. Pharm. First Semester

1-T-1 Introduction to Pharmaceutics

1. Pharmacy profession: History, code of pharmaceutical ethics. Pharmacy as a career, pharmacy in relation to allied health professions. Introduction to pharmacopoeias.
2. Routes of drug administration. Classification of pharmaceutical dosage forms. Definition of solid, liquid, semisolid, gaseous dosage forms and introduction to novel drug delivery systems.
3. Definitions, general formulations, manufacturing procedures and official products of-
   Aromatic waters, syrups, spirit, elixirs, glycerites, lotion, liniments, Jellies, mucilages, emulsions, suspensions, milks.
4. Extraction and Galenical Products: Principle and method of extraction, preparation of infusion, tinctures, dry and soft liquid extracts.
6. Pharmaceutical arithmetic: Dilution and concentration of solutions, calculation by allegation, proof spirits, isotonic solutions.
7. Study of following pharmaceutical aids with their application: Colouring agent, flavouring agents, sweetening agents.

1-P-1 Introduction to Pharmaceutics (Practical)

Experiments based on Theory topics.

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1-T-2 Pharmaceutical Chemistry Physical

1. Introduction
2. Behaviour of Gases: Kinetic theory of gases, deviation from ideal behaviour and explanation.
3. The liquid state: Physical properties- surface tension, parachor, viscosity, refractive index, optical rotation, dipole moments and chemical constituents.
4. Solutions: Ideal and real solutions, solution of gases in liquid, colligative properties, partition coefficient, conductance and its measurements, Debye Huckel theory. Expression of concentration, ebulisocope and cryoscopic methods for determination of molecular weight. Osmosis. Liquid-liquid system, critical solution temperature.
5. Thermodynamics: First, second and third laws of thermodynamics, Zeroth law, absolute temperature scale, thermochemical equations, free energy functions and applications.
6. Chemical equilibrium: Homogeneous and Heterogeneous Law of mass action, Le Chatelier's principle, Hydrolysis of salts, Henderson Hasselbalch's equation.
7. Phase rule: - One and two component system of pharmaceutical interest.
8. Chemical kinetics: Order of reaction, first and second order of reaction, determination of order of reaction, Theories of reaction kinetics, characteristics of homogeneous and heterogeneous catalysis, acid base and enzyme catalysis.
9. Quantum Mechanics: Postulate of quantum mechanics, operators in quantum mechanics, the Schrödinger wave equation.
10. Nuclear and Radiation Chemistry: Nuclear radiopharmaceutical, Clinical Application and dosage, hazards & precautions.

1-P-2 Pharmaceutical Chemistry Physical (Practical)

Experiments based on Theory topics.

1-T-3 Pharmaceutical Chemistry Inorganic

An outline of methods of preparation, uses and assays of the following classes of pharmaceuticals included in pharmacopoeia:

1. Acid & Bases, buffers, water
2. Gastrointestinal Agents: Acidifying agents, antacids, protective & adsorbents, catharties.
3. Major Intra- & Extracellular electrolytes: Physiological ions, Electrolytes used in replacement Theory of acid base balance and combination therapy.
4. Essential & trace elements: Transition elements & their compounds of pharmaceutical importance: Ion & haematinics, mineral supplements
5. Cationic & Anionic components of Inorganic drugs useful for systemic effects.
6. Topical Agents: Protective, Astringents, Ant infective
7. Inhalants, Expectorant and Respiratory stimulants
8. Complexing & Chelating agents use in Therapy
9. Antidotes in poisoning
10. Miscellaneous Agents - Antioxidant

1-P-3 Pharmaceutical Chemistry Inorganic (Practical)

Experiments based on Theory topics.

1-T-4 Pharmaceutical Biology

1. Modern concepts of Biology viz. molecular, Physiological and biochemical aspects.
2. Biological classification, species and population, Biotic community, Biosphere
3. Method of classification of plants
4. Plant cell: It's structure and non-living inclusion, mitosis and meiosis, different types of plant tissues and their functions.
5. Morphology of root, stem, bark, wood, leaf, flower, fruit and seed, modification of root and stem.
6. Biodiversity and its conservation and management: Social, ethical, aesthetic, commercial and medicinal values of biodiversity.
7. General structure and life history of parasites as illustrated by amoeba, Entamoeba, trypanosome, plasmodium, taenia and ascaris.
8. General structure and life history of insects like mosquito, housefly, silkworm and mites.
9. Plant Taxonomy: Study of the following families with special reference to medicinal important plants: Papaveraceae, Ranunculaceae, Cruciferaceae, Apocyaneceae, Rutaeceae, Umbelliferae, Rubiaceae, Solanaceae, Convolvulaceae, Scrophylariaceae, Labiaceae, Euphorbiaceae, Liliaceae, Amarylidaceae, Zingiberaceae and Dioscoraceae.
10. Introduction to microscopy (optical, electron, phase contrast, etc.)
11. Micro-chemical tests for cell wall and cell inclusions.
12. General structure, physiological life history and medico economic importance of: Bacteria, Penicillium, Claviceps, Yeast, Mushrooms and Lycopodium.
13. Preparation and preservation of herbarium sheets.

1-P-4 Pharmaceutical Biology

Experiments based on Theory topics

1-T-5 Computer Applications

1. Digital Electronics: Number system, Review of logic gates, Boolean algebra, Combinational circuits, Decoders and Multiplexers, Flip-Flops, Binary Counters, Shift registers, Data representation, fixed point and floating point representation and other binary codes, half adder, full adder, substracter.

2. Introduction to Computers: Computer System Characteristics and Capabilities: Speed, Accuracy, Reliability, Memory capability, Repeatability, Computer Hardware: Block Diagram of a Computer, Types of Computers: Analog, Digital, Hybrid General and Special Purpose Computers, Computer Generations: Characteristics of Computer Generations Computer Systems – Micros, Minis & Main-frames, Introduction to a PC: The IBM Personal Computer Types of PC systems PC, XT & AT Pentium PC's Limitations of Micro Computer.

3. Computer Software: System software, Application Software, Types of System Software, Introduction and Types of Operating Systems programs, Booting Loader, Diagnostic Tests, Operating Systems Executive, BIOS, Utility Programs, File Maintenance, Language Processors, Assembler, Compiler & Interpreter, Application Software: Types of Application Software- Special emphasis on application of MS-Office software, Difference between Program and Packages, Disk Operating System: Internal & External Commands, Unix Commands.

4. Networking Concepts: Types of networks design structures: LAN/MAN/WAN; Advantages and limitations, Internet and its Basic Concepts: The Mechanism of the Internet, HTML Basics & Web Site Design.

1-P-5 Computer Applications (Practical)

Experiments based on Theory topics.

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B. Pharm. Second Semester

2-T-1 Physical Pharmacy

1. States of Matter:- Gases & Liquids- Introduction, Real gases, Liquefaction of gases, Solids- Crystallisation, Polymorphism: Definition, different shapes of polymorphs, examples and its applications to Pharmacy.
2. Physical Properties of Drug Molecule - Additive, constitutive and colligative properties; Dielectric constant, its significance to pharmacy.
3. Solutions of non electrolytes- Properties and types of solutions, boiling point and boiling point diagrams, Lowering of vapour pressure, osmotic pressure-Semi permeable membrane and osmotic pressure, measurement of osmotic pressure.
4. Solutions of electrolytes - Electrolysis; Conductance: Equivalent and specific conductance.
5. Solubility and Distribution Phenomenon - General principles, types of solvents; solubility of salts; solubility of slightly soluble electrolyte, solubility of weak electrolyte-influence of pH, influence of surfactants; distribution coefficient (Nernst coefficient), co-solvency.
6. Application of Chemical Kinetics: Arrhenius equation and shelf life determination, Theories of reaction rate, Accelerated stability studies: Introduction, conditions used in studying and purpose of studying.
7. Interfacial Phenomenon- Surface tension and surface free Energy ; measurement of surface and interfacial tension, spreading of liquids; adsorption at liquid interfaces, HLB-determination and importance with respect to suspension and emulsion, adsorption on solid surfaces, measurement of surface free area, its significance and importance, electrical double layer, Nernst and Zeta potential , effects of electrolytes, importance with respect to suspension emulsions.
8. Colloids- Introduction, definition, types size and methods of preparation, differences between true , colloidal and coarse suspensions; optical and Kinetic properties : Electro kinetic phenomenon-electrophoresis, electro-osmosis, Donnan membrane equilibrium and its applications; stability of colloidal systems, sensitisation and protective colloids; solubilisation of colloids
9. Rheology- Introduction – Newtonian and Non Newtonian system, viscosity measurements, thixotropy and its pharmaceutical significance; applications of rheology to pharmacy.
10. Micromerities : Introduction to fundamental and derived properties, methods to determine particle size, shape and surface area, density and bulkiness, flow properties, compaction.

2-P-1 Physical Pharmacy (Practical)

Experiments based on Theory topics.

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

2-T-2 Pharmaceutical Engineering- I

1. Introduction to industrial Processing: Unit Operations and Processes, fundamental concept of material and energy balance Dimensional analysis.
2. Materials of pharmaceutical Plant construction: - Factors affecting the material selection for Pharmaceutical plants. Physical, Chemical and mechanical properties and uses of important materials and their alloys employed in the construction of pharmaceutical plants, heat and corrosion resistant alloys.
3. Corrosion and its prevention: - General considerations, types of corrosion, methods of reducing corrosion.
4. Industrial hazards and safety measures: - Mechanical chemical, electrical, fire and explosive hazards in pharmaceutical process, industries including inflammable gases and dusts. Safety measures in pharmaceutical plants and works.
5. Flow of fluids: Fluid static, manometers, Reynolds number and its significance, distribution of velocities across a pipe, Bernoulli's theorem and its applications. Fluid heads, friction losses, Enlargement and contraction losses, measurement of flow of fluids.
6. Transportation of material: - Solids: Types of conveyors. Belt conveyers, Chain conveyers screw conveyors, pneumatic conveyors and conveying of manufactured materials. Liquid: - pipes, pipe fittings, pumps and valves. Gases: - Fans, blowers, compressors and ejectors.
7. Process variables and elements of automatic process control, principles and instruments used in measurement of variables like temperature, pressure, flow level, moisture etc. Introduction to process control.
8. Filtration:- Mechanism of filtration, factors affecting filtration, selection of filters, study of filter media, and filter aids, classification of filters, filter press, leaf filters, continuous rotary filters, media filter, membrane filters, sterile filtration of liquids.
9. Size Reduction: - Mechanism of size reduction, factors affecting size reduction, pharmaceutical application, theory of size reduction, Energy requirement, classification of equipment, Study of cutting rolls, Hammer mill, ball mill roller mill fluid energy mill colloid mill, selection of equipment's, Wet grinding, closed circuit grinding.

2-T-3 Pharmaceutical Engineering -II

1. Heat transfer- Heat transfer mechanisms. Heat transfer by conduction. Fourier's law compound resistance in series. heat flow through a cylinder. conduction. convection through fluids. Natural and forced convection. Surface coefficients. overall heat transfer coefficients. Radiation. Concepts of black and gray body. Heaters. heat exchangers. Inductive heating. Introduction to various types of heating media and fuels. steam as heating medium. properties and uses of steam. Steam traps. heating by electricity. Insulations types and selection of insulators.
2. Evaporation: - Factors affecting evaporation. types of evaporators. study of evaporating pan. evaporating still. short tube evaporators. forced circulation evaporators. film evaporators. Evaporator accessories. Evaporators capacity. heat and material balances. multiple effect evaporation. capacity of multiple effect evaporators under reduced pressure.
3. Distillation: - General theory applied to binary mixtures boiling point and equilibrium diagrams. Raoult's law and Henry's law. constant boiling mixtures. Equilibrium distillations. differential distillations. rectification. construction of rectifying columns. Enthalpy composition diagram. reflux ratio. McCabe-Thiele method for calculation of theoretical plates efficiency. steam distillation. molecular distillation and its applications.
4. Humidity and air conditioning:- Definition of various terms. psychometric charts. wet bulb theory. determination of humidity. methods of increasing and decreasing humidity. air conditioning. cooling towers. importance of humidity and its control.
5. Refrigeration:- General considerations. coefficient of performance. capacity of a refrigerating unit. compression and absorption types of refrigeration cycle. choice of refrigerate. application in pharmacy.
6. Drying: Introduction. theory of drying rate of drying. classification of dryers. vacuum spray. tray. fluidised bed dryers. Principle of freeze drying and freeze dryers..
7. Crystallisation: - Crystal forms and crystal habit solubility curves theory of crystallisation. nucleation and crystal growth material and energy balances. classification. principle under- lying the design and operation of tank. Swenson Walker. Crystal and vacuum type crystallizers.
8. Gas absorption: - Tower packing properties and types of packing materials for tower. tower construction. pressure drop through packed towers. mass transfer coefficients. HETP.

2-P-3 Pharmaceutical Engineering –II (Practical)

Experiments based on Theory topics of Pharmaceutical Engineering- I and II.

2-T-4 Pharmaceutical Jurisprudence

1. Introduction
   a. Pharmaceutical Legislations – A brief review
   b. Drugs & Pharmaceutical Industry – A brief review
   c. Pharmaceutical Education – A brief review
2. An elaborate (practical oriented) study of the following
   a. Pharmaceutical Ethics-Pharmacist in relation to his job
   b. Pharmacy Act 1948
   c. Drugs and Cosmetics Act 1940 and Rules 1945
   d. Medicinal & Toilet Preparations (Excise Duties)Act 1955
   e. Narcotic Drugs & Psychotropic Substances Act 1985 & Rules.
   f. Drugs Price Control Order.
3. A brief study of the following with special reference to the main provisions.
   a. Poisons Act 1919
   b. Drugs and Magic Remedies (Objectionable Advertisements) Act 1954
   c. Medical Termination of Pregnancy Act 1970 & Rules 1975
   d. Prevention of Cruelty to Animals Act 1960
   e. Factories Act 1948
   f. Patents Act 1970.
4. Code of Social Ethics, laws related to vigilance, Anticorruption (Organisation, Structure/Agencies), C.B.I. (Organisation, Structure & laws), and Corrupt Practices & Complaint. These concept and context for profession of pharmacy.
5. A brief study of the various prescription/Non-prescription Products, Medical/Surgical accessories, Diagnostic aids, appliances available in the market.

Note: - The teaching of all the above acts should cover the latest amendments.

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2-T-5 Human Anatomy and Physiology-I

1. Scope of anatomy and physiology and basic terminology used.
2. Structure of cell, its components and their functions.
3. Elementary tissue of the human body: Epithelial, connective, muscular and nervous tissues, their sub-type and their characteristics.
4. Osseous system: Structure, composition and functions of skeleton, classification of joints, type of movement of joints, disorders of joints.
5. Skeletal system: Gross anatomy and physiology of muscle contraction, physiological properties of skeletal muscle and their disorder.
6. Haemopoietic system: Composition and functions of blood and its elements, their disorder, blood groups and their significance, mechanism of coagulation.
7. The lymphatic system: Composition, formulation and circulation of lymph, disorder of lymph and lymphatic system, Basic Physiology and function of spleen.
8. The cardiovascular system: Basic anatomy of the heart, Physiology of heart, blood vessels and circulation, Basic understanding of cardiac cycle, heart sound and electrocardiogram, blood pressure and its regulation. Outline of cardiovascular disorder like hypertension, hypotension, atherosclerosis, angina, myocardial infarction, congestive heart failure and cardiac arrhythmias.

2-P-5 Human Anatomy and Physiology-I (Practical)

Experiments based on Theory topics

B. Pharm. Third Semester

3-T-1 Modern Dispensing Pharmacy

1. **History, definition and scope.**

2. **Prescription:** Types and parts of prescription, handling of prescription, source of errors in prescription, compounding of prescription, care required in dispensing procedures, including labelling of dispensed products, precautions while dispensing various dosage forms, prescription refills, prescription pricing.

3. **Good compounding and dispensing practices:** Personnel, house keeping, building, documentations, prescription filling, drug profile PMR, ADR, purchase records, stock records, idiosyncratic cases.

4. **Latin terms:** knowledge of commonly used Latin terms in prescription and their translation into English.

5. **Principles involved and procedures adopted in dispensing of:** Typical prescriptions like mixtures, solutions, emulsions, creams ointments, powders, capsules, pastes, gels, jellies, suppositories , ophthalmic, pastilles, lozenges, pills, lotions, liniments, inhalation, paints, sprays, tablet triturates.

6. **Incompatibilities in prescription:** Definition, types, physical, chemical and therapeutic, Intentional and unintentional, toleration and adjusted incompatibility. Inorganic incompatibilities including those of metals and their salts, non-metals, acids, alkalis. Organic incompatibilities including purine bases, alkaloids, barbiturates, tannins, pyrazolone derivatives, amino acids, quaternary ammonium compounds, carbohydrates, glycosides, anaesthetics, dyes, surface active agents. Correction of incompatibilities.

7. **Dispensing calculations**. Basis of posology, calculation of doses for infants, children, adults, elderly and renally impaired patients. Detection of overdoses in prescription, knowledge of prophylactic and therapeutic doses with route of administration. Different systems of weight and measurements and their interconversions.

8. **Surgical products:** Definition, primary wound dressing, absorbents, surgical cotton, surgical gauze's etc., bandages, adhesive tape, protective cellulose haemostatics, official dressings, absorbable and non absorbable sutures, ligatures and catgut. Medical prosthetics and organ replacement materials.

3-P-1 Modern Dispensing Pharmacy

Experiment based on theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

3-T-2 Pharmaceutical Chemistry Organic-I

1. Structure and Properties : Atomic structure, Atomic orbitals, Molecular orbital theory, wave equation, Molecular orbitals, Bonding and Antibonding orbitals, Covalent bond, Hybrid orbitals, Intermolecular forces, Bond dissociation energy, Polarity of bonds, Polarity of molecules, structure and physical properties, Intermolecular forces, Acids and bases.

2. Stereochemistry: Isomerism and nomenclature and associated physicochemical properties, optical activity, stereoisomerism, specification of configuration, Reactions involving stereoisomers, chirality, chiral reagents conformations.

3. Structure; Nomenclature; Preparation and Reactions of: Alkanes, Alkenes, Alkynes; Cycloalkanes, Dienes, Benzene, Polynuclear aromatic compounds, Arenes, Alkyl halides, Alcohols, Ethers, Epoxides, Amines, Phenols, Aldehydes and ketones, Carboxylic acids, Functional derivatives of carboxylic acids, Reactive intermediates - carbocations, carbanions, carbenes, nitrene and nitrenium ions.

3-P-2 Pharmaceutical Chemistry Organic-I

Experiment based on theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

3-T-3 Pharmaceutical Chemistry Organic-II

1. Nucleophilic and Electrophilic Aromatic Substitution Reactions: Reactivity and orientation; Electrophilic and Nucleophilic Addition Reactions; Rearrangements (Beckman, Hoffman, Benzilic acid, pinacole-pinacolone and Beyer-Villiger);

2. Elimination reactions Conservation of orbital symmetry and rules: Electrocyclic, Cycloaddition and sigmatropic reactions; Neighbouring group effects; Catalysis by transition metal complexes, Stereoselective and stereospecific reactions; New organic reagents used in drug synthesis.

3. Heterocyclic Compounds: Chemistry, preparations and properties of some important heterocyclis containing 3, 4, 5, 6 & 7 atoms with one or two heteroatoms like O, N, and S.

4. Chemistry of lipids, Carbohydrates, Proteins and Nucleic acids.

3-P-3 Pharmaceutical Chemistry Organic-II

Experiment based on theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

3-T-4 Pharmaceutical Analysis: I

1. Significance of quantitative analysis in quality control, Different techniques of analysis, Preliminaries and definitions, Significant figures, Rules for retaining significant digits, Types of errors, Mean deviation, Standard deviation, Statistical treatment of small data sets, Selection of sample, Precision and accuracy, Fundamentals of volumetric analysis, methods of expressing concentration, primary and secondary standards.

2. Acid Base Titrations: Acid base concepts, Role of solvent, Relative strengths of acids and bases, Ionization, Law of mass action, Common ion effect, Ionic product of water, pH, Hydrolysis of salts, Henderson-Hasselbalch equation, Buffer solutions, Neutralization curves, Acid-base indicators, Theory of indicators, Choice of indicators, mixed indicators, Polyprotic system, Polyamine and amino acid systems, Amino acid titration, applications in assay of HIO_4, NaOH, $CaCO_3$ etc.

3. Oxidation Reduction Titrations : Concepts of oxidation and reduction, Redox reactions, Strengths and equivalent weights of oxidizing and reducing agents, Theory of redox titrations, redox indicators, Cell representations, Measurement of electrode potential, Oxidation-reduction curves, Iodimetry and Iodometry, Titrations involving ceric sulphate, potassium iodate, potassium bromate, potassium permanganate; titanous chloride and Sodium 2, 6-dichlorophenol, indophenol.

4. Precipitation Titrations: Precipitation reactions, Solubility products, Effect of acids, temperature and solvent upon the solubility of a precipitate, Argentometric titrations and titrations involving ammonium or potassium thiocyanate, mercuric nitrate, and barium sulphate, Indicators, Mohrs method, Volhard's method and Fajan's method.

5. Gravimetric Analysis: Precipitation techniques, solubility products; The colloidal state, supersaturation co-precipitation, postprecipitation, digestional washing of the precipitate, filtration, filter papers and crucibles, ignition, thermogravimetric curves, Specific examples like barium sulphate, aluminium as aluminium oxide, calcium as calcium oxalate and magnesium as magnesium pyrophosphate, organic precipitants.

3-P-4 Pharmaceutical Analysis: I

Experiment based on theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

3-T-5 Human Anatomy and Physiology-II

1. Digestive System: Gross anatomy of the gastro-intestinal tract, functions of its different parts including those of liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food. Disorders of digestive system.

2. Respiratory System: Anatomy of respiratory organs & its functions, respiration, mechanism and regulation of respiration, respiratory volumes and vital capacity.

3. Central Nervous System: Functions of different parts of brain and spinal cord. Neurohumoral transmission in the central nervous system, reflex action electroencephalogram, specialized functions of the brain. Cranial nerves and their functions.

4. Autonomic Nervous System: Physiology and functions of the autonomic nervous system. Mechanism of neurohumoral transmission in the ANS.

5. Urinary System: Various parts, structures and functions of the kidney and urinary tract. Physiology of urine formation and acid-base balance. Diseases of the urinary system.

6. Reproductive System: Male and female reproductive systems and their hormones, physiology of menstruation, coitus and fertilization. Sex differentiation, spermatogenesis & oogenesis. Pregnancy its maintenance and parturition.

7. Endocrine System: Basic anatomy and physiology of pituitary, thyroid, parathyroid. Adrenals, pancreas, testes and ovary, their hormones and functions.

8. Sense Organs: Basic anatomy and physiology of the eye (vision), ear (hearing), taste buds, nose (smell) and skin (superficial receptors).

9. a. Concepts of health and disease: Disease causing agents and prevention of disease.

b. Classification of food requirements: Balanced diet, nutritional deficiency disorders, their treatment and prevention, specifications for drinking water.

c. Demography and family planning: Medical termination of pregnancy.

d. Communicable diseases: Brief outline, their causative agents, modes of transmission and prevention (Chicken pox, measles, influenza, diphtheria, whooping cough, tuberculosis, poliomyelitis, helminthiasis, malaria, filariasis, rabies, trachoma, tetanus, leprosy, syphilis, gonorrhoea, and AIDS).

e. First Aid: Emergency treatment of shock, snake bites, burns, poisoning, fractures and resuscitation methods.

3-P-5 Human Anatomy and Physiology-II

Experiment based on theory topics

B. Pharm. Fourth Semester

4-T-1 Pharmaceutical Technology- I

1. **Centrifugation:** - Theoretical consideration, principle of centrifugation, study of laboratory and large scale equipments and their applications. Size Reduction: - Mechanism of size reduction, factors affecting size reduction, pharmaceutical application, theory of size reduction, energy requirement, classification of equipment. Study of cutting rolls, Hammer mill, ball mill, roller mill, fluid energy mill, colloid mill, selection of equipments. Wet grinding, closed circuit grinding.
2. **Size separation:** - Standards for powders, sieves and sieving equipment fluid classification methods sedimentation, Ceylon separator elutriation particle size distribution and its measurement representation of data.
3. **Extraction:** - Principles of solid-liquid and liquid-liquid extraction. Theories of extraction of drugs, study of diffusion batteries, Door agitator, continuous counter current extraction system, extraction towers, Podbielniak extractor.
4. **Mixing :-** Fundamentals, mechanism of mixing, Factors influencing the selection of mixers, study of solid- solid, solid-liquid and liquid- liquid mixers used in pharmaceutical industry, ultrasonic mixers.
5. **Compaction and compression:-** Measurement of punch forces, transmission of forces through powders distribution of forces, acting within the powder mass, effect of pressure on relative volume, Lubrication of the die wall, adhesion and cohesion of particles, strength of granules, factors affecting the strength of tablets.
6. Study of principle underlying the design and operation of various machines employed in the small scale and large scale production of tablets, capsules, ointments, liquid orals and parenterals.
7. **Packaging of Pharmaceutical Products:** Packaging components, types, specification and methods of evaluation stability aspects of packaging. Packaging equipment's, factors influencing choice of containers, legal and other official requirements for containers, package testing.
8. **Pilot plant scale up Techniques:** - Concept of pilot plant, Pilot plant-scale up techniques in pharmaceuticals.

4-P-1 Pharmaceutical Technology- I

Experiment based on theory topics

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4-T-2 Pharmaceutical Analysis- II

Theoretical considerations and application in drug analysis and quality control of the following analytical techniques:

1. Non-aqueous titrations
2. Complexometric titrations
3. Miscellaneous Methods of Analysis: Diazotisation titrations, Kjeldahl method of nitrogen estimation, Karl-Fischer titration, Oxygen flask combustion.
4. Extraction procedures including separation of drugs from excipients
5. Chromatography: The following techniques will be discussed with relevant examples of pharmacopocial products. TLC, HPLC, GLC, HPTLC, paper chromatography and column chromatography.
6. Potentiometry
7. Conductometry
8. Coulometry
9. Polarography
10. Amperometry

4-P-2 Pharmaceutical Analysis- II

Experiment based on theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

4-T-3 Pharmaceutical Biochemistry

1. Biochemical organization of the cell and transport processes across cell membrane.

2. The concept of free energy, determination of change in free energy - from equilibrium constant and reduction potential, bioenergetics, production of ATP and its biological significance.

3. Enzymes: Nomenclature, enzyme kinetics and its mechanism of action, mechanism of inhibition, enzymes and iso-enzymes in clinical diagnosis.

4. Co-enzymes: Vitamins as co-enzymes and their significance. Metals as co- enzymes and their significance.

5. Carbohydrate Metabolism: Conversion of polysaccharide to glucose-1-phosphate, glycolysis and fermentation and their regulation. Gluconeogenesis and glycogenolysis, metabolism of galactose and galactosemia, role of sugar nucleotides in biosynthesis, and pentose phosphate pathway.

6. The Citric Acid Cycle: Significance, reactions and energetic of the cycle, Amphibolic role of the cycle, and Glyoxylic acid cycle.

7. Lipids Metabolism: Oxidation of fatty acids, β-oxidation & energetic, α-oxidation, ω-oxidation. Biosynthesis of ketone bodies and their utilization. Biosynthesis of saturated and unsaturated fatty acids, control of lipid metabolism. Essential fatty acids & eicosanoids (prostaglandins, thromboxanes and leukotrienes), phospholipids, and sphingolipids.

8. Biological Oxidation: Redox-potential, enzymes and co-enzymes involved in oxidation reduction & its control, the respiratory chain, its role in energy capture and its control, Energetics of oxidative phosphorylation. Inhibitors of respiratory chain and oxidative phosphorylation, mechanism of oxidative phosphorylation.

9. Nitrogen & Sulphur Cycle: Nitrogen fixation, ammonia assimilation, nitrification and nitrate assimilation, sulphate activation, sulphate reduction. Incorporation of sulphur in organic compounds, release of sulphur from organic compounds.

10. Metabolism of Ammonia and Nitrogen Containing Monomers: Nitrogen balance. Biosynthesis of amino acids. Catabolism of amino acids. Conversion of amino acids to specialized products, Assimilation of ammonia. Urea cycle, metabolic disorders of urea cycle. Metabolism of sulphur containing amino acids. Porphyrin biosynthesis. Formation of bile pigments. Hyperbilirubinemia. Purine biosynthesis. Purine nucleotide interconversion. Pyrimidine biosynthesis and formation of deoxyribounucleotides.

11. Biosynthesis of Nucleic Acids: Brief introduction of genetic organization of the mammalian genome, alteration and rearrangements of genetic material, Biosynthesis of DNA and its replication. Mutation. Physical & chemical mutagenesis/ carcinogenesis. DNA repair mechanism. Biosynthesis of RNA.

12. Genetic Code and Protein Synthesis: Genetic code. Components of protein synthesis and inhibition of protein synthesis. Brief account of genetic engineering and polymerase chain reactions. Regulation of gene expression.

4-P-3 Pharmaceutical Biochemistry

Experiment based on theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

4-T-4 Pharmacognosy-I

1. Definition, history, scope and development of Pharmacognosy
2. Sources of drugs: Biological, marine, mineral and plant tissue cultures as sources of drugs
3. Classification of drugs: Alphabetical, morphological, taxonomical, chemical and pharmacological classification of drugs.
4. Cultivation, Collection, Processing and storage of crude drugs: Factors influencing cultivation of medicinal plants. Types of soils and fertilizers of common use. Pest management and natural pest control agents. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants.
5. Quality control of crude drugs: Adulteration of crude drugs and their detection by organoleptic, microscopic, physical, chemical and biological methods and properties.
6. Introduction to active constituents of drugs: their isolation, classification and properties.
7. Systematic pharmacognostic study of following:

a) Carbohydrates and derived products: agar, guar gum acacia, honey, isabgol, pectin, starch, sterculia and tragacanth.

b) Lipids: Bees wax, castor oil, cocoa butter, cod liver oil, lard, linseed oil, rice bran oil, shark liver oil and wool fat.

4-P-4 Pharmacognosy–I

Experiment based on theory topics

4-T-5 Applied Mathematics

1. Algebra : Equations reducible to quadratics, simultaneous equations (linear and quadratic). Determinants, properties of solution of simultaneous equations by Cramer's rule, matrices, definition of special kinds of matrices, arithmetic operations on matrices, inverse of a matrix, solution of simultaneous equations by matrices, pharmaceutical applications of determinants and matrices. Evaluation of En1, En2, and En3, mensuration and its pharmaceutical applications.

2. Measures of Central Value: Objectives and pre-requisites of an ideal, measure, mean, mode and median.

3. Trigonometry: Measurement of angle, T-ratios, addition, subtraction and transformation formulae, T-ratios of multiple, submultiple, allied and certain angles. Application of logarithms in pharmaceutical computations.

4. Analytical Plane Geometry: Certain co-ordinates, distance between two points, area of triangle, a locus of point, straight line, slope and intercept from, double- intercept form, normal (perpendicular form), slope-point and two point form, general equation of first degree.

5. Calculus:

Differential: Limits and functions, definition of differential coefficient, differentiation of standard functions, including function of a function (Chain rule). Differentiation of implicit functions, logarithmic differentiation, parametric differentiation, successive differentiation.

Integral: Integration as inverse of differentiation, indefinite integrals of standard forms, integration by parts, substitution and partial fractions, formal evaluation of definite integrals.

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

B. Pharm. Fifth Semester

5-T-1 Pharmaceutical Technology-II

1. Liquid Dosages Forms: Introduction, types of additives used in formulations, vehicles, stabilisers, preservative, suspending agents, emulsifying agents, solubilizers, colours, flavours and others. Manufacturing, packaging, labelling and evaluation of clear liquids, suspensions and emulsions official in pharmacopoeia.
2. Semisolid Dosage Forms: Definitions, types, mechanisms of drug penetration, factors influencing penetration, semisolid bases and their selection. General formulation of semisolids, clear gels manufacturing procedure, evaluation and packaging.
3. Suppositories: Ideal requirements, bases, displacement value, manufacturing procedure, packaging and evaluation.
4. Capsules: Advantages and disadvantages of capsule dosage form, Material for production of hard gelatin capsule, size of capsule, formulation, method of capsule filling. Soft gelatin capsules: Shell and capsule content, manufacture. Importance of base absorption and minimum/gm factors in soft capsules. Quality control, stability testing and storage of capsule dosage forms.
5. Tablets: Advantages and disadvantages of tablets, applications and formulations of different types of tablets, granulation technology on large-scale by various techniques, different types of tablet compression machinery and the equipments employed, evaluation of tablets. Coating of Tablets: Types of coating, film forming materials, formulation of coating solution, equipments for coating, coating process, evaluation of coated tablets. Stability kineties and quality assurance.
6. Blood Products and Plasma Substitutes: Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin, foam plasma substitutes, ideal requirements, PVP, dextran, etc.
7. Pharmaceutical Aerosols: definition, propellants, general formulation, manufacturing and packaging methods, pharmaceutical applications.
8. Ophthalmic Products: Requirements, types, formulation, methods of preparation, labeling, containers, evaluation.

5-P-1 Pharmaceutical Technology-II (Practical)

Experiments based on Theory topics.

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

5-T-2 Pharmaceutical Microbiology

1. Scope of Microbiology - Historical development - applications to pharmaceuticals
2. Classification of micro-organisms into bacteria, yeast and fungi, rickettsia and viruses. Stains and types of staining techniques, introduction to microscopy and its techniques.
3. Biology of micro-organisms:

a). Bacteria - Size and shape, structure, cell wall, cytoplasm, capsules, spores (properties, formation, germination), locomotion, reproduction (binary fission, reproduction involving genetic exchange, transformation, conjugation and transduction), growth, (growth requirements, culture media, growth curve, measurement of bacterial growth and mean generation time), counting methods (total count and viable count),characteristics of disease causing bacteria (Staphylococcus, Streptococcus, Neisseria, Clostridium, Corynebacterium, Pseudomonas, Vibrio, Hemophillus, Escherichia, Salmonella, Mycobacterium).

b). Yeasts and Fungi - Introduction, classification and characteristics of fungi class with their clinical significance.

c). Rickettsia - Introduction - clinical significance and applications.

d). Viruses - Introduction - general properties (size, nucleic acid content, metabolism) - structure of viruses (helical symmetry and icosahedral symmetry) - effect of chemical and physical agents on viruses - virus-host cell interactions - bacteriophage and its epidemiological uses (lytic growth cycle and lysogeny) – human viruses and their cultivation in cell culture, chick embryo and animal inoculation - multiplication of human viruses - interferon's - HIV - tumor viruses - prions.

4. Sterilisation - Definition - Classification into thermal and non-thermal methods - details of hot air sterilization, autoclaving, gaseous, radiation, sterile filtration - bio burden determination - sterilisation monitors (physical, chemical and biological indicators) - sensitivity of micro organisms, survivor curves, expression of resistance (D-values and z-values), sterility assurance - Applications of autoclaving in hospitals
5. Disinfection and Sanitation - Definition (antiseptics, preservatives and sanitising agents) – Chemical classification (acids and esters, alcohols, etc.) - factors affecting choice of antimicrobial agent (properties of chemical agent and microbiological challenge, environmental factors and toxicity of agent) - factors affecting disinfection process - evaluation of disinfection (RW coefficient, Kelsey-Sykes test) - dynamics of disinfection.
6. Microbial Epidemiology - portal of entry (respiratory tract, intestinal tract, urionogenital tract, skin and conjunctiva) - resistance to host defence, inflammatory response, avoidance of phagocytosis – manifestation of disease - damage to tissues.
7. Industrial Microbiology: Preparation, standardization of various antibiotics, vitamins and glycerides.

5-P-2 Pharmaceutical Microbiology (Practical)

Experiments based on Theory topics

5-T-3 Pharmaceutical Analysis- III

1. Introduction, pharmacopoeial monograph, literature collection, data handling and expression of analytical results - Documentation and record keeping.
2. Validation: Validation of analytical Methods and Equipment as defined in USP
3. General physical method- Density, Solubility, Molecular weight, Refractometry, Optical activity, Viscosity, Surface tension.
4. Analysis of Drugs and Excipients in Solid State- Introduction - particle size analysis and scope of methods.
5. Instrumental methods in the development and use of medicines -Introduction, product characterisation for drug development, product development, production and pharmacopoeial controls, drug metabolism and pharmacokinetics.
6. The basis of spectrophotometry- Introduction, atomic spectra, molecular spectra, instrumentation, spectrophotometer.
7. Ultraviolet-visible absorption spectrophotometry- Introduction, quantitative spectrophotometric assay of medicinal substances, assay of substances in multi-component samples, optimum condition for spectrophotometric measurements, structural analysis.
8. Atomic emission spectrometry and atomic absorption spectrophotometry.
9. Spectroflurimetry- Introduction, instrumentation, application and quantitative aspects.
10. Radiochemistry - Radio-immuno assay (RIA) and related immunoassay techniques. ELISA-technique - theory, Instrumentation and applications.
11. Nuclear Magnetic resonance spectroscopy- Introduction, instrumentation, application and quantitative aspects, carbon-13 NMR (CMR) spectroscopy.
12. Mass spectrometry- Introduction, instrumentation and practical application.
13. The application of spectroscopic techniques to structural elucidation- Introduction; aids to spectral interpretation, exercise and solutions.

5-P-3 Pharmaceutical Analysis- III

Experiments based on Theory topics

5-T-4 Medicinal Chemistry –I

1. Introduction and History
2. Biopharmaceutical Properties of Drug Substance
3. Structural features and Pharmacological activity
4. Theoretic aspects of drug design
5. Molecular Modelling
6. Receptors and Drug action
7. Physicochemical Properties in relation to biological action.
8. Metabolic changes of drugs and related organic compounds.
9. The synthesis and SAR of the compound, Classification under each class and Biochemical approaches in drug design wherever possible should be discussed.

a. Adrenergic agents: Phenyl ethylamine analogs, Epinephrine, Norepinephrine, Ephedrine, Pseudo-ephedrine HCl, Metaraminol bitartrate, Triminopeptane and Naphazoline HCl.
b. Cholinergic and anticholinergic: Acetylcholine and its analogs, Atropine
c. Neuromuscular Blocking Agents
d. General anaesthetics: - Cyclopropane, halothane, vinyl ether, tribromethanol, Sodium thiopental
e. Local anaesthetics: - Cocaine, Procaine Hydrochloride, Benzocaine, Butacaine sulphate, Metabutethiamine HCl , Dibucaine HCl, Lignocaine HCl, Diperodon HCl.

5-P-4 Medicinal Chemistry –I (Practical)

Experiments based on Theory topics

5-T-5 Pharmacology-I

1- General Pharmacology

a. Introduction to Pharmacology- Definition, scope and various branches, source of drugs, dosage form and routes of drug administration. Factors affecting absorption from gut
b. Pharmacodynamics-Mechanism of drug action, Receptors, classification and drug receptors interaction, combined effect of drugs, factors modifying drug action, drug dose and response.
c. Pharmacokinetics-Mechanism and principle of Absorption, Distribution, Metabolism and Excretion of drugs. Principles of basic and clinical pharmacokinetics. Bioavailability and bioequivalence studies.
d. Pharmacogenetics
e. Adverse drug reactions, Drug interactions
f. Discovery and development of new drugs-Preclinical and clinical studies.

2. Pathophysiology of common diseases

a. Basic Principles of Cell Injury and Adaptations- Causes of Cellular injury, pathogenesis, morphology of cell injury, adaptations and cell death.
b. Basic mechanisms involved in the process of inflammation and repair- Vascular and cellular events of acute inflammation, chemical mediators of inflammation, pathogenesis of chronic inflammation, brief outline of the process of repair.
c. Immunopathophysiology- T and B cells, MHC proteins, antigen presenting cells, immune tolerance, pathogenesis of hypersensitivity reactions, autoimmune diseases, AIDS, Amyloidosis.
d. Pathophysiology of diseases- Asthma, diabetes, rheumatoid arthritis, gout, ulcerative colitis, neoplasia, psychosis, depression, mania, epilepsy, acute and chronic renal failure, hypertension, angina, congestive heart failure, atherosclerosis, myocardial infarction, congestive heart failure, peptic ulcer, anemias, hepatic disorders, tuberculosis, urinary tract infections and sexually transmitted diseases. Wherever applicable the molecular basis should be discussed.

3. Bioassay

Bioassay of Drugs and Biological Standardization- Principles and methods of bioassay, Bioassay of insulin, oxytocin, vasopressin, ACTH, histamine and 5-HT

4. Principles of Toxicology

a. Definition for acute, sub acute and chronic toxicity, genotoxicity, carcinogenicity, teratogenicity and mutagenicity studies.
b. Definition of poison, general principles of treatment of poisoning with particular reference to barbiturates, opioids, organophosphorous and atropine poisoning.
c. Heavy metals and heavy metal antagonists.

5. Classification, Principle of drug action, Receptors, mechanism of action, dynamics of absorption, distribution, metabolism, excretion, doses and side effect of drugs acting on peripheral nervous system:
a. Neurohumoral transmission (Autonomic and somatic).
b. Parasympathomimetics, Parasympatholytics, Sympathomimetics, Sympatholytics, Ganglionic stimulants and blockers.
c. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).
d. Local anesthetic agents.
e. Drugs used in Myasthenia Gravis and Alzheimer's disease.

5-P-5 Pharmacology-I (Practical)

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

B. Pharm. Sixth Semester

6-T-1 Pharmaceutical Technology-III

1. Preformulation studies:
   a) Study of physical properties of drug like physical form, polymorphism, particle size, shape, density, wetting, dielectric constant, Solubility, dissolution and organoleptic property and their effect on formulation, stability and bioavailability.
   b) Study of chemical properties of drugs like hydrolysis, oxidation, reduction, racemisation , decarboxylation polymerization, etc., and their influence on formulation and stability of products. Drug –excipient interaction
   c) Study of pro-drugs in solving problems related to stability, bioavailability and elegancy of formulations
2. Parenteral Products.
   a. Formulation factors, Vesicles and additive, preparation of solution, suspensions, infusion fluids, lyophilisation & preparation of sterile powders.
   b. Containers and Closures: Prefilling treatment, washing of containers and closures, filling and closing of ampoules, vials, equipment for large-scale manufacture and evaluation of parenteral products.
   c. Aseptic Techniques-source of contamination and methods of prevention, Design of aseptic area, Laminar flow bench services and maintenance
3. Validation: Introduction, types and validation methods for pharmaceutical operations involved in the production of following pharmaceutical products: Capsules, Tablets, Solutions, Suspensions, Emulsions, Ointments and Cream.
4. Kinetics and drug stability: general consideration and concepts, half-life determination, accelerated stability study and expiration dating.
5. Microencapsulation: Concept, core material, coating materials, techniques, application.
6. Controlled/Sustained Released Products: Oral, transdermal and parenteral systems and their evaluation.
7. Targeted drug delivery: Rationale, drug delivery systems (Microparticles, nanoparticles, liposomes, resealed erythrocytes)
8. GMP, quality assurance, quality audit, GLP, ISO 9000 series, TQM, Drug Regulatory Affairs, Introduction to WHO and ICH guidelines.

6-P-1 Pharmaceutical Technology-III (Practical)

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

6-T-2 Medicinal Chemistry-II

The synthesis and SAR of the compound, Classification under each class and biochemical approaches in drug design wherever possible should be discussed.

1. **Hypnotic and Sedatives:** Barbitone sodium, Allobarbitone Hexabarbitone and Glutethimide. Sulfonals.
2. **Tranquilizers:** Reserpine, Benzquinamide, Chlopromazine HCl, Triflupromazine HCl, Chloreyclizine HCl, Chlordizepoxid and Diazepam.
3. **Anticonvulsants:** Phenobarbital, Dipheny hydantion, Trimethadione, paramethadione, phensuximide.
4. **Antidepressant:** Imipramine, amitryptyline, Doxepine, Trimipramine, clomipramine, Desipramine, Nortriptyline, Maprotilline, Amoxapine, MAO inhibitors, Lithium Compounds
5. **Analgesics, antipyretics and Anti-inflammatory agents:** Morphine HCl, Mefenamic acid, Indomethacin, Acetaminophen, aminopyrin, Phenybutazone and Ibuprofen, Analgin, pethidine, Dexapropoxyphen, Ketoprofen.
6. **Antihypertensive:** Piperoxan, Dibenamine, Azapentine phosphate, Tolazoline Hydrochloride, Propranolol hydrochloride, Hexa-methonium Bromide, Pentolinium tartrate, dopa-Guanethidine Sulphate, A study of Rauwolfia veratrum and Ergot alkaloids in general
7. **Analeptics:** Picrotoxin, Pentylenetetrazol, Nikethamide, Caffeine, amphetamine and N-allylmorphine.
8. **Anticoagulants:** Bishydroxy coumarin, Ethyl biscoumacetate, Sodium warfarin, Diphenadione, and Heparin.
9. **Plasma Extenders:** General Survey of important compounds.
10. Immunosuppressive and immunostimulants

6-P-2 Medicinal Chemistry-II (Practical)

Experiments based on Theory topics

6-T-3 Pharmacology –II

1. Pharmacology of Central Nervous System

Management of CNS disorders (Epilepsy, Parkinsonism, schizophrenias, depression)

a. Neurohumoral transmission in the C.N.S with special emphasis on pharmacology of various neurotransmitters.
b. General anesthetics.
c. Alcohols and disulfiram.
d. Sedatives, hypnotics and centrally acting muscle relaxants
e. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
f. Anti-epileptic drugs.
g. Anti-parkinsonism drugs.
h. Analgesics, antipyretics, and anti-inflammatory agents.
i. Management of rheumatic diseases and drugs used in gout.
j. Narcotic analgesics and antagonists.
k. C.N.S stimulants.
l. Drug addiction, drug abuse, tolerance and dependence.

2. Pharmacology of Cardiovascular system

Management of CVS disorders (Hypertension, CCF, Angina, Acute Myocardial Infarction, cardiac Arrhythmias)

a. Introduction of haemodynamics and Electrophysiology of heart.
b. Cardiac glycosides: Digitalis & Coronary dilators
c. Anti-hypertensive drugs.
d. Anti-anginal drugs.
e. Anti-arrhythmic drugs.
f. Drugs used in congestive heart failure & atherosclerosis
g. Anti-hyperlipidemic drugs.
h. Vasodilator drugs including calcium channel blockers and beta adrenergic antagonists
i. Drug used in the therapy of shock.

3. Drugs acting on the Hemopoietic system:

a. Hematinics and growth hormones
b. Anticoagulants, Vitamin K and Hemostatic agents
c. Fibrinolytic and anti-platelet drugs
d. Blood and plasma volume expanders

4. Peptides and Proteins as Mediators:

a. General Principles of peptide pharmacology.
b. Biosynthesis and regulation of peptides.
c. Peptide antagonists.
d. Protein and peptide as drugs.

5. Miscellaneous agents

a. Immunostimulants and immunosuppressants.
b. Therapeutic Drug Monitoring
c. Concept of Essential Drugs and Rational Drug use

6-P-3 Pharmacology–II (Practical)

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

6-T-4 Pharmacognosy –II

1. Resins: Study of Drugs Containing Resins and Resin Combination like Colophony, podophyllum, jalap, cannabis, capsicum, myrrh, asafoetida, balsam of tolu, balsam of peru, benzoin, turmeric, ginger.
2. Tannins: Study of tannins and tannin containing drugs like Gambir, black catechu, gall and myrobalan.
3. Volatile Oils : General methods of obtaining volatile oils from plants, Study of volatile oils of Mentha, Coriander, Cinnamon, Cassia, Lemon peel, Orange peel, Lemon grass, Citronella, Caraway, Dill, Spearmint, Clove, Fennel, Nutmeg, Eucalyptus, Chenopodium, Cardamom, Valerian, Musk, Palmarosa, Gaultheria, Sandal wood.
4. Phytochemical Screening:
a. Preparation of extracts.
b. Screening of alkaloids, saponins, cardenolides and bufadienolides, flavonoids and leucoanthocyanidins, tannins and polyphenols, anthraquinones, cynogenetic glycosides, amino acids in plant extracts.
5. Fibres: Study of fibres used in pharmacy such as cotton, silk, wool, nylon, glass wool, polyester and asbestos.
6. Pharmaceutical aids: Study of pharmaceutical aids like talc, diatomite, kaolin, bentonite, gelatin and natural colors.

6-P-4 Pharmacognosy –II (Practical)

Experiments based on Theory topics

6-T-5 Hospital and Community Pharmacy

1. Organization and Structure: Organization of a hospital and hospital pharmacy. Responsibilities of a hospital pharmacist. Pharmacy and therapeutic committee. Budget preparation and Implementation.

2. Hospital Formulary: Contents, preparation and revision of hospital formulary. Role of pharmacist in health care. Pharmacy ethics

3. Pharmacy Profession
   a. Introduction to profession of pharmacy
   b. Employment position and job responsibilities of a pharmacist
4. Drug Store Management and Inventory Control:
(a) Organization of drug store. Types of materials stocked, storage conditions.
(b) Purchase and Inventory Control principles, purchase procedures. Purchase order. Procurement and stocking.

5. Drug distribution Systems in Hospitals:
(a) Out-patient dispensing, methods adopted.
(b) Dispensing of drugs to in-patients. Types of drug distribution systems. Charging policy, labeling.
(c) Dispensing of drugs to ambulatory patients.
(d) Dispensing of controlled drugs.

6. Central Sterile Supply Unit and their Management: Types of materials for sterilization, packing of materials prior to sterilization, sterilization equipments. Supply of sterile materials.

7. Manufacture of Sterile and Nonsterile Products: Policy making of manufacturable items, demand and costing, personnel requirements, manufacturing practice, Master formula Card, production control, Manufacturing records.

8. Drug Information Services: Sources of information on drugs, disease, treatment schedules, procurement of information, Computerized services (e.g., MEDLINE). Retrieval of information. Medication error.

9. Records and Reports: Prescription filling, drug profile, patient medication profile, cases on drug interaction and adverse reactions, idiosyncratic cases, etc.
10. Clinical Pharmacy: Introduction to clinical pharmacy, definition, concept, scenario of clinical pharmacy and pharmaceutical care. Daily activities of a clinical pharmacist and Medication errors

11. Nuclear Pharmacy: Introduction to Radio- pharmaceuticals, radio-active half-life, Units of radio-activity Production of radio-pharmaceuticals, methods of isotopic tagging, preparation of radio-isotopes in laboratory using radiation dosimetry, radio-isotope generators. Permissible radiation dose level. Radiation hazards and their prevention, specifications for radio-active laboratory.

6-P-5 Project work

Submission of Project report as Review/ Research/field survey, etc.

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B. Pharm. Seventh Semester

7-T-1 Biopharmaceutics and Pharmacokinetics

1. Introduction to biopharmaceutics and pharmacokinetics: definition, historical development, fundamental principls, role in formulation development and clinical setting

2. Drug absorption : Passage of drugs across biological barrier (passive diffusion, active transport, facilitated diffusion, ion-pair formation and pinocytosis): Factors influencing absorption- I. physico-chemical, physiological and pharmaceutical.

3. Drug disposition: Factors affecting distribution and barriers, drug-protein binding in blood and tissue.

4. Pharmacokinetics: Significance of plasma drug concentration measurements. Compartment model-definition and scope. Pharmacokinetics of drug absorption-Zero order and first order absorption rate constant using Wagner-Nelson and residual methods.

5. Compartment kinetics – One compartment and two compartment models. Determination of pharmacokinetic parameters from plasma and urine data after drug administration by intravascular and oral route.

6. Clearance concept, Mechanism of renal clearance, clearance ratio, determination of renal clearance. Excretion ratio, hepatic clearance, biliary excretion. Extra-hepatic circulation.

7. Non-linear pharmacokinetics with special reference to one compartment model after I.V. drug administration.

8. Clinical Pharmacokinetics: Definition and scope-Dosage adjustment in patients with and without renal and hepatic failure.. Pharmacokinetic drug interactions and their significance in combination therapy.

9. Bioavailability and bioequivalence: Measures of bioavailability, C_{max}, t_{max}, K_e and Area Under the Curve (AUC); Design of single dose bioequivalence study and relevant statistics; Review of regulatory requirements for conducting bioequivalent studies. Biopharmaceutical Classification System (BCS) of drugs.

10. Performance evaluation methods

a) In vitro dissolution studies for solid dosage forms, methods, interpretation of dissolution data.

b) In vivo methods of evaluation and statistical treatment.

11. Software used in biopharmaceutics and pharmacokinetics and its importance.

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7-T-2 Medicinal Chemistry –III

The synthesis and SAR of the compound, Classification under each class and Biochemical approaches in drug design wherever possible should be discussed.

1. **Diuretics:** Mersalyl. Ehacrynic acid Aminophyline. Aminometradine. Triameterene Acetazolamide and Bendroflumethiazide. Chlorthiazide. Chlorthalidone. Furesemide and Spironolactone mercurials. Carbonic anhydrase inhibitors and benzothidiazines
2. **Antihistaminic:** Ethanolamine derivatives- Diphenhydramine HCl. Dymenhydrinate. Pyrulaminemaleate. Pheniramine maleate. Chlorpheniramine maleate. Promethazine HCl
3. **Expectorants and Antitussive:** Potassium glucosulphonate. Terpene hydrate. Noscapine. Carbetapentane citrate.
4. **Antineoplastic drugs:** Drugs covered in major groups of anticancer drugs viz., alkylating agents, antimetabolites, antitumour antibiotics and plant alkaloids.
5. **Sulfonamides:** Mechanism of action of Sulfonamides, synthesis and uses of Sulphacetamide, Sulphaguandine, Sulphadiazine, Sulphamerazine, Sulphasomidine, Trimethoprim, Phathiazole, Sulphadoxin.
6. **Antibiotic:** Chemistry, Biosynthesis and semi-synthetic penicillin, Chloramphenicol & tetracycline, A study of the properties and use of Ampicillin, Kanamycin, Neomycin, Erythromycin, streptomycin, Nystatin, Bacitracin and Cycloserine. Structural variations in chloramphenicol and Tetracycline.
7. **Antitubercular drugs:** Study of PAS, Isonicotinaldehyde, thiosemicarbazine, Isoniazid, streptomycin, pyrazinamide, Ethambutol, Rifampicin, Ethionamide.
8. **Antifungal Agents:** Drugs covered in major classes of antifungal agents viz., polyene, imidazoles, thiazole, triazole, griseofulvin, tolnaftate.
9. **Anti-malarial:** Structure activity relationship in 4-amino-quinolines and 8- amino-quinolines. Synthesis and uses of Chloroquine, Amodiaquine, pamaquine, primaquine, Quoinacrine, proguanil and pyrimethamine.
10. **Antiviral including anti HIV agents**
11. **Anthelmintics:** A study of santonin, Ascaridol, Filicit, Antimalarial & antibiotics & anthelminitics, Synthesis of Diethyl carbamazine, Mebandazole, Piperazine citrate, Tetramisole, Levamisole
12. **Anti-amoebics:** Factors affecting the efficiency of antiamoebic drugs, Drug combination, A study of Emetine, conesine-9-quinolinals and antibiotics as antiamoebics, synthesis and uses of Bially-lunical, Mantomide and Dihydroxy quinoline, Metronidazole, Tinidazole.

7-P-2 Medicinal Chemistry –III (Practical)

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

7-T-3 Pharmacology – III

1. **Drugs acting on urinary system:**
   a. Diuretics & anti-diuretics
   b. Fluid and electrolyte balance

2. **Autacoids:**
   a. Histamine and Antihistaminic drugs; 5-HT- its agonists and antagonists, drugs used in the treatment of migraine.
   b. Prostaglandins, thromboxanes and leukotrienes.
   c. Angiotensin, Bradykinin and other vasoactive peptides
   d. Non-steroidal anti-inflammatory drugs

3. **Drugs acting on the respiratory system:**
   a. Anti-asthmatic drugs including bronchodilators, nasal decongestants and mucolytics.
   b. Anti-tussive and expectorants.
   c. Respiratory stimulants.

4. **Pharmacology of Drugs acting on the Gastrointestinal Tract**

Management of Gastrointestinal Disorders- Peptic ulcer, Ulcerative colitis, Hepatitis and Cirrhosis.

   a. Antacids, anti-secretary and antiulcer drugs.
   b. Laxatives and antidiarrhoeal drugs.
   c. Appetite stimulants and suppressants.
   d. Digestants and carminatives
   e. Emetics and anti-emetics.

5. **Pharmacology of Endocrine system**

Management of Endocrine Disorders-Diabetes mellitus and Thyroid disorders.

   a. Basic concepts in endocrine pharmacology.
   b. Hypothalamic and pituitary hormones.
   c. Thyroid hormones and anti-thyroid drugs, parathormone, calcitonin and vitamin-D.
   d. Antidiabetics, Insulin, Oral hypoglycemic agents and glucagon.
   e. ACTH and corticosteroids.
   f. Androgens and anabolic steroids.
   g. Estrogens, progesterone and oral contraceptives.
   h. Drugs acting on the uterus.

6. **Chemotherapy**
   a. General Principles of chemotherapy.
   b. Sulfonamides and co-trimoxazole.
   c. Antibiotics- Penicillins, Cephalosporins, Chloramphenicol, Macrolides, Quinolines and Fluoroquinolins, Quinolones, Tetracyclines, Amino glycosides and Miscellaneous Antibiotics.
   d. Chemotherapy of tuberculosis, leprosy, fungal diseases, viral diseases, AIDS, protozoal diseases, worm infestations, urinary tract infections and sexually transmitted diseases.
   e. Chemotherapy of malignancy.
   f. Anthelmintics and Anti-amoebics

7-P-3 Pharmacology – III

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

7-T-4 Pharmacognosy –III

1. Study of the biological sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs containing glycosides:

(i) **Saponins**: Liquorice, ginseng, dioscorea, sarsaparilla, and senega.
(ii) **Cardioactive sterols**: Digitalis, squill, strophanthus and thevetia.
(iii) **Anthraquinone cathartics**: Aloe, senna, rhubarb and cascara.
(iv) **Others**: Psoralea, Ammi majus, Ammi visnaga, gentian, saffron, chirata, quassia.

2. Studies of traditional drugs, common vernacular names, botanical sources, morphology, chemical nature of chief constituents, pharmacology, categories and common uses and marketed formulations of following indigenous drugs:
Amla, Kantkari, Satavari, Tylophora, Bhilawa, Kalijiri, Bach, Rasna, Punarnava, Chitrack, Apamarg, Gokhru, Shankhapushpi, Brahmi, Adusa, Arjuna, Ashoka, Methi, Lahsun, Palash, Guggal, Gymnema, Shilajit, Nagarmotha and Neem.

3. The holistic concept of drug administration in traditional systems of medicine. Introduction to ayurvedic preparations like Arishtas, Asvas, Gutikas, Tailas, Churnas, Lehyas and Bhasmas.

4. Historical development of plant tissue culture, types of cultures, nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy.

5. Marine pharmacognosy, novel medicinal agents from marine sources.

6. Natural allergens and photosensitizing agents and fungal toxins.

7. Chemotaxonomy of medicinal plants.

8. Herbs as health foods.

7-P-4 Pharmacognosy –III

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

7-T-5 Chemistry of Natural Products

1. Chemical and spectral approaches to simple molecules of natural origin
2. Concept of stereoisomerism taking examples of natural products.
3. Chemistry, biogenesis and pharmacological activity of medicinally important monoterpenes, sesquiterpenes, diterpenes, and triterpenoids.
4. Carotenoids: α-carotenoids, β-carotenes, vitamin A, Xanthophylls of medicinal importance.
5. Glycosides: Chemistry and biosynthesis of digitoxin, digoxin, hecogenin, sennosides, diosgenin and sarasapogenin.
6. Alkaloids: Chemistry, biogenesis and pharmacological activity of atropine and related compounds; quinine, reserpine, morphine, papaverine, ephedrine, ergot and vinca alkaloids.
7. Chemistry and biogenesis of medicinally important lignans and quassanoids, flavonoids.
8. Chemistry and therapeutic activity of penicillin, streptomycin and tetracyclines.

B. Pharm. Eighth Semester

8-T-1 Cosmetic Technology

1. Introduction to cosmetics: their applications, origin and development of cosmetic sciences. Fundamental of cosmetic science. Structure and functions of skin and hair. Formulation considerations of cosmetics
2. Formulation considerations: Preparation, packaging and evaluation of the following categories of cosmetics-
   i. **Face Preparation:** Face powder, Compact powder, Talcum powder, Face packs and Masks.
   ii. **Skin Preparation:** Skin creams, Anti-wrinkle preparations, Barrier materials, Protective creams and gels, Vanishing creams, Cold creams, Cleansing creams, all purpose creams, emollient, Anti-perspirant,/ deodorant, Moisturising and foundation formulation, Bleaching creams, Night and Massage creams, Hand creams Protective skin tonics, Skin moisturizers, Sun-screen, Suntan, and anti-sun burn preparation.
   iii. **Shaving Preparation:** Lather shaving stick, Lather shaving creams, Shaving foams, Shaving gels, Pre-and after shave lotions.
   iv. **Shampoo and Bath preparations:** Clear liquid shampoos, Aerosol shampoos, dry shampoos, Acid-balanced shampoos, Egg shampoos, Anti-dandruff Shampoos, Bath oils, Foam baths.
   v. **Hair Preparations:** Hair tonics, Hair conditioners, Hair lotions, Hair sprays, Hair dressings, Hair setting lotions and creams, Hair dyes, Bleaches, Hair waiving, Hair Straightners and Hair strengtheners.
   vi. **Dentifrice:** Tooth powders, Tooth pastes, Denture cleansers.
   vii. **Foot Preparation:** Foot powders, Foot sprays, Foot creams, Corn preparations and Athelete's foot preparation.
   viii. **Baby care products:** baby powder, baby oils, baby lotions, baby creams, baby soaps
   ix. **Manicure Preparation:** Nail polish, Nail lacquers and Nail bleaches.
   x. **Herbal Cosmetics:** Cosmetics containing Aloe, Babul, Brahmi, Chandan, Cucumber, Haldi, Jatamansi, Khus, Mehandi, Neem, Reetha, Shikakai, Tulsi, Arnica, Bhringraj and Volatile oils .
   xi. **Colored make-up preparations:** Lipsticks, Rouge, Mascara, Eye make-up, Eye-liner, Eyebrow pencils.
3. Packaging and labelling of cosmetics. Safety and Toxicity Testing of various types of Cosmetics.
4. Perfumes in cosmetics: Synthetic, natural and artificial perfumes, classification of perfumes, manufacturing and blending of perfumes.
5. Emerging cosmetic products, use of drug delivery systems like liposomes, microcapsules, cosmetic patches, elastic vesicles as topical/transdermal drug delivery systems
6. Legal aspect of cosmetic products, Ingredient prohibited & restricted by FDA, Safety and current amendments, different specific regulatory systems, Legal authority and manufacture of cosmetics for sale.

8-P-1 Cosmetic Technology

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

8-T-2 Pharmaceutical Biotechnology

1. **Immunology and Immunological Preparations:** Principles, antigens and haptens, immune system, cellular humoral immunity, immunological tolerance, antigen-antibody reactions and their applications. Hypersensitivity, active and passive immunization; Vaccines- their preparation, standardization and storage.

2. **Genetic Recombination:** Transformation, conjugation, transduction, protoplast fusion and gene cloning and their applications. Development of hybridoma for monoclonal antibodies. Study of biotechnology derived drugs such as Activase, Humulin, Humatrope, HB, etc.

3. **Fermentation:** Fermenter, its design, control of different parameters. Isolation of mutants, factors influencing rate of mutation. Design of fermentation process. Isolation of fermentation products with special reference to penicillins, streptomycins, tetracyclines and vitamin B_{12}, etc.

4. **Microbial Transformation:** Introduction and Principle, types of reactions mediated by microorganisms, design of biotransformation processes, selection of organisms, biotransformation process and its improvements with special reference to steroids.

5. **Enzyme immobilization:** Techniques of immobilization, factors affecting enzyme kinetics. Study of enzymes such as hyaluronidase, penicillinase, streptokinase and streptodornase, amylases and proteases etc. Immobilization of bacteria and plant cells.

8-P-2 Pharmaceutical Biotechnology

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

8-T-3 Medicinal Chemistry –IV

The synthesis and SAR of the compound, Classification under each class and Biochemical approaches in drug design wherever possible should be discussed.

1. **Sex-hormones:** Synthesis of testosterone, progesterone & oestrone from diosgenin & cholesterol. Preparation & use of non steroidal estrogens, diethylstilbestrol, Monomesterol, Hexosterol, Ethinyl estradiol, Ethisterone, Testosterone, Propionate and methyl Testosterone.
2. **Cortex Hormones:** Synthesis of cortisone acetate from diosgenin and cholesterol. Preparation & uses of dexa-
3. corticosterone acetate, hydrocortisone acetate, prednisolone & prednisone, dexamethasone, betamethasone.
4. **Non-Steroidal hormones**: Adrenaline & Thyroxin.
5. **Antidiabetic agents:** Insulin, Carbutamide, Chloropamide, Tolbutamide.
6. **Vitamins:** Constitution & physiological importance, vitamin A, thiamine, riboflavin, ascorbic acid, folic acid, pantothenic acid & pyridoxin.
7. **Medicinal Dyes:** Synthesis & uses of gentian violet, malachite green, brilliant green, amaranth, resochin brown, 9-aminoacridine, acriflavin, methylene blue and diloxinate furoate.
8. **Diagnostic agents:** General survey of important compounds.

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

8-T-4 Pharmacognosy –IV

1. Systematic study of source, cultivation, collection, processing, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following alkaloid containing drugs:

a) Pyridine - piperidine: Tobacco, areca and lobelia.
b) Tropane: Belladonna, hyoscyamus, datura, duboisia, coca and withania
c) Quinoline and isoquinoline: Cinchona, ipecac, opium.
d) Indole: Ergot, rauwolfia, catharanthus, nux-vomica and physostigma
e) Imidazole: Pilocarpus
f) Steroidal: Veratrum and kurchi
g) Alkaloidal amine: Ephedra and colchicum.
h) Glycoalkaloid: Solanum.
i) Purines: Coffee, tea and cola.

2. Role of medicinal and aromatic plants in national economy. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. Utilization and production of phytoconstituents such as quinine, calcium sennosides, podophyllotoxin, diosgenin, solasodine, taxol and tropane alkaloids.
3. Biological sources, preparation, identification tests and uses of the following enzymes: Diastase, papain, pepsin, trypsin, pancreatin.
4. General techniques of biosynthetic studies and basic metabolic pathways. Brief introduction to biogenesis of secondary metabolites of pharmaceutical importance.
5. Plant bitters and sweeteners.
6. Introduction, classification and study of different chromatographic methods and their applications in evaluation of herbal drugs.
7. Utilization of aromatic plants and derived products with special reference to sandalwood oil, mentha oil, lemon grass oil, vetiver oil, geranium oil and eucalyptus oil.
8. Herbal cosmetics ingredients.

8-T-4 Pharmacognosy –IV

Experiments based on Theory topics

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

8-T-5 Industrial Management and Accountancy

1. Concept of Management: Administrative Management (Planning, organizing, Staffing, Directing and controlling), Entrepreneurship development, operative management (Personnel, Materials, Production, Financial Marketing, Time/space, Margin/Morale), Principles of Management (Co-ordination, Communication, Motivation, Decision making, leadership, Innovation, Creativity, Delegation of Authority/Responsibility, Record Keeping). Identification of key points to give maximum thrust for development and perfection.

2. Accountancy: Principles of Accountancy, Ledger posting and book entries, preparation of trial balance, columns of cash book, Bank reconciliation statement, rectification of errors, Profits and loss account, balance sheet, purchase keeping and pricing of stocks, treatment of cheques, bills of exchange promissory notes and hundies, documentary bills.

3. Economics: Principles of economics with special reference to the laws of demand and supply, demand schedule, demand curves, labour welfare, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods.

4. Pharmaceutical Marketing: Functions, buying, selling, transportation, storage, finance, feedback, information, channels of distribution, wholesale, retail, departmental store, multiple shop and mail order business.

5. Salesmanship: Principles of sales promotion, advertising, ethics of sales, merchandising, literature, detailing Recruitment, training, evaluation, compensation to the pharmacist.

6. Market Research: Measuring & Forecasting Market demands-Major concept in demand measurement, Estimating current demand, Geodemographic analysis, Estimating industry sales, market share & future demand, Market segmentation & Market Targeting.

7. Materials Management: A brief exposure or basic principles of materials management major areas, scope, purchase, stores, inventory control and evaluation of materials management.

8. Production Management: A brief exposure of the different aspects of Production Management-Visible and Invisible inputs, Methodology of Activities Performance Evaluation Technique, Process-Flow, Process Know-how maintenance management, Job evaluation, human relations.

9. Financial Management: Budget and its types: financial budget, expenditure budget, performance budgeting.
10. Competitive practice in the pharmaceutical industry
a. Patent laws, patent policies and Trademark laws

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 7, 2016

Pt. Ravishankar Shukla University, Raipur (C.G.) 492 010

Master of Pharmacy

(Pharmaceutics)
(A Two Year Post-Graduate Degree Program
W.E.F. Academic Session 2006-2007)

Ordinance
&
Syllabus

(W. E. F. Academic Session 2016-2017)

University Institute of Pharmacy
Faculty of Technology.

Approved in meeting of Board of Studies in Faculty of Technology, Subject: Pharmacy Dt. June 07, 2016

Pt. Ravi Shankar Shukla University, Raipur C.G.

Ordinance No.

Ordinance of Master of Pharmacy
2 Years Post Graduate Degree Course

1.0 The Master Degree in Pharmacy of 2 years (4 Semesters) Duration hereafter shall be designated in short **M. Pharm.**

1.1 The duration of M. pharm. course shall extend over a period of two years consisting of four semesters named below:
(i) M. Pharm. I Semester
(ii) M. Pharm. II Semester
(iii) M. Pharm. III Semester
(iv) M. Pharm. IV Semester

1.2 Each semester shall be spread over for not less than sixteen weeks.

2.0 Academic Qualifications for Admission

2.1 The minimum qualification for admission to first semester of master of pharmacy two years (four semesters) course will be as under:
The candidate who has passed the B. Pharm. examination from AICTE approved institutes with at least 60% marks (55% for reserved category) will be eligible for admission to M. Pharmacy.

3.0 Admission and Fee Structure

As decided by Pt. Ravishankar Shukla university from time to time.

4.0 Sessional

4.1 Twenty five percent of the marks for each theory and practical subject/paper shall be allotted for sessionals of M. Pharm. I semester and II semester.

4. 1.1 **Theory**: Two sessional examinations shall be held during each semester for each theory paper/subject from which one best answered by the candidate shall be considered for the award of sessional marks.

4.1.2 **Practical**: Marks shall be awarded on the basis of the experiments performed by the students, prior preparation for the experiment for the experiment, conduct inside the laboratory, results of the experiments, day to day completion of the records and viva-voce.

4.1.3 No improvement will be allowed in sessional marks by reappearing in the sessional examinations.

5.0 Examinations:

5.1 There shall be one university examination at the end of each semester. These examinations will be designated as follows:
M. Pharm. I Semester
M. Pharm. II Semester
M. Pharm. III Semester (Mini Project & Major Research Project),
M. Pharm. IV Semester (Major Research Project).

5.2 There will be a full examination at the end of each semester consisting of theory papers and the laboratory practicals.

5.3 A candidate who fails to secure the minimum marks will be permitted to appear in the failed subject.

5.4 The examination of major research project shall be conducted in the fourth semester.

5.5 There will be no supplementary examination.

5.6 The candidate has to complete the M. Pharm. course in maximum 4 years.

5.7 A.T.K.T. / Backlog:

5.7.1 A candidate can proceed from M. Pharm. first semester to M. Pharm. second semester, irrespective of the number of subjects in which he/ she has failed.

5.7.2 A candidate is allowed to proceed from M. Pharm second semester to M. Pharm third semester , irrespective of number of subjects in which he / she has failed in second semester but he/ she has to cleared/passed M. Pharm first semester examination in all subjects.

5.7.3 A candidate is allowed to continue his/her project work and submit the dissertation in accordance with the relevant regulation, but the result of the M.Pharm fourth semester will not be declared until he / she has cleared the M. Pharm. first, second and third semester examinations.

6.0 Standard of Passing:

6.1 In each subject (theory and practical)

6.1.1 Minimum 50% in sessional and semester examination taken together.

6.1.2 Each theory paper & practical will be treated as separate subject for passing.

7.0 Division and Merit List

7.1 The division shall be awarded only after IV semester examination and shall be based on the aggregate marks obtained at his/her successful attempts at the I, II, III and iv semester examinations i.e. full examination of M. Pharm. there will be only four divisions as follows:

S. No.	Block of Grand Total Marks	Division
1.	75% and above	First class with distinction
2.	65% and above but less than 75%	First class
3.	60% and above but less than 65%	Second class
4.	Below 60% marks	Pass class

7.2 The university shall declare the merit after the main examination of the fourth semester of M. Pharm. on the basis of the integrated performance of all the 2 years (four semesters). The merit list shall include the first five candidates securing at least first class and passing all the semester examinations in single attempt.

8.0 Medium of Instruction and Examination:

8.1 The medium of instruction and examination shall be English throughout the course of study.

8.2 The subjects to be studied in different semester of M. Pharm. shall be as per the scheme & syllabus approved by the board of studies from time to time in different discipline of pharmaceutical sciences.

9.0 Project Work:

For M. Pharm. III (mini project) and IV (major research project) semester students a project work shall be compulsory. The project shall be undertaken in any of the areas of pharmacy in respective discipline. The project work shall be done under the supervision of faculty member/s. The candidate shall be required to submit the project report in triplicate. The candidate shall present a seminar on his / her mini project there shall be thesis seminar, examination & viva voce of the major research project at the end of IV semester.

10.0 Attendance

Candidate appearing as regular student for any semester examination are required to attend 75 percent of the lectures delivered and of the practical classes held separately in each subject of the course of study, provided that a short fall in attendance up to 10% and a further 5% can be condoned by the principal of the college and vice-chancellor of the university respectively for satisfactory reasons.

If a candidate has passed a semester examination in full he/she shall not be permitted to reappear in the examination for improvement of division/ marks or any other purpose.

Appendix-A
Course of Study and Scheme of Examination
M. Pharm. (Pharmaceutics)
First Semester

Code No.	Subject	Teaching (Hours Per Week)			Distribution of Marks				
					Theory Marks (I)		Practical Exam. (II)		Total
		Theory	Practical	Total	Sessional	Exam.	Sessional	Exam.	I+II
01.	DRA, IPR and Quality Assurance	04	---	04	25	75	--	--	100
02.	Biotechnology & Herbal Technology	04	04	08	25	75	25	75	200
03.	Modern Analytical Techniques	04	06	10	25	75	25	75	200
04.	Product Development and Formulation	04	06	10	25	75	25	75	200
	Total	16	16	32	100	300	75	225	700

M. Pharm. Second Semester

Code No.	Subject	Teaching (Hours Per Week)			Distribution of Marks				Total
					Theory Marks (I)		Practical Exam. (II)		
		Theory	Practical	Total	Sessional	Exam	Sessional	Exam	I + II
01.	Biopharmaceutics, Pharmacokinetics and Clinical Kinetics	04	-	04	25	75	--	--	100
02.	Controlled Drug Delivery Systems	04	-	04	25	75	--	--	100
03.	Novel Drug Delivery Systems	04	-	04	25	75	-	-	100
04	Pharmaceutical Packaging Technology	04	-	04	25	75	-	-	100
05	*Lab (Practical)	-	16	16	-	-	100	200	300
	Total	16	16	32	100	300	100	200	700

*Practical based on theory paper 1 To 4.

In second year i.e. third and fourth semester, a minor and a major research project shall be undertaken by the candidate respectively. A minor research project has to be undertaken by the candidate in the third semester and evaluation of the same shall be done at the end of the third semester as per the scheme.

M. Pharm. Third Semester

Seminar / Viva	Project report	Total
100	200	300
-		

There will be thesis/ project work seminar/ presentation, examination and viva voce of major research project at the end of fourth semester.

M. Pharm. Fourth Semester

Sessional work	Thesis examination Viva- Voce	Presentation of thesis work in the institute	Total
200	400	100	700

Grand Total of M. Pharm. Marks

First Year (First Sem)	+	First Year (Second Sem)	+	Second Year (Third Sem)	+	Second Year (Fourth Sem)		Grand Total
700	+	700	+	300	+	700	=	2400

M. Pharm. Semester- I

DRA Intellectual Property Rights and Quality Assurance

1. Requirements of GMP, CGMP, GLP, USFDA, WHO guidelines and ISO 9000 series.
2. Drugs and cosmetics acts and rules, Drug regulatory affairs.
3. Documentation-Protocols, forms and maintenance of records in pharmaceutical industry.
4. Preparation of documents for new drug approval and export registration.
5. Processing and its application, intellectual property rights (Patent, Copyright and Trade marks).
6. Concepts in validation, validation of manufacturing, analytical and process validation and its application.
7. Basic concepts of quality control and quality assurance systems, source and control of quality variation of raw materials: Containers, closures, personnel, environmental, etc.
8. In-process quality control tests, IPQC problems in pharmaceutical industries. ICH guidelines.
9. Sampling plans sampling and characteristic curves.
10. Regulatory requirements for contract research organization. Regulations for Biosimilars.
11. **Clinical trials:** Developing clinical trial protocols. Institutional review board/ independent ethics committee Formulation and working procedures informed Consent process and procedures. HIPAA-new, requirement to clinical study process, pharmacovigilance safety monitoring in clinical trials.

Books and References Recommended

1. Willing, S.H., 'Good Manufacturing Practices for Pharmaceuticals" Marcel Dekker, Inc., New York.
2. Drugs and Cosmetic Acts and Rules.
3. Bharathi, Drugs and Pharmacy Laws in India.
4. Patel, A .H." Industrial Microbiology", Macmillan India Ltd., Delhi.
5. Nash R. A. and Wachter, A .H." Pharmaceutical Process Validation", Marcel Dekker,Inc.,New York.
6. Bolton, S., Pharmaceutical Statistics.
7. Banker, G. S. And Rhodes, Ct., "Modem Pharmaceutics", Marcel Dekker,Lnc.,New York.
8. OPPI, Quality Assurance.

9. Carleton,Fj. And Agallow,J.P.," Validation of Aseptic Pharmaceutical Processes". Marcel Dekker,Inc., New York.
10. Garfield, Quality Assurance Principles of Analytical Laboratories.
11. Indian Pharmacopoeia. The Controller of Publications. Govt. Of India, Delhi

M. Pharm. Semester - I

Biotechnology and Herbal Technology

1. **Introduction**

   Advent of biotechnology and herbal technology, Pharmaceutical biotechnology and its applications.

2. **Genetics And Genetic Engineering**

   Genetics: Structure of DNA as genetic material, Replication, repair, gene rearrangements, recombination and transposition, RNA synthesis and splicing. Protein synthesis and targeting. Control of gene expression in prokaryotes, Eukaryotic chromosomes and genetic defects.

   Genetic Engineering: Introduction, mutagenesis, cutting and rejoining. Polymerase chain reaction, Isolation and amplification of genes, gene expression and general introduction to genomics. Principal of Genetic recombination, vectors for gene delivery, Gene cloning, Pharmacogenomics, genetic pharmaceutical products.

3. **Immunology And Its Preparations**

   A brief introduction to immunology, Monoclonal antibodies and Hybridoma technology, Formation and selection of hybrid cells, principles and productions of monoclonal antibodies, commercial production, characterization, quality control and storage of monoclonal antibodies, Advantages and applications of monoclonal antibodies.

4. **Introduction To Bioinformatics & Biostatistics:**

   Biological Data base, sequence analysis, protein structure, Genetic and physical mapping, Application of bioinformatics in pharmaceutical industries.

5. **Tissue Culture**

   Introduction, historical background, preparation of culture media, types of culture, modification through transformative cell culture, Regeneration of plants. Micro propagation, protoplast microinjection, Methods of gene transfer in plants, pharmaceutical applications of plant tissue culture.

6. **Fermentation:**

Introduction, Enzyme technology process: Chemically and genetically modified enzyme, Isolation, purification and modification in enzymes. Enzymes as therapeutics, enzymes in drug delivery design.

Biotransformation, techniques of fermentation, design of fermantors and bioreactors, fermentation products.

7. **Immobilization**

Various techniques of immobilization, immobilization of cells and enzymes. Applications of Immobilization enzyme and cell immobilization and its therapeutic applications.

8. **Herbal Drug Standardization**

Definitions of a range of medicinal plant materials as noted in Ayurvedic Pharmacopoeia of India(API), United States Pharmacopoeia(USP), European Pharmacopoeia(EP) and documents of European Medicines Evaluation Agency (EMEA) and World Health Organization (WHO) and factors affecting quality of plant drugs. Significance of important techniques in establishing identity, purity and quality of plant drugs as described in different pharmacopoeias.

9. **Neutraceuticals**

Approach for health management. Overview of internationally marketed nutraceuticals and functional Foods. Issues of quality control of nutraceuticals, various approaches for quality control and standardization of raw materials, extracts and formulation.

10. **Herbal Technology**

Herbal technology techniques, Manufacturing techniques of traditional herbals formulation and Formulation development of novel herbals formulation.

Books and References Recommended

1. Nelson,D.L. and Coy,M.M,"Lehninger's Principles of Biochemistry", Worth Publishers, New York.
2. Karp, G., Cell & Molecular Biology.
3. Crommelin, D. J., A, And Sindelar Rd., Pharmaceutical Biotechnology.
4. Templeton N. S., And Lasic. D. D., Gene Therapy.
5. Benjamin Lewin, Genes.
6. Watson and Trooze, Recombinant DNA Techniques
7. Lesk , A.M.," Introduction To Bioinformatics", Oxford University Press(Indian Edition). New Delhi.
8. Watson, Molecular Biology of Cell.
9. Watson, J.D., Gilman, M, Recombinant DNA Technology
10. Baxevanis, A.D., Frana, Duelette, B.F., Bioinformatics
11. Alberts, B., Johnson, A, Lewin, J., Raff, M., Roberts, K, Walter, P., Molecular Biology of the Cell.

Modern Analytical Techniques

1. Theory, Instrumentation, Methods and applications of UV spectrophotometer.
2. Theory and Instrumentation of IR, FTIR, their advantages and applications in structural elucidation.
3. NMR, C-13 NMR, Origin of Spectra, Chemical Shifts, Spin-Spin Coupling, Coupling Constant, Instrumentation and application for structural elucidation.
4. Mass spectra, Instrumentation, Fragmentation pattern and application for structural elucidation.
5. Theory, Instrumentation and application of the following:
   a. Fluorescence
   b. X- ray
   c. Atomic spectroscopy
   d. Ultra centrifugation
   e. ESR
   f. Liquid scintillation spectrometry
   g. Auto radiography
6. Separation techniques: Fundamental principles, basic instrumentation, qualitative and quantitative pharmaceutical applications of gas-liquid chromatography, HPLC HPTLC, gel chromatography, electrophoresis and ion-pair chromatography.
7. Principles, instrumentation and application of GC-Mass, HPLC-Mass for complex mixtures.
8. Immunoassay Technique: Enzymes and radioimmunoassay techniques. Theory, methods and applications.
9. Thermal Methods: Thermo gravimetry (Tg), Differential scanning calorimetry (DSC). Differential thermal analysis (DTA)
10. Principles and application of light, phase contrast, scanning and transmission electron microscopy, cytometry and flow cytometry.

Books and References Recommended

1. Fiorey, Analytical Profiles of Drugs, Vol.1-16.
2. Sinder, Text Book of HPLC
3. Mclafferty, Mass Spectrometry.
4. Rao, C. N., Ultraviolet Spectroscopy for Chemical Application.
5. Silverstein, R.M. And Wcbster,F.," Spectrophotometric Identification Of Organic Compounds",John Wiley & Sons, Ltd., USA
6. Rao, C. N., Chemical Application of Infrared Spectroscopy
7. Weissberger, Physical Methods in Organic Chemistry.
8. Kiencz, B. And Dierasi, C., Interpretation of Mass Spectra of Organic Compounds.
9. Jackmann, Application of NMR Spectra to Organic Compounds.
10. Willard.H ,And Merrit L.," Instrumental Methods Of Analysis", CBS Publisher & Distributors,New Delhi.
11. Eliel, E. L., "Stereochemistry of Carbon Compounds", Tata Mcgraw Hill Publishing Co. Ltd., New Delhi.
12. Naahod, P., Physical Method of Structure Determination.
13. Stahl, Thin Layer Chromatography.
14. Ewing,G.W.," Instrumental Methods of Chemical Analysis", Mcgraw Hill Book Company, New York
15. Block and Durrum, Paper Chromatography and Electrophoresis.
16. Gennaro,A.R.,"Remington- The Science And Practice Of Pharmacy",Lippincot, Wiliams And Wilkins, Philadelphia.
17. Sirmer, Spectroscopic Analysis.

Product Development and Formulation

1. **Preformulation Studies**
   Perspective and Concepts: Detailed study of parameters like solubility, partition coefficient, dissolution influencing formulation and bioavailability of drugs. Methodology, solid state properties and purity studies, drug excipient compatibility study.

2. **Formulation additives**
   Study of different formulation additives, drug-excipients, excipient–excipient interactions and incompatibilities.

3. **Solubilization**
   Theory of solubilization, methods of solubility enhancement, factors influencing solubility.

4. Recent advances in parenteral and solid dosage form technology and automation in manufacturing process.

5. **Dissolution Technology**
   Design of dissolution apparatus (forced convection devices, non-sink devices, and continuous flow through methods), dissolution media, dissolution testing of different types of dosage formulations, effect of environmental factors in dissolution testing; data interpretation, in-vitro and in-vivo correlation.

6. **Polymers**
   Classification, general methods of synthesis, properties, characterization and application in pharmacy. biodegradable polymers, classification, mechanism of biodegradation in the body, safety and applications in pharmaceuticals and biomedical engineering.

7. **Drug Stability**
   Solid state drug stability, kinetics stability study programme for formulations, stability indicating assays and ICH guidelines for stability.

8. **Optimization Techniques in Pharmaceutical Formulation and Processing**
   Optimization parameters, statistical design and their applications.

9. **Cosmaceuticals**: Advances in cosmetic technology.

10. **Pilot plant design:** Basic requirements for design, facility, equipment selection, for tablets, capsules, liquid orals, parentrals and semisolid preparations. **Scale up:** Importance, Technology transfer from R & D to pilot plant to plant scale, process scale up for tablets, capsules, liquid orals, semisolids, parentrals, NDDS products – stress on formula, equipments, product uniformity, stability, raw materials, physical layout, input, in-process and finished product specifications, problems encountered during transfer of technology.

Books and References Recommended

1. Swarbrick,J. and Boynin,J.C.,"Encyclopedia Of Pharmaceutical Technology", Vol. 1-3, Marcel Dekkar ,Inc., New York.
2. Gennaro,A.R.,Remington - The Science & Practice Of Pharmacy, Lippincot Wiliams and Wilkins, Philadelphia
3. Aulton,M.E., Pharmaceutics -The Science Of Dosage Form Design", Churchill Livingstone,London
4. Carstersen, J. T., "Drug Stability: Principles & Practice", Marcel Dekker,Inc.,Ny
5. Banker,G.S. and Rhodes,C., "Modern Pharmaceutics",Marcel Dekker,Inc.,Ny
6. Ilium,L. and Davis,S.S.,"Polymers In Controlled Drug Delivery ",Wright Bristol.
7. Kibbe, Handbook of Pharmaceutical Excipients "Pharmaceutical Press", London.
8. Lachman, L. & Lieberman, H.A., "Theory and Practice of Industrial Pharmacy", Verghese Publishing House, Bombay
9. Martin, Physical Pharmacy
10. Lieberman,H.A. And Lachman,L., "Pharmaceutical Dosage Forms - Dispersed Systems" Vol. 1 – 3, Marcel Dekker, Inc.,Ny
11. Avis,K.E.. And Lachman,L., "Pharmaceutical Dosage Forms - Parenteral Medications" Vol. 1 - 3, Marcel Dekker, Inc.,Ny
12. Lieberman, H. A. and Lachman, L., "Pharmaceutical Dosage Forms - Tablets" Vol. 1 - 3, Marcel Dekker, Inc.,Ny
12. Yalkowsky;S.H., "Techniques of Solubilization of Drugs",Marcell Dekker, Inc.,Ny
13. **Lodén**, Marie, **Maibach,** Howard I. Treatment of Dry Skin Syndrome, The Art and Science of Moisturizers, Springer, 2012.

M. Pharm. Semester – II

Biopharmaceutics, Pharmacokinetics and Clinical Kinetics

1. **Transport of Drugs through Biological Membranes:**

   Drug Absorption: Gastrointestinal absorption of drugs, mechanism of drug absorption, physico-chemical, and biological factors influencing absorption. Buccal absorption, salivary excretion of drugs, excretion of drugs via. sweat, excretion of drugs into milk, penetration of drugs into eye, transfer across placenta, passage of drug into and out of cerebrospinal and brain. Transport across caco 2 monolayers, Other Cell-lines to predict- biological, pharmaceutical and analytical considerations

2. **Bio-Availability and Bio-Equivalence**

   Bioequivalence its importance and determination, Objectives and consideration in bio-availability studies, Concept of Equivalents, study design for the assessment of bioavailability and bio-equivalence, factors influencing bio-availability and bio-equivalence, Regulatory aspects of bio-availability and bioequivalence studies for conventional dosage forms and controlled drug delivery systems, In-vitro in-vivo data correlation, Methods of establishing IVIVC and Factors affecting IVIVC.

3. **Pharmacokinetics**

   Basic consideration, Pharmacokinetic models, Consideration of one, two and multiple compartment models on intravenous administration, intravenous infusion and oral dosage forms.

   Kinetics of multiple dosing: Dosage regimens, loading and maintenance doses, one and two compartment models on intravenous administration, and first order absorption in multiple dosing. Kinetics of reversible pharmacological effects – direct and indirect effects.

4. **Clinical Pharmacokinetics**

Introduction to clinical pharmacokinetics: Concepts, absorption, distribution and renal excretion, hepatic clearance and elimination, disposition and absorption kinetics, intravenous dose, constant I.V. infusion, extra-vascular dose, metabolite kinetics. Pharmacokinetic drug interactions, Inhibition and induction of drug metabolism, Inhibition of biliary excretion, Therapeutic regimens: Therapeutic response and toxicity, dosage regimens, clinical trial studies, Therapeutic drug monitoring (TDM).

5. **Physiologic Pharmacokinetic Models**

Concepts, physiologic pharmacokinetic model with binding, blood flow limited versus diffusion limited model, applications and limitation of physiologic pharmacokinetic models, mean residence time (MRT), statistical moments theory, mean absorption time (MAT), mean dissolution time (MDT).

6. **Non-Linear Pharmacokinetic**

Definition, significance and applications with literature examples, recognition of non-linearity, computation of nonlinear pharmacokinetic parameters (Vm, Km, AUC, etc.) by single Michaelis Menten kinetics. Non –Linear Tissue Binding Constants.

7. **Software used for Bio-Pharmaceutics and pharmacokinetics study and their significance**

Books and References Recommended

1. Notari R.E., "Biopharmaceutics and Clinical Pharmacokinetics - An Introduction", Marcel Dekker, Inc., New York.
2. Gibaldi, M., Biopharmaceutics and Clinical Pharmacokinetics", Marcel Dekker, Inc., New York
3. Shargel, L. and Andrew, B.C., "Applied Biopharmaceutics and Pharmacokinetics", Prentice-Hall International, Inc.,
4. Smith,R. and Steward,J., "Text Book Of Biopharmaceutical Analysis", Lea and Fcbiger,Philadelphia,
5. Rowland,M. and Tozer.T.N.,"Clinical Pharmacokinetics-Concepts and Applications",B.I. Wavery Pvt. Ltd.(Lea & Febiger),New Delhi
6. Swarbick,J.," Current Concept In The Pharm. Sci., Dosage Form Design and bioavailability, Marcell Dekker .Lnc.,Ny
7. Gibaldi,M. and Perrier,D.:' Pharmacokinetics",Marccl Dekker,Lnc.,Ny
8. Banker,G.S. and Rhodes,C.,Modem Pharmaceutics,Marcel Dekker,Lnc.,Ny
9. Aulton,M.E.,Pharmaceutics-The Science of Dosage Form Design",Marcel Dekker, Inc.,Ny
10. Tozer, N., Malcolm Rowland Thomas; Clinical Pharmacokinetics: Concepts and Applications.

Controlled Drug Delivery System

1. Concepts & Models of Controlled Drug Delivery System

Theoretical concepts, influence of drug properties and routes of drug administration on the design of sustained and controlled release systems with reference to Tablets and Capsules. Classification of rate controlled drug delivery systems, with special reference to rate programmed release, activation modulated & feedback regulated. Computation of desired resealed rate for CDDS, pharmacokinetic design-intermittent, zero order, first order release.

2. Oral Controlled Release Drug Delivery Systems

Fabrication and evaluation of various drug delivery systems including gastro-retentive, colon-targeted and pulsatile drug delivery.

3. Transdermal Therapeutic Systems

Permeation enhancers, technologies for developing transdermal drug delivery system & evaluations, current innovations in skin delivery systems including iontophoresis

4. Parenteral Products

General considerations, various approaches and factors influencing the design and performance

5. Chemical Drug Delivery Systems

Prodrug and chemical delivery systems. Soft drug approach

6. Brain Drug Delivery

Physiological and physicochemical factors affecting drug delivery to brain, strategies for brain drug delivery.

7. Mucosal Drug Delivery Models

Buccal, Rectal, Nasal, Vaginal, Bioadhesive and Mucoadhesive drug delivery, formulation development, In-Vitro, Ex-Vivo and In-Vivo Methods of Evaluation (For Each Route).

8. Pulmonary Drug Delivery

Factors affecting absorption and metabolism of drug in airways, current and new technologies to pulmonary drug delivery.

9. Ophthalmic Drug Delivery

Development and performance evaluation for topical and intraocular drug delivery.

10. **Dosage Forms for Personalized Medicine**: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy.

Books and References Recommended

1. Mathiowitz, E.,"Encyclopedia of Controlled Drug Delivery", Vol-1 & II John Wiley & Sons, Canada
2. Swarbrick,J. and Boyln,J ;,"Encyclopedia Of Pharmaceutical Technology" Vol. I - III, Marcel Dekker,Lnc.,New York.
3. Jones,D.A.,"Transdermal & Related Drug Delivery System., Marcel Dekker,Lnc.,Ny
4. Robinson,J.R and Lee,.H.,"Controlled Drug Delivery Fundamentals & Applications Marcel Dekker ,Inc.,New York.
5. Chein,Y.W.,"Transdermal Controlled Systemic Medications" , Marcel Dekker ,Inc.,New York
6. Hillery, A. and Llyod,A.W.,"Drug Delivery & Targetting", Taylor & Francis, London
7. Deasy, P.B.,"Microencapsulation & Related Drug Processes" Marcel Dekker,Lnc.,New York

M.Pharm. Semester - II

Novel Drug Delivery System

1. **Targeted Drug Delivery**
   Definition, concept, importance in therapeutics principles of molecular biology - cell recognition and signalling , signal transduction, cell surface receptors, methods in drug targeting delivery systems, appreciation of Aquasomes, Pharmacosomes.

2. **General Considerations, Biochemical and Molecular Biology Approaches, Characterization & Commercial Concept of following Drug Delivery Systems**
   a. Liposomes
   b. Resealed Erythrocytes
   c. Nanoparticles
   d. Monoclonal Antibodies
   e. Microparticulate Carriers

3. Peptide and Protein Drug Delivery: Concepts, delivery techniques, formulation, stability testing, causes of protein destabilization, stability and destabilization

4. **An Overview and Applications of following Drug Delivery Systems:**
   a. Liquid crystals
   b. Magnetically modulated drug delivery
   c. Dendrimers
   d. Submicron emulsions
   e. Hydrogel system
   f. Transfersomes

Books and References Recommended

1. Mathiowitz, E.,"Encyclopedia of Controlled Drug Delivery", Vol- I & II, John Wiley & Sons, Canada
2. Swarbrick,J. and Boyln,J .,"Encyclopedia of Pharmaceutical Technology" Vol. I-III, Marcel Dekker, Lnc.,New York.
3. Jones,.D..A.,"Transdermal & Related Drug Delivery System. Marcel Dekker,Lnc.,New York.
4. Robinson,J.R. and Lec," Controlled Drug Delivery Fundamentals & Applications Marcel Dekker, Lnc., New York.
5. Chein,Y.W.,"Transdermal Controlled Systemic Medications" , Marcel Dekker,Lnc..New York
6. Hillery,A., and Liyod,A.W.,"Drug Delivery & Targeting", Taylor & Francis, London
7. Deasy,P.B., "Microencapsualtion & Related Drug Processes" Marcel Dekker,Lnc.,New York

M. Pharm. Semester – II

Pharmaceutical Packaging Technology

1. Concepts in pharmaceutical packaging
2. The packaging function
3. Regulatory aspects of pharmaceutical packaging. Package system, package design research.
4. Packaging materials with special reference to: Glass, Plastics, Metals & Polymers
5. Control of Packaging Materials
6. Ancillary materials used in packaging
7. Types and testing of containers and closures, closure systems
8. Pharmacopoeial Tests and Specifications.
9. Types of packaging with special reference to: Blister, strip, sachet, child resistant and tamper evident packaging, Packaging of parenteral, ophthalmics and aerosols
10. Stability of packages and packaging materials
11. Sterilization of packaging materials
12. Printing and decoration of labels and packages
13. Package testing
14. Defects in packaging

Books and References Recommended

1. Swarbrick,L. And Bolyln,J.C.,Encyclopedia of Pharmaceutical Technology Vol. 1 - 3, Marcel Dekker,Inc.,New York.
2. Dean,D.A., Evans,E.R. and Hall, I.H.,"Pharmaceutical Packaging Technology", Taylor and Francis. London
3. Banker,G.S. and Rodes,C., "Modem Pharmaceutics",Marcel Dekker,Inc.,New York.
4. Aulton,M. E., Pharmaceutics-The Science Of Dosage Form Design, Churchill Livingstone, UK.
5. Lachman,L., Lieberman,H.A. and Kanig.J.L., Varghese Publishing House,Bombay
6. Gennaro,A .R.,"Remington-The Science and Practice of Pharmacy",Lippincott Williams and Wilkins, Philadelphia

Ph.D. Course Work Syllabus in Pharmaceutical Sciences (2016-17)
One Semester

Paper I Advanced Research Methodology
Paper II Review of Literature, Advanced Research Tools & Seminar

Paper I: Advanced Research Methodology			
1	**RESEARCH**		
	Definition of research, Applications of research and types, Research process and steps.	6L	10
	Literature review: Importance of literature review, methods and sources of literature review, Review the literature selected, Development of a theoretical and conceptual framework, writing up the review.		
2	**RESEARCH DESIGN**		
	Design of Experiments: Objectives, strategies, Experimental design, Simple Comparative Experiments-Basic statistical concepts, sample mean and variance, random variable, correlation and regression, standard normal distribution, statistical hypothesis, degrees of freedom, Two sample *t*-test, *F*-test, *Chi-square* test, *P*-value, Confidence Intervals, Paired *t*-test.	12L	20
	Single Factor Experiment: Analysis of Variance (ANOVA) for fixed effect model; ANOVA for Randomized complete block design to control effects of nuisance factors.		
	Two Factor Factorial Design: Basic definitions and principles, main effect and interaction, response surface and contour plots, General arrangement for a two-factor factorial design; Models-Effects, means and regression.		
3	**RESEARCH PROPOSAL**		
	An Introduction: Preamble, problem, objectives, hypothesis to be tested, design of study, measurement procedures, analysis of data, organization of report, Displaying data tables, graphs and charts	12L	20
	Writing a research report: General consideration, Prewriting considerations, Thesis writing, Formats of report writing, Formats of publications in Research journals		
4	**DRUG REGULATORY AFFAIRS**		
	Indian Patent Act 1970, its amendments, concepts of IPR, criteria for granting patents and filing a Indian patent, Introduction to Patent Search.	12L	20
	. ICH guidelines, GMP, GLP, USFDA, CTD, ISO 9000, TQM, OECD guidelines		
	WHO guidelines for standardization of raw material and finished products including herbal products.		
5	**PHARMACEUTICAL ANALYSIS**		
	Principles and applications of the following: Absorption spectroscopy (UV, visible and IR). Principles of NMR, ESR, Mass spectroscopy, X-ray diffraction analysis, malditof and different chromatographic techniques and methods, Thermal Techniques. Microscopy Techniques.	12L	20
6	**COMPUTATIONAL ANALYSIS**		
	Introduction to the creation and advancement of databases, algorithms, computational and statistical techniques for data analysis.	6L	10
	Applications of Microsoft excel for quantitative and statistical data analysis, Power point, Introduction to Internet database surfing.		
	Advanced Research Tools– Exposure to SPSS, Design expert, Systat, SigmaPlot, WinNonlin, Kinetica and Pk analyst software.		

Note: Lecture - 1 Hour (preferably through ICT)

Approved in meeting of Board of Studies in Faculty of Technology, Sub: Pharmacy Dt. June 07, 2016

7/6/2016 7/6/16 7/6/16

Paper II	Review of Literature, Advanced Research Tools & Seminar		
1.	Review of Literature – Writing review of literature in the area of the proposed Ph.D. program	24 L	40
2.	Advanced Research Tools- Exposure to design expert, Systat, Sigma Plot and Kinetica	12 L	20
3.	Seminar – Based on the review of literature;	24 L	40

Note: The candidate must obtain 50% or more marks to qualify in the course work.

SCHEME OF EXAMINATION

SEMESTER - I

Paper	Subject	Internal	External	Total Marks
	THEORY (400)			
CC-101	History, Principles and foundation of Physical Education	30	70	100
CC-102	Anatomy and Physiology	30	70	100
CC-103	Health Education and Environmental Studies	30	70	100
EC-101/102	Olympic Movement/Officiating and Coaching (Elective)	30	70	100
	PRACTICAL (400)			
PC-101	Track and Field (Running Events)	30	70	100
PC-102	Swimming/Gymnastics/Shooting	30	70	100
PC-103	Indigenous Sports: Kabaddi/ Malkhambh/ lezim / March past (Any of one out of these)	30	70	100
PC-104	Mass Demonstration Activities: Kho-Kho / dumbbells / tipri / wands / hoop /umbrella (Any one out of these)	30	70	100
	Total	**240**	**560**	**800**

SEMESTER -II

Paper	Subject	Internal	External	Total Marks
	THEORY (400)			
CC-201	Yoga Education	30	70	100
CC-202	Educational Technology and Methods of Teaching in Physical Education	30	70	100
CC-203	Organization and Administration	30	70	100
EC-201/202	Contemporary issues in physical education, fitness and wellness/ Sports Nutrition and Weight Management (Elective)	30	70	100
	PRACTICAL (300)			
PC-201	Track and Field (Jumping Events)	30	70	100
PC-202	Yoga/Aerobics / Swimming / Gymnastics (Any of the two out of these)	30	70	100
PC-203	Racket Sports: Badminton/ Table Tennis/ Squash/ Tennis (Any of the two out of these)	30	70	100
	TEACHING PRACTICE (100)			
TP-201	Teaching Practice (Classroom and outdoor)	30	70	100
	Total	**240**	**560**	**800**

SEMESTER –III

Paper	Subject	Internal	External	Total Marks
	THEORY (400)			
CC-301	Sports Training	30	70	100
CC-302	Computer Applications in Physical Education	30	70	100
CC-303	Sports Psychology and Sociology	30	70	100
EC-301/302	Sports Medicine, Physiotherapy and Rehabilitation/Curriculum Design (Elective)	30	70	100
	PRACTICAL (300)			
PC-301	Track and Field (Throwing Events)	30	70	100
PC-302	Combative Sports : Martial Art, Karate, Judo, Fencing, Boxing, Taekwondo, Wrestling (Any two out of these)	30	70	100
PC-303	Team Games: Baseball, Cricket, Football, Hockey, Softball, Volleyball, Handball, Basketball, Netball (Any two of these)	30	70	100
	TEACHING PRACTICE (100)			
TP-301	Teaching Practice (Teaching Lesson Plans for Racket Sport/ Team Games/Indigenous Sports)	30	70	100
	Total	**240**	**560**	**800**

SEMESTER -IV

Paper	Subject	Internal	External	Total Marks
	THEORY (400)			
CC-401	Measurement and Evaluation in Physical Education	30	70	100
CC-402	Kinesiology and Biomechanics	30	70	100
CC-403	Research and Statistics in Physical Education	30	70	100
EC-401/402	Theory of sports and games(Specifically sports and games specialization)/Sports Management (Elective)	30	70	100
	PRACTICAL (200)			
PC-401	Track and Field/Swimming /Gymnastics (Any of one out of these)	30	70	100
PC-402	Kabaddi/ Kho-Kho/ Baseball/ Cricket/ Football/Hockey/Softball/ Volleyball/ Handball/ Basketball/ Netball/ Badminton/ Table Tennis/ Squash/ Tennis (Any of one out of these)	30	70	100
	TEACHING PRACTICE (200)			
TP-401	Sports Specialization: Coaching lessons Plans Track and Field/Swimming /Gymnastics (Any of one out of these)	30	70	100
TP-402	Game specialization Coaching lessons: Kabaddi/ Kho-Kho/ Baseball/ Cricket/Football/Hockey /Softball/ Volleyball/ Handball/ Basketball/ Netball/ Badminton/ Table Tennis/ Squash/ Tennis (Any of one out of these)	30	70	100
	Total	**240**	**560**	**800**

B. P. Ed. – Outline of Syllabus

Semester – I

Theory Courses

CC-101 HISTORY, PRINCIPLES AND FOUNDATION OF PHYSICAL EDUCATION

Unit – 1: Introduction

- Meaning, Definition and Scope of Physical Education
- Aims and Objective of Physical Education
- Importance of Physical Education in present era.
- Misconceptions about Physical Education.
- Relationship of Physical Education with General Education.
- Physical Education as an Art and Science.

Unit- 2 – Historical Development of Physical Education in India

- Indus Valley Civilization Period. (3250 BC – 2500 BC)
- Vedic Period (2500 BC – 600 BC)
- Early Hindu Period (600 BC – 320 AD) and Later Hindu Period (320 AD – 1000 AD)
- Medieval Period (1000 AD – 1757 AD)
- British Period (Before 1947)
- Physical Education in India (After 1947)
- Contribution of Akhadas and Vyayamshals
- Y.M.C.A. and its contributions.

Unit- 3- Foundation of Physical Education

- Philosophical foundation:
- Idealism, Pragmatism, Naturalism, Realism, Humanism, Existentialism and Indian Philosophy and Culture.
- Fitness and wellness movement in the contemporary perspectives
- Sports for all and its role in the maintenance and promotion of fitness.

Unit-4- Principles of Physical Education

- Biological
    - Growth and development
    - Age and gender characteristics
    - Body Types
    - Anthropometric differences
- Psychological
    - Learning types, learning curve
    - Laws and principles of learning
    - Attitude, interest, cognition, emotions and sentiments

- Sociological
    - Society and culture
    - Social acceptance and recognition
    - Leadership
    - Social integration and cohesiveness

References:

Bucher, C. A. (n.d.) *Foundation of physical education.* St. Louis: The C.V. Mosby Co.

Deshpande, S. H. (2014). *Physical Education in Ancient India*. Amravati: Degree college of Physical education.

Mohan, V. M. (1969). *Principles of physical education.* Delhi: Metropolitan Book Dep.

Nixon, E. E. & Cozen, F.W. (1969). *An introduction to physical education*. Philadelphia: W.B. Saunders Co.

Obertuffer, (1970). *Delbert physical education*. New York: Harper & Brothers Publisher.

Sharman, J. R. (1964). *Introduction to physical education*. New York: A.S. Barnes & Co.

William, J. F. (1964). *The principles of physical education*. Philadelphia: W.B. Saunders Co.

Semester I

Theory Courses

CC-102 ANATOMY AND PHYSIOLOGY

UNIT-I

- Brief Introduction of Anatomy and physiology in the field of Physical Education.
- Introduction of Cell and Tissue.
- The arrangement of the skeleton – Function - of the skeleton – Ribs and Vertebral column and the extremities – joints of the body and their types
- Gender differences in the skeleton.
- Types of muscles.

UNIT-II

- **Blood and circulatory system:** Constituents of blood and their function –Blood groups and blood transfusion, clotting of blood, the structure of the heart-properties of the heart muscle, circulation of blood, cardiac cycle, blood pressure, Lymph and Lymphatic circulation. Cardiac output.
- **The Respiratory system:** The Respiratory passage – the lungs and their structure and exchange of gases in the lungs, mechanism of respiration (internal and external respiration) lung capacity, tidal volume.
- **The Digestive system:** structure and functions of the digestive system, Digestive organs, Metabolism,
- **The Excretory system:** Structure and functions of the kidneys and the skin.
- **The Endocrine glands:** Functions of glands pituitary, Thyroid, Parathyroid. Adrenal, Pancreatic and the sex glands.
- **Nervous systems:** Function of the Autonomic nervous system and Central nervous system. Reflex Action,
- **Sense organs:** A brief account of the structure and functions of the Eye and Ear.

UNIT-III

- Definition of physiology and its importance in the field of physical education and sports.
- Structure, Composition, Properties and functions of skeletal muscles.
- Nerve control of muscular activity:
  - Neuromuscular junction
  - Transmission of nerve impulse across it.
- Fuel for muscular activity
- Role of oxygen- physical training, oxygen debt, second wind, vital capacity.

UNIT-IV

- Effect of exercise and training on cardiovascular system.
- Effect of exercise and training on respiratory system.
- Effect of exercise and training on muscular system
- Physiological concept of physical fitness, warming up, conditioning and fatigue.
- Basic concept of balanced diet – Diet before, during and after competition.

References:

Gupta, A. P. (2010). *Anatomy and physiology.* Agra: SumitPrakashan.

Gupta, M. and Gupta, M. C. (1980). *Body and anatomical science.* Delhi: Swaran Printing Press.

Guyton, A.C. (1996). Textbook of Medical Physiology, 9th edition. Philadelphia: W.B. Saunders.

Karpovich, P. V. (n.d.). *Philosophy of muscular activity.* London: W.B. Saunders Co.

Lamb, G. S. (1982). Essentials of exercise physiology. Delhi: Surjeet Publication.

Moorthy, A. M. (2014). *Anatomy physiology and health education.*Karaikudi: Madalayam Publications.

Morehouse, L. E. & Miller, J. (1967). *Physiology of exercise*. St. Louis: The C.V. Mosby Co.

Pearce, E. C. (1962). *Anatomy and physiology for nurses.* London: Faber & Faber Ltd.

Sharma, R. D. (1979). *Health and physical education,* Gupta Prakashan.

Singh, S. (1979). *Anatomy of physiology and health education*. Ropar: Jeet Publications.

Semester I

Theory courses

CC-103 HEALTH EDUCATION AND ENVIRONMENTAL STUDIES

Unit – I Health Education

- Concept, Dimensions, Spectrum and Determinants of Health
- Definition of Health, Health Education, Health Instruction, Health Supervision
- Aim, objective and Principles of Health Education
- Health Service and guidance instruction in personal hygiene

Unit – II Health Problems in India

- Communicable and Non Communicable Diseases
- Obesity, Malnutrition, Adulteration in food, Environmental sanitation, Explosive Population,
- Personal and Environmental Hygiene for schools
- Objective of school health service, Role of health education in schools
- Health Services – Care of skin, Nails, Eye health service, Nutritional service, Health appraisal, Health record, Healthful school environment, first- aid and emergency care etc.

Unit – III Environmental Science

- Definition, Scope, Need and Importance of environmental studies.
- Concept of environmental education, Historical background of environmental education,
- Celebration of various days in relation with environment.
- Plastic recycling & probation of plastic bag / cover.
- Role of school in environmental conservation and sustainable development.

Unit – IVNatural Resources and related environmental issues:

- Water resources, food resources and Land resources
- Definition, effects and control measures of:
- Air Pollution, Water Pollution, Soil Pollution, Noise Pollution, Thermal Pollution
- Management of environment and Govt. policies , Role of pollution control board.

References:

Agrawal, K.C. (2001). *Environmental biology*.Bikaner: Nidhi publishers Ltd.

Frank, H. &Walter, H., (1976). *Turners school health education*. Saint Louis: The C.V. Mosby Company.

Nemir, A. (n.d.). The school health education. New York:Harber and Brothers.

Odum, E.P. (1971). *Fundamental of ecology*. U.S.A.: W.B. Saunders Co.

Semester – I

Theory courses

EC-101 OLYMPIC MOVEMENT (ELECTIVE)

Unit – I Origin of Olympic Movement

- Philosophy of Olympic movement
- The early history of the Olympic movement
- The significant stages in the development of the modern Olympic movement
- Educational and cultural values of Olympic movement

Unit – IIModern Olympic Games

- Significance of Olympic Ideals, Olympic Rings, Olympic Flag
- Olympic Protocol for member countries
- Olympic Code of Ethics
- Olympism in action
- Sports for All

Unit – III Different Olympic Games

- Para Olympic Games
- Summer Olympics
- Winter Olympics
- Youth Olympic Games

Unit – IV Committees of Olympic Games

- International Olympic Committee - Structure and Functions
- National Olympic committees and their role in Olympic movement
- Olympic commission and their functions
- Olympic medal winners of India

Reference:

Osborne, M. P. (2004). *Magictree house fact tracker: ancient greece and the olympics: a nonfiction companion to magic tree house: hour of the Olympics. New York:* Random House Books for Young Readers.

Burbank, J. M., Andranovich, G. D. &Heying Boulder, C. H. (2001). Olympic dreams: the impact of mega-events on local politics: Lynne Rienner

Semester – I

Theory courses

EC-102 OFFICIATING AND COACHING (Elective)

Unit- I: Introduction of Officiating and coaching

- Concept of officiating and coaching
- Importance and principles of officiating
- Relation of official and coach with management, players and spectators
- Measures of improving the standards of officiating and coaching

Unit- II: Coach as a Mentor

- Duties of coach in general, pre, during and post game.
- Philosophy of coaching
- Responsibilities of a coach on and off the field
- Psychology of competition and coaching

Unit- III: Duties of Official

- Duties of official in general, pre, during and post game.
- Philosophy of officiating
- Mechanics of officiating – position, singles and movement etc.
- Ethics of officiating

Unit- IV: Qualities and Qualifications of Coach and Official

- Qualities and qualification of coach and official
- General rules of games and sports
- Eligibility rules of intercollegiate and inter-university tournaments, preparation of TA, DA bills
- Integrity and values of sports

Reference Books:

Bunn, J. W. (1968). *The art of officiating sports*. Englewood cliffs N.J. Prentice Hall.

Bunn, J. W. (1972). *Scientific principles of coaching.* Englewood cliffs N. J. Prentice Hall.

Dyson, G. H. (1963). *The mechanics of athletics*. London: University of London Press Ltd.

Dyson, G. H. (1963). *The mechanics of Athletics*. London: University of London Press Ltd.

Lawther, J.D. (1965). *Psychology of coaching.* New York: Pre. Hall.

Singer, R. N. (1972). *Coaching, athletic & psychology*.New York: M.C. Graw Hill.

Semester – II

Theory Courses

CC-201 YOGA EDUCATION

Unit – I: Introduction

- Meaning and Definition of Yoga
- Aims and Objectives of Yoga
- Yoga in Early Upanisads
- The Yoga Sutra: General Consideration
- Need and Importance of Yoga in Physical Education and Sports

Unit - II: Foundation of Yoga

- The Astanga Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi
- Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga

Unit - III Asanas

- Effect of Asanas and Pranayama on various system of the body
- Classification of asanas with special reference to physical education and sports
- Influences of relaxtive, meditative posture on various system of the body
- Types of Bandhas and mudras
- Type of kriyas

Unit – IVYoga Education

- Basic, applied and action research in Yoga
- Difference between yogic practices and physical exercises
- Yoga education centers in India and abroad
- Competitions in Yogasanas

References:

Brown, F. Y.(2000). *How to use yoga*. Delhi:Sports Publication.

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Semester – II

Theory Courses

CC-202 EDUCATIONAL TECHNOLOGY AND METHODS OF TEACHING N PHYSICAL EDUCATION

Unit – I Introduction

- Education and Education Technology- Meaning and Definitions
- Types of Education- Formal, Informal and Non- Formal education.
- Educative Process
- Importance of Devices and Methods of Teaching.

Unit – II Teaching Technique

- Teaching Technique – Lecture method, Command method, Demonstration method, Imitation method, project method etc.
- Teaching Procedure – Whole method, whole – part – whole method, part – whole method.
- Presentation Technique – Personal and technical preparation
- Command- Meaning, Types and its uses in different situations.

Unit – III Teaching Aids

- Teaching Aids – Meaning, Importance and its criteria for selecting teaching aids.
- Teaching aids – Audio aids, Visual aids, Audio – visual aids, Verbal, Chalk board, Charts, Model, Slide projector, Motion picture etc
- Team Teaching – Meaning, Principles and advantage of team teaching.
- Difference between Teaching Methods and Teaching Aid.

Unit – IV Lesson Planning and Teaching Innovations

- Lesson Planning – Meaning, Type and principles of lesson plan.
- General and specific lesson plan.
- Micro Teaching – Meaning, Types and steps of micro teaching.
- Simulation Teaching - Meaning, Types and steps of simulation teaching.

Reference:

Bhardwaj, A. (2003). *New media of educational planning*.New Delhi:Sarup of Sons.

Bhatia,& Bhatia,(1959). *The principles and methods of teaching.*New Delhi: Doaba House.

Kochar, S.K. (1982). *Methods and techniques of teaching.*New Delhi: Sterling Publishers Pvt. Ltd.

Sampath, K.,Pannirselvam, A. &Santhanam, S. (1981). *Introduction to educational technology.*New Delhi: Sterling Publishers Pvt. Ltd.

Walia, J.S. (1999). *Principles and methods of education.*Jullandhar:Paul Publishers.

Semester – II

Theory Courses

CC-203 ORGANZATION AND ADMINISTRATION IN PHYSICAL EUCATION

Unit – I: Organization and administration

- Meaning and importance of Organization and Administration in physical education
- Qualification and Responsibilities of Physical Education teacher and pupil leader
- Planning and their basic principles,
- Program planning: Meaning, Importance, Principles of program planning in physical education.
- Functions of Planning, organizing, staffing, directing, communicating, co-ordination, controlling, evaluating and innovating.

Unit- II: Office Management, Record, Register & Budget

- Office Management: Meaning, definition, functions and kinds of office management
- Records and Registers: Maintenance of attendance Register, stock register, cash register, physical efficiency record, Medical examination Record.
- Budget: Meaning, Importance of Budget making,
- Criteria of a good Budget, Sources of Income, Expenditure, Preparation of Budget.

Unit-III: Facilities, & Time-Table Management

- Facilities and equipment management: Types of facilities Infrastructure-indoor, out door.
- Care of school building, Gymnasium, swimming pool, Play fields, Play grounds
- Equipment: Need, importance, purchase, care and maintenance.
- Time Table Management: Meaning, Need, Importance and Factor affecting time table.

Unit-IV:Competition Organization

- Importance of Tournament,
- Types of Tournament and its organization structure - Knock-out Tournaments, League or Round Robin Tournaments, Combination Tournament and challenge Tournament.
- Organization structure of Athletic Meet
- Sports Event Intramurals & Extramural Tournament planning

References:

Broyles, F. J. &Rober, H. D. (1979). *Administration of sports, Athletic programme: A Managerial Approach.* New York: Prentice hall Inc.

Bucher, C. A. (1983). *Administration of Physical Education and Athletic programme.*St. Lolis: The C.V. Hosby Co.

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Tirunarayanan, C. &Hariharan, S. (1969). *Methods in Physical Education.*Karaikudi: South India Press.

Voltmer, E. F. &Esslinger, A. A. (1979).*The organization and administration of Physical Education.* New York: Prentice Hall Inc.

Semester – II

Theory Courses

EC-201 CONTEMPORARY ISSUES IN PHYSICAL EDUCATION, FITNESS AND WELLNESS (ELECTIVE)

Unit – I Concept of Physical Education and Fitness

- Definition, Aims and Objectives of Physical Education, fitness and Wellness
- Importance and Scope of fitness and wellness
- Modern concept of Physical fitness and Wellness
- Physical Education and its Relevance in Inter Disciplinary Context.

Unit – II Fitness, Wellness and Lifestyle

- Fitness – Types of Fitness and Components of Fitness
- Understanding of Wellness
- Modern Lifestyle and Hypo kinetic Diseases – Prevention and Management
- Physical Activity and Health Benefits

Unit – III Principles of Exercise Program

- Means of Fitness development – aerobic and anaerobic exercises
- Exercises and Heart rate Zones for various aerobic exercise intensities
- Concept of free weight Vs Machine, Sets and Repetition etc
- Concept of designing different fitness training program for different age group.

Unit – IV Safety Education and Fitness Promotion

- Health and Safety in Daily Life
- First Aid and Emergency Care
- Common Injuries and their Management
- Modern Life Style and Hypo-kinetic Disease –Prevention and Management

References:

Difiore, J.(1998). *Complete guide to postnatal fitness.* London: A & C Black,.

Giam, C.K & The, K.C. (1994). *Sport medicine exercise and fitness.* Singapore: P.G. Medical Book.

Mcglynn, G., (1993). *Dynamics of fitness*. Madison: W.C.B Brown.

Sharkey, B. J.(1990). *Physiology of fitness*, Human Kinetics Book.

Semester II

Theory courses

EC-202 SPORTS NUTRITION AND WEIGHT MANAGEMENT (ELECTIVE)

Unit – I Introduction to Sports Nutrition

- Meaning and Definition of Sports Nutrition
- Basic Nutrition guidelines
- Role of nutrition in sports
- Factor to consider for developing nutrition plan

Unit – II Nutrients: Ingestion to energy metabolism

- Carbohydrates, Protein, Fat – Meaning, classification and its function
- Role of carbohydrates, Fat and protein during exercise
- Vitamins, Minerals, Water – Meaning, classification and its function
- Role of hydration during exercise, water balance, Nutrition – daily caloric requirement and expenditure.

Unit – III Nutrition and Weight Management

- Meaning of weight management Concept of weight management in modern era Factor affecting weight management and values of weight management
- Concept of BMI (Body mass index), Obesity and its hazard, Myth of Spot reduction, Dieting versus exercise for weight control, Common Myths about Weight Loss
- Obesity – Definition, meaning and types of obesity,
- Health Risks Associated with Obesity, Obesity - Causes and Solutions for Overcoming Obesity.

Unit – IV Steps of planning of Weight Management

- Nutrition – Daily calorie intake and expenditure, Determination of desirable body weight
- Balanced diet for Indian School Children, Maintaining a Healthy Lifestyle
- Weight management program for sporty child, Role of diet and exercise in weight management, Design diet plan and exercise schedule for weight gain and loss

References:

Bessesen, D. H. (2008). Update on obesity. *J ClinEndocrinolMetab.93*(6), 2027-2034.

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Semester – III

Theory Courses

CC-301 SPORTS TRAINING

Unit – I Introduction to Sports Training

- Meaning and Definition of Sports Training
- Aim and Objective of Sports Training
- Principles of Sports Training
- System of Sports Training – Basic Performance, Good Performance and High Performance Training

Unit – II Training Components

- Strength – Mean and Methods of Strength Development
- Speed – Mean and Methods of Speed Development
- Endurance - Mean and Methods of Endurance Development
- Coordination – Mean and Methods of coordination Development
- Flexibility – Mean and Methods of Flexibility Development

Unit – III Training Process

- Training Load- Definition and Types of Training Load
- Principles of Intensity and Volume of stimulus
- Technical Training – Meaning and Methods of Technique Training
- Tactical Training – Meaning and Methods of Tactical Training

Unit – IV Training programming and planning

- Periodization – Meaning and types of Periodization
- Aim and Content of Periods – Preparatory, Competition, Transitional etc.
- Planning – Training session
- Talent Identification and Development

Reference:

Dick, W. F. (1980).*Sports training principles.*London: Lepus Books.

Harre, D.(1982).*Principles of sports training.*Berlin: Sporulated.

Jensen, R. C.& Fisher, A.G. (1979). *Scientific basis of athletic conditioning*. Philadelphia: Lea and Fibiger, 2nd Edn.

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Uppal, A.K., (1999).*Sports Training.*New Delhi: Friends Publication.

Semester III

Theory Courses

CC-302 COMPUTER APPLICATIONS IN PHYSICAL EDUCATION

Unit – I: Introduction to Computer

- Meaning, need and importance of information and communication technology (ICT). Application of Computers in Physical Education
- Components of computer, input and output device
- Application software used in Physical Education and sports

Unit – II: MS Word

- Introduction to MS Word
- Creating, saving and opening a document
- Formatting Editing features Drawing table ,
- page setup, paragraph alignment, spelling and grammar check printing option, inserting page number, graph, footnote and notes

Unit – III: MS Excel

- Introduction to MS Excel
- Creating, saving and opening spreadsheet
- creating formulas
- Format and editing features adjusting columns width and row height understanding charts.

Unit – IV: MS Power Point

- Introduction to MS Power Point
- Creating, saving and opening a ppt. file
- format and editing features slide show , design , inserting slide number
- picture ,graph ,table
- Preparation of Power point presentations

Referances:

Irtegov, D. (2004). *Operating system fundamentals*. Firewall Media.
Marilyn, M.& Roberta, B.(n.d.).*Computers in your future*. 2nd edition, India: Prentice Hall.
Milke, M.(2007). *Absolute beginner's guide to computer basics*. Pearson Education Asia.
Sinha, P. K. & Sinha, P. (n.d.).*Computer fundamentals*. 4th edition, BPB Publication.

Semester – III

Theory Courses

CC-303 SPORTS PSYCHOLOGY AND SOCIOLOGY

Unit -I: introduction

- Meaning, Importance and scope of Educational and Sports Psychology
- General characteristics of Various Stages of growth and development
- Types and nature of individual differences; Factors responsible -Heredity And environment
- Psycho-sociological aspects of Human behavior in relation to physical education and sports

Unit-II: Sports Psychology

- Nature of learning, theories of learning, Laws of learning,
- Plateau in Learning; & transfer of training
- Meaning and definition of personality, characteristics of personality,
- Dimension of personality, Personality and Sports performance
- Nature of motivation: Factors influencing motivation; Motivation and techniques and its impact on sports performance.
- Mental Preparation Strategies: Attention focus, Self- talk, Relaxation, Imaginary.
- Aggression and Sports, Meaning and nature of anxiety, Kinds of anxiety
- Meaning and nature of stress; Types of stress, Anxiety, Stress, Arousal and their effects on sports performance

Unit-III: Relation between Social Science and Physical Education.

- Orthodoxy, customs, Tradition and Physical Education.
- Festivals and Physical Education.
- Socialization through Physical Education.
- Social Group life, Social conglomeration and Social group, Primary group and Remote group.

Unit-4 Culture : Meaning and Importance.

- Features of culture,
- Importance of culture.
- Effects of culture on people life style.
- Different methods of studying Observation/ Inspection method, Questionnaire method, Interview method

References:

Ball, D. W. & Loy, J. W. (1975).*Sport and social order; Contribution to the sociology of sport.*London: Addison Wesley Publishing Co., Inc.

Blair, J.& Simpson, R.(1962). *Educational psychology*, New York:McMillan Co.

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William, F. O.&Meyer, F. N. (1979). A handbook of sociology. New Delhi: Eurasia Publishing House Pvt Ltd.

Semester – III

Theory Courses

EC-301 SPORTS MEDICINE, PHYSIOTHERAPY AND REHANLITATION (ELECTIVE)

Unit-I: - Sports Medicine:

- Sports Medicine: Meaning, Definition, Aims, Objectives, Modern Concepts and Importance.
- Athletes Care and Rehabilitation: Contribution of Physical Education Teachers and Coaches.
- Need and Importance of the study of sports injuries in the field of Physical Education
- Prevention of injuries in sports – Common sports injuries – Diagnosis –
- First Aid - Treatment - Laceration – Blisters – Contusion - Strain – Sprain – Fracture – Dislocation and Cramps – Bandages – Types of Bandages – trapping and supports.

Unit-II: Physiotherapy

- Definition – Guiding principles of physiotherapy, Importance of physiotherapy, Introduction and demonstration of treatments - Electrotherapy – infrared rays – Ultraviolet rays –short wave diathermy – ultrasonic rays.

Unit-III: Hydrotherapy:

- Introduction and demonstration of treatments of Cry therapy, Thermo therapy, Contrast Bath, Whirlpool Bath – Steam Bath – Sauna Bath – Hot Water Fomentation – Massage: History of Massage – Classification of Manipulation (Swedish System) physiological Effect of Massage.

Unit-IV: Therapeutic Exercise:

- Definition and Scope – Principles of Therapeutic Exercise – Classification, Effects and uses of Therapeutic exercise – passive Movements (Relaxed, Forced and passive - stretching) – active movements (concentric, Eccentric and static) application of the therapeutic exercise: Free Mobility Exercise – Shoulder, Elbow – Wrist and Finger Joints – Hips, Knee, ankle and Foot joints – Trunk. Head and Neck exercises.

References:

Christine, M. D., (1999). *Physiology of sports and exercise*.USA: Human Kinetics.

Conley, M. (2000). *Bioenergetics of exercise training*. In T.R. Baechle, & R.W. Earle, (Eds.), Essentials of Strength Training and Conditioning (pp. 73-90). Champaign, IL: Human Kinetics.

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Pandey, P.K., (1987). *Outline of sports medicine*, New Delhi: J.P. Brothers Pub.
Williams, J. G. P. (1962). *Sports medicine*. London: Edward Arnold Ltd.

Semester – III

Theory Courses

EC-302 CURRICULUM DESIGN (Elective)

UNIT-I Modern concept of the curriculum

- Need and importance of curriculum, Need and importance of curriculum development, the role of the teacher in curriculum development.
- Factors affecting curriculum - Social factors - Personnel qualifications - Climatic consideration - Equipment and facilities -Time suitability of hours.
- National and Professional policies, Research finding

UNIT-IIBasic Guide line for curriculum construction; contest (selection and expansion).

- Focalization
- Socialization
- Individualization
- Sequence and operation
- Steps in curriculum construction.

UNIT-IIICurriculum-Old and new concepts, Mechanics of curriculum planning.

- Basic principles of curriculum construction.
- Curriculum Design, Meaning, Importance and factors affecting curriculum design.
- Principles of Curriculum design according to the needs of the students and state and national level policies.
- Role of Teachers

UNIT-IV Under-graduate preparation of professional preparation.

- Areas of Health education, Physical education and Recreation.
- Curriculum design-Experience of Education, Field and Laboratory.
- Teaching practice.
- Professional Competencies to be developed-Facilities and special resources for library, laboratory and other facilities.

Reference:

Barrow, H. M. (1983). *Man and movement: principles of physical education*. Philadelphia: Lea and Febiger.

Bucher, C. A. (1986). Foundation of physical education: St. Louis: The C. V. Mosby & Company.

Cassidy, R. (1986). *Curriculum development in physical education*. New York: Harper & Company.

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Larson, L.A. (n.d.). *Curriculum foundation in physical education.* Englewood Cliffs: N.J. Prentice Hall Inc.

Underwood, G. L. (1983). *The physical education curriculum in secondary school: planning and implementation.*England: Taylor and Francis Ltd.

Willgoose, C.E. (1979). *Curriculum in physical education*. 3rd Ed. Englewood Cliffs.: N.J. Prentice Hall, Inc.

Semester – IV

Theory Courses

CC-401 MEASUREMENT AND EVALUATION IN PHYSICAL EDUCATION

Unit- IIntroduction to Test & Measurement & Evaluation

- Meaning of Test & Measurement & Evaluation in Physical Education
- Need & Importance of Test & Measurement & Evaluation in Physical Education
- Principles of Evaluation

Unit- IICriteria; ClassificationandAdministration of test

- Criteria of good Test
- Criteria of tests, scientific authenticity (reliability, objectivity, validity and availability of norms)
- Type and classification of Test
- Administration of test, advance preparation – Duties during testing – Duties after testing.

Unit- III Physical Fitness Tests

- AAHPER youth fitness test
- National physical Fitness Test
- Indiana Motor Fitness Test
- JCR test
- U.S Army Physical Fitness Test

Unit- IV Sports Skill Tests

- Lockhart and McPherson badminton test
- Johnson basketball test
- McDonald soccer test
- S.A.I volleyball test
- S.A.I Hockey test

References:

Bangsbo, J. (1994). *Fitness training in football: A scientific approach*. Bagsvaerd, Denmark: Ho+Storm.

Barron, H. M., &Mchee, R. (1997). *A practical approach to measurement in physical education*. Philadelphia: Lea and Febiger.

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Mathews, D.K., (1973). *Measurement in physical education*, Philadelphia: W.B.SoundersCompnay.

Pheasant, S. (1996). *Body space: anthropometry, ergonomics and design of work*. Taylor & Francis, New York.

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Sodhi, H.S., & Sidhu, L.S. (1984). *Physique and selection of sports- a kinanthropometric study*. Patiala: Punjab Publishing House.

Semester – IV
Theory Courses

CC-402 KINESIOLOGY AND BIOMECHANICS

Unit – I Introduction to Kinesiology and Sports Biomechanics

- Meaning and Definition of Kinesiology and Sports Biomechanics
- Importance of Kinesiology and Sports Biomechanics to Physical Education Teacher, Athletes and Sports Coaches.
- Terminology of Fundamental Movements
- Fundamental concepts of following terms – Axes and Planes, Centre of Gravity, Equilibrium, Line of Gravity

Unit – II Fundamental Concept of Anatomy and Physiology

- Classification of Joints and Muscles
- Types of Muscle Contractions
- Posture – Meaning, Types and Importance of good posture.
- Fundamental concepts of following terms- Angle of Pull, All or None Law, Reciprocal Innovation

Unit – III Mechanical Concepts

- Force - Meaning, definition, types and its application to sports activities
- Lever - Meaning, definition, types and its application to human body.
- Newton's Laws of Motion – Meaning, definition and its application to sports activities.
- Projectile – Factors influencing projectile trajectory.

Unit – IV Kinematics and Kinetics of Human Movement

- Linear Kinematics – Distance and Displacement, speed and velocity, Acceleration
- Angular kinematics – Angular Distance and Displacement, Angular Speed and velocity, Angular Acceleration.
- Linear Kinetics – Inertia, Mass, Momentum, Friction.
- Angular Kinetics – Moment of inertia ,Couple, Stability.

Reference:

Bunn, J. W. (1972).*Scientific principles of coaching.* Englewood Cliffs, N.J.: Prentice Hall Inc.

Hay, J. G. & Reid, J. G.(1982).*The anatomical and mechanical basis of human motion.* Englewood Cliffs, N.J.: prentice Hall Inc.

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Hay, J. G. (1970).*The biomechanics of sports techniques*. Englewood Cliffs, N.J.: Prentice Hall, Inc.

Simonian, C.(1911).*Fundamentalsof sport biomechanics.* Englewood Cliffs, N.J.: Prentice Hall Inc.

Semester – IV
Theory Courses
CC-403 RESEARCH AND STATISTICS IN PHYSICAL EDUCATION

Unit-I Introduction to Research

- Definition of Research
- Need and importance of Research in Physical Education and Sports.
- Scope of Research in Physical Education & Sports.
- Classification of Research
- Research Problem, Meaning of the term, Location and criteria of Selection of Problem, Formulation of a Research Problem, Limitations and Delimitations.

Unit-II Survey of Related Literature

- Need for surveying related literature.
- Literature Sources, Library Reading
- Research Proposal, Meaning and Significance of Research Proposal.
- Preparation of Research proposal / project.
- Research Report: A group project is to be undertaken by a small batch of students under the supervision of a teacher, wherein it is expected to survey school facilities of physical education, health assessment programme evaluation, fitness status of the students, staff and other stakeholders etc. and submit the report to the institution.

Unit-III Basics of Statistical Analysis

- Statistics: Meaning, Definition, Nature and Importance
- Class Intervals: Raw Score, Continuous and Discrete Series, Class Distribution, Construction of Tables
- Graphical Presentation of Class Distribution: Histogram, Frequency Polygon, Frequency Curve. Cumulative Frequency Polygon, Ogive, Pie Diagram

Unit- IVStatistical Models in Physical Education and Sports

- Measures of Central Tendency: Mean, Median and Mode-Meaning, Definition, Importance, Advantages, Disadvantages and Calculation from Group and Ungrouped data
- Measures of Variability: Meaning, importance, computing from group and ungroup data
- Percentiles and Quartiles: Meaning, importance, computing from group and ungroup data

References:

Best, J.W. (1963). *Research in education*. U.S.A.: Prentice Hall.

Bompa, T. O. &Haff, G. G. (2009). *Periodization: theory and methodology of training, 5th ed.* Champaign, IL: Human Kinetics.

Brown, L. E., &Ferrigno, V. A. (2005). Training for speed, agility and quickness, 2nd ed. Champaign, IL: Human Kinetics.

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Carl, E. K., & Daniel, D. A. (1969). Modern principles of athletes training. St. Louis: St. Louis's Mosby Company.

Clark, H. H., & Clark, D. H. (1975). *Research process in physical education*. Englewood cliffs, New Jersey: Prentice Hall, Inc.

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Oyster, C. K., Hanten, W. P., & Llorens, L. A. (1987). *Introduction to research: A guide for the health science professional.* Landon: J.B. Lippincott Company.

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Uppal, A. K. (1990). *Physical fitness: how to develop.* New Delhi: Friends Publication.

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Semester – IV
Theory Courses

EC-401 THEORY OF SPORTS AND GAMES (ELECTIVE)

UNIT-IINTRODUCTION

General Introduction of speciliazed games and sports–

- Athletics,
- Badminton,
- Basketball,
- Cricket,
- Football,
- Gymnastic,
- Hockey,
- Handball,
- Kabaddi,
- Kho-Kho,
- Tennis,
- Volleyball and
- Yoga.

Each game or sports to be dealt under the following heads

- History and development of the Game and Sports
- Ground preparation, dimensions and marking
- Standard equipment and their specifications
- Ethics of sports and sportsmanship

UNIT-II Scientific Principles of coaching: (particular sports and game specific)

- Motion – Types of motion and Displacement, Speed, Velocity, Acceleration, Distance and Newton's Law of motions.
- Force – Friction, Centripetal and Centrifugal force, Principles of force.
- Equilibrium and its types
- Lever and its types
- Sports Training – Aims, Principles and characteristics.
- Training load – Components, Principles of load, Over Load (causes and symptoms).

UNIT-III Physical fitness components: (particular sports and game specific)

- Speed and its types
- Strength and its types
- Endurance and its types
- Flexibility and its types
- Coordinative ability and its types

- Training methods: - Development of components of physical fitness and motor fitness through following training methods (continuous method, interval method, circuit method, fartlek /speed play and weight training)

UNIT-IV Conditioning exercises and warming up.

- Concept of Conditioning and warming up.
- Role of weight training in games and sports.
- Teaching of fundamental skill & their mastery (technique, tactic and different phases of skill acquisition).
- Recreational and Lead up games
- Strategy – Offence and defense, Principles of offence and defense.

References:

Bunn, J. W. (1968). *The art of officiating sports*. Englewood cliffs N.J. Prentice Hall.

Bunn, J. W. (1972). *Scientific principles of coaching.* Englewood cliffs N. J. Prentice Hall.

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Semester – IV

Theory Courses

EC-402 SPORTS MANAGEMENT

Unit-I

- Nature and Concept of Sports Management.
- Progressive concept of Sports management.
- The purpose and scope of Sports Management.
- Essential skills of Sports Management.
- Qualities and competencies required for the Sports Manager.
- Event Management in physical education and sports.

Unit-II

- Meaning and Definition of leadership
- Leadership style and method.
- Elements of leadership.
- Forms of Leadership.
    - Autocratic
    - Laissez-faire
    - Democratic
    - Benevolent Dictator
- Qualities of administrative leader.
- Preparation of administrative leader.
- Leadership and Organizational performance.

Unit-III

- Sports Management in Schools, colleges and Universities.
- Factors affecting planning
- Planning a school or college sports programme.
- Directing of school or college sports programme.
- Controlling a school, college and university sports programme.
    - Developing performance standard
    - Establishing a reporting system
    - Evaluation
    - The reward/punishment system

Unit-IV

- Financial management in Physical Education & sports in schools, Colleges and Universities.
- Budget – Importance, Criteria of good budget,
- Steps of Budget making
- Principles of budgeting

REFERENCES:

Ashton, D. (1968).*Administration of physical education for women*.New York: The Ronal Press Cl.

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Part – B
Practical Courses
Semester – I

PC - 101
Track and Field:

Running Event

- Starting techniques: Standing start, Crouch start and its variations, Proper use of blocks.
- Finishing Techniques: Run, Through, Forward lunging, Shoulder Shrug
- Ground Marking, Rules and Officiating
- Hurdles:
    - Fundamental Skills- Starting, Clearance and Landing Techniques.
    - Types of Hurdles
    - Ground Marking and Officiating.

Relays: Fundamental Skills

- Various patterns of Baton Exchange
- Understanding of Relay Zones
- Ground Marking
- Interpretation of Rules and Officiating.

PC 102

Gymnastics: Floor Exercise

- Forward Roll, Backward Roll, Sideward Roll, different kinds of scales, Leg Split, Bridge, Dancing steps, Head stand, Jumps-leap, scissors leap.
- Vaulting Horse
- Approach Run, Take off from the beat board, Cat Vault, Squat Vault.

PC – 102

Swimming: Fundamental Skills

- Entry into the pool.
- Developing water balance and confidence
- Water fear removing drills.
- Floating-Mushroom and Jelly fish etc.
- Gliding with and without kickboard.
- Introduction of various strokes
- Body Position, Leg, Kick, Arm pull, Breathing and Co ordination.
- Start and turns of the concerned strokes.
- Introduction of Various Strokes.
- Water Treading and Simple Jumping.

- Starts and turns of concerned strokes.
- Rules of Competitive swimming-officials and their duties, pool specifications, seeding heats and finals, Rules of the races.

PC – 102

Shooting Fundamental Skills

- Basic stance, grip, Holding rifle/ Pistol, aiming target
- Safety issues related to rifle shooting
- Rules and their interpretations and duties of officials

(Any one out of three)

PC – 103 Indigenous sports:

Kabaddi: Fundamental Skills

- Skills in Raiding-Touching with hand, various kicks, crossing of baulk line, Crossing of Bonus line, luring the opponent to catch, Pursuing.
- Skills of Holding the Raider-Various formations, Catching from particular position, Different catches, Luring the raider to take particular position so as to facilitate catching, catching formations and techniques.
- Additional skills in raiding-Bringing the antis in to particular position, Escaping from various holds, Techniques of escaping from chain formation, Combined formations in offence and defense.
- Ground Marking, Rules and Officiating

PC – 103

Malkhambh and Light Apparatus:

- Lathi-Two counts exercises, Four Count exercises, eight count exercises, sixteen count exercises.
- GhatiLezuim-AathAawaaz, Bethakawaaz, AagePaon, Aagekadam, Do pherawaaz, Chau pherawaaz, Kadamtaal, Pavitra, Uchhakpavitra, Kadampavitra.
- Mass P.T. Exercises-Two count, four count and eight count exercises.
- Hindustani Lezuim-Char Awaaz, EkJagah, AantiLagaav, Pavitra, Do Rukh, Chau Rukh, Chau rukhbethak, Momiya.
- Drill and Marching
- Malkhamb-Salaami, Hold, Saadiudi, Bagaludi, Dashrangudi, Bagliudi, Veludi, Soydoro, Phirki, Padmasana, T.Balance, Pataka, Landing.
- Rope Malkhamb-Salaami, PadmasanaChadh, Katibandh1-2, Sadiadhi, Rikebpakkad, Rikebpagniadhi, Kamaradhi, Nakkikasadhi, Kamaradhi, Nakkikasadhi, Urubandhtedhi, Sadibagli, Do hatibagli, Kamarbandhbagli, nakkikasbagli, Dashrang, Hanuman pakad, Gurupakkad, various padmasana, Landing.

PC - 104

Kho Kho:

- General skills of the game-Running, chasing, Dodging, Faking etc.
- Skills in chasing-Correct Kho, Moving on the lanes, Pursuing the runner, Tapping the inactive runner, Tapping the runner on heels, Tapping on the pole, Diving, Judgement in giving Kho, Rectification of Foul.
- Skills in Running-Zig zag running, Single and double chain, Ring play, Rolling in the sides, Dodging while facing and on the back, fakes on the pole, fake legs, body arm etc, Combination of different skills.
- Ground Marking
- Rules and their interpretations and duties of officials.

PC – 104

Dumbells/ Wands/ Hoop/ Umbrella/ Tipri: Fundamentals skills

- Apparatus/ Light apparatus Grip
- Attention with apparatus/ Light apparatus
- Stand – at – ease with apparatus/ ligfht apparatus
- Exrcise with verbal command,drum, whistle and music – Two count, Four count, Eight count and Sixteen count.
- Standing Exercise
- Jumping Exercise
- Moving Exercise
- Combination of above all

Semester – II

PC – 201

Track and Field

Athletics: Jumping Events

- High Jump (Straddle Roll)
- Approach Run,
- Take off
- Clearance over the bar.
- Landing

PC – 202

Gymnastics:

- Parallel Bar:
- Mount from one bar
- Straddle walking on parallel bars.
- Single and double step walk
- Perfect swing
- Shoulder stand on one bar and roll forward.
- Roll side
- Shoulder stand
- Front on back vault to the side(dismount)
- Horizontal /Single Bar:
- Grip
- Swings
- Fundamental Elements
- Dismount
- Uneven Parallal Bar:
- Grip
- Swings
- Fundamental Elements
- Dismount

PC – 202

Yoga:

- Surya Namaskara,
- Pranayams
- Corrective Asanas
- Kriyas
- Asanas
  - Sitting
  - Standing
  - Laying Prone Position,
  - Laying Spine Position

PC – 202

Swimming:

Introduction of water polo game

- Fundamental skills
- Swimm with the ball
- Passing
- Catching
- Shooting
- Goal keeping
- Rules of the games and responsibility of officials

Introduction of Diving sports.

- Basic Diving Skills from spring boards
- Basic Diving Skills from platform

PC – 202

Aerobics: Introduction of Aerobics

- Rhythmic Aerobics - dance
- Low impact aerobics
- High impact aerobics
- Aerobics kick boxing
- Postures – Warm up and cool down
- THR Zone – Being successful in exercise and adaptation to aerobic workout.

PC - 203

Badminton: Fundamental Skills

- Racket parts, Racket grips, Shuttle Grips.
- The basic stances.
- The basic strokes-Serves, Forehand-overhead and underarm, Backhand-overhead and underarm
- Drills and lead up games
- Types of games-Singles, doubles, including mixed doubles.
- Rules and their interpretations and duties of officials.

PC - 203

Table Tennis: Fundamental Skills

- The Grip-The Tennis Grip, Pen Holder Grip.
- Service-Forehand, Backhand, Side Spin, High Toss.
- Strokes-Push, Chop, Drive, Half Volley, Smash, Drop-shot, Balloon, Flick Shit, Loop Drive.
- Stance and Ready position and foot work.
- Rules and their interpretations and duties of officials.

PC – 203

Squash Fundamental Skills

- Service- Under hand and Over hand
- Service Reception
- Shot- Down the line, Cross Court
- Drop
- Half Volley
- Tactics – Defensive, attacking in game
- Rules and their interpretations and duties of officials.

PC – 203

Tennis: Fundamental Skills**.**

- Grips- Eastern Forehand grip and Backhand grip, Western grip, Continental grip, Chopper grip.
- Stance and Footwork.
- Basic Ground strokes-Forehand drive, Backhand drive.
- Basic service.
- Basic Volley.
- Over-head Volley.
- Chop
- Tactics – Defensive, attacking in game
- Rules and their interpretations and duties of officials.

Semester – III

PC – 301

Track and fields (Throwing Events)

- Discus Throw, Javelin, Hemmer throw, shot-put
- Basic Skills and techniques of the Throwing events
- Ground Marking / Sector Marking
- Interpretation of Rules and Officiating.
- Grip
- Stance
- Release
- Reserve/ (Follow through action)
- Rules and their interpretations and duties of officials

PC – 302

Boxing: Fundamental Skills

- Player stance
- Stance - Right hand stance, left hand stance.
- Footwork – Attack, defense.
- Punches – Jab, cross, hook, upper cut, combinations.
- Defense slip – bob and weave, parry/block, cover up, clinch, counter attack
- Tactics – Toe to toe, counter attack, fighting in close, feinting
- Rules and their interpretations and duties of officials.

PC – 302

Martial Arts/Karate: Fundamental Skills

- Player Stances – walking, hand positions, front-leaning, side-fighting.
- Hand Techniques - Punches (form of a punch, straight punch, and reverse punch), Blocks (eight basic).
- Leg Techniques - Snap kicks, stretching straight leg, thrust kicks, sidekicks, round house.
- Forms - The first cause Katas.
- Self Defense - against punches, grabs and strikes, against basic weapons (knife, club sticks).
- Sparring - One step for middle punch, high punch and groin punch. (Defended by appropriate block from eight basic blocks).
- Rules and their interpretations and duties of officials.

PC – 302

Taekwondo Fundamental Skills

- Player Stances – walking, extending walking, L stance, cat stance.
- Fundamental Skills – Sitting stance punch, single punch, double punch, triple punch.
- Punching Skill from sparring position – front-fist punch, rear fist punch, double punch, and four combination punch.
- Foot Tenchniques (Balgisul) – standing kick (soseochagi), Front kick (AP chagi), Arc kick (BandalChagi), Side kick, (YeopChagi), Turning kick (DollyoChagi), Back kick (Twit Chagi), Reverse turning kick (BandaeDollyoChagi), Jump kick (TwimyoChagi),
- Poomsae (Forms) – Jang, Yi Jang, Sam Jang, Sa Jang, O Jang, Yook Jang, Chil Jang, Pal Jang (Fundamental Movement – eye control, concentration of spirit, speed control, strength control, flexibility, balance, variety in techniques)
- Sparring (Kyorugi) – One Step Sparring (hand techniques, foot techniques, self defense techniques, combination kicks), Free Sparring.
- Board Breaking (Kyokpa) – eye control, balance, power control, speed, point of attack.
- Rules and their interpretations and duties of officials.

PC – 302

Judo: Fundamental skills

- Rei (Salutation)-Ritsurei(Salutation in standing position), Zarai (Salutation in the sitting position)
- Kumi kata (Methods of holding judo costume)
- Shisei (Posture in Judo)
- Kuzushi (Act of disturbing the opponent posture)
- Tsukuri and kake (Preparatory action for attack)
- Ukemi (Break Fall)-UrhiroUkemi (Rear break Fall), Yoko Ukemi (Side Break Fall), Mae Ukemi (Front Break Fall), Mae mawariUkemi (Front Rolling break fall)
- Shin Tai (Advance or retreat foot movement)-Suri-ashi (Gliding foot), Twugi-ashi (Following footsteps), Ayumi-ashi (Waling steps.
- Tai Sabaki (Management of the body)
- NageWaze (Throwing techniques)-HizaGuruma (Knee wheel), SesaeTwurikomi-ashi (Drawing ankle throw), De ashihari (Advance foot sweep), O Goshi (Major loinm), SeoiNage (Shoulder throw).
- Katamawaze(Grappling techniques)-Kesagatame (Scaff hold), Kata gatame (Shoulder hold), Kami shihogatama (Locking of upper four quarters), Method of escaping from each hold.

PC – 302

Wrestling: Fundamental Skills

- Take downs, Leg tackles, Arm drag.
- Counters for take downs, Cross face, Whizzer series.
- Escapes from under-sit-out turn in tripped.
- Counters for escapes from under-Basic control back drop, Counters for stand up.
- Pinning combination-Nelson series(Half Nelson, Half Nelson and Bar arm), Leg lift series, Leg cradle series, Reverse double bar arm, chicken wing and half Nelson.
- Escapes from pining: Wing lock series, Dopuble arm lock roll, Cridge.
- Standing Wrestling-Head under arm series, whizzer series
- Referees positions.

PC – 302

Fencing: Fundamental Skill

- Basic Stance - on-guard position (feet and legs)
- Footwork – advance, retire, lunge, Step-lunge
- Grip – hold a foil correctly, Etiquette – salute and handshake to coaches and partners
- Hit a target (glove, mask, person) at riposte distance
- Lunge from an on-guard position.
- Attack - simple attacks from sixte – direct, disengage, doublé attack, compound attacks high line – one-two and cut-over disengage, Cut-over attack, Low line attacks
- Semi circular parries – octave and septime
- Understand the layout of a piste.
- Compound or successive parries.
- Lateral parry and direct riposte
- Fence a bout – judges etc. salutes and handshakes
- Rules and their interpretations and duties of officials.

PC 303 Team Games

PC 303

Base Ball Fundamental Skills

- Player Stances – walking, extending walking, L stance, cat stance.
- Grip – standard grip, choke grip,
- Batting – swing and bunt.
- Pitching –

- Baseball : slider, fast pitch, curve ball, drop ball, rise ball, change up, knuckle ball, screw ball,
- Softball: windmill, sling shot,
- starting position: wind up, set.
- Fielding –
    - Catching: basics to catch fly hits, rolling hits,
    - Throwing: over arm, side arm.

- Base running –
    - Base running: single, double, triple, home run,
    - Sliding: bent leg slide, hook slide, head first slide.

- Rules and their interpretations and duties of officials.

PC 303

Netball: Fundamental Skills

- Catching: one handed, two handed, with feet grounded, in flight.
- Throwing (different passes and their uses): one handed passes (shoulder, high shoulder, underarm, bounce, lob); two handed passes (push, overhead, bounce).
- Footwork: landing on one foot; landing on two feet; pivot; running pass.
- Shooting: one hand; two hands; forward step shot; backward step shot.
- Techniques of getting free: dodge and sprint; sudden sprint; sprint and stop; sprinting with change of speed.
- Defending: marking the player; marking the ball; blocking; inside the circle; outside the circle (that is, defending the circle edge against the pass in).
- Intercepting: pass; shot.
- The toss-up.
- Role of individual players
- Rules and their interpretations and duties of officials.

PC – 303

Cricket: Fundamental Skills

- Batting-Forward and backward defensive stroke
- Bowling-Simple bowling techniques
- Fielding-Defensive and offensive fielding
- Catching-High catching and Slip catching
- Stopping and throwing techniques
- Wicket keeping techniques

PC 303

Football: Fundamental Skills

- Kicks-Inside kick, Instep kick, Outer instep kick, lofted kick
- Trapping-trapping rolling the ball, trapping bouncing ball with sole
- Dribbling-With instep, inside and outer instep of the foot.
- Heading-From standing, running and jumping.
- Throw in
- Feinting-With the lower limb and upper part of the body.
- Tackling-Simple tackling, Slide tackling.
- Goal Keeping-Collection of balls, Ball clearance-kicking, throwing and deflecting.

PC 303

Hockey: Fundamental Skills

- Player stance & Grip
- Rolling the ball
- Dribbling
- Push
- Stopping
- Hit
- Flick
- Scoop
- Passing – Forward pass, square pass, triangular pass, diagonal pass, return pass,
- Reverse hit
- Dodging
- Goal keeping – Hand defence, foot defence
- Positional play in attack and defense.
- Rules and their interpretations and duties of officials.
- Rules and their interpretations and duties of officials.
- Ground Marking.

PC – 303

Softball Fundamental Skills

- Catching: one handed, two handed, with feet grounded, in flight.
- Throwing (different passes and their uses): one handed passes (shoulder, high shoulder, underarm, bounce, lob); two handed passes (push, overhead, bounce).
- Footwork: landing on one foot; landing on two feet; pivot; running pass.
- Shooting: one hand; two hands; forward step shot; backward step shot.

- Techniques of getting free: dodge and sprint; sudden sprint; sprint and stop; sprinting with change of speed.
- Defending: marking the player; marking the ball; blocking; inside the circle; outside the circle (that is, defending the circle edge against the pass in).
- Intercepting: pass; shot.
- The toss-up.
- Role of individual players
- Rules and their interpretations and duties of officials.

PC 303

Volleyball: Fundamental Skills

- Players Stance-Receiving the ball and passing to the team mates,
- The Volley (Over head pass),
- The Dig(Under hand pass).
- Service-Under Arm Service, Side Arm Service, Tennis Service, Round Arm Service.
- Rules and their interpretations and duties of officials.

PC - 303

Hand Ball:

- Fundamental Skills-Catching, Throwing, Ball Control, Goal Throws-Jump Shot, Centre Shot, Dive Shot, Reverse Shot, Dribbling-High and Low, Attack and Counter Attack, Simple Counter Attack, Counter Attack from two wings and centre, Blocking, Goal keeping, Defense.
- Rules and their interpretations and duties of officials.

PC – 303

Basket ball: Fundamental Skills

- Player stance and ball handling
- Passing-Two Hand chest pass, Two hand Bounce Pass, One Hand Base ball pass, Side Arm Pass, Over Head pass, Hook Pass.
- Receiving-Two Hand receiving, One hand receiving, Receiving in stationary position, Receiving while jumping, Receiving while running.
- Dribbling-How to start dribble, How to drop dribble, High dribble, Low dribble, Reverse dribble, Rolling dribble.
- Shooting-Layup shot and its variations, one hand set shot, One hand jump shot, Hook shot, Free throw.
- Rebounding-Defensive rebound, Offensive rebound, Knock out, Rebound Organization.
- Individual Defensive-Guarding the man with the ball and without the ball.
- Pivoting.
- Rules and their interpretations and duties of the officials.

TP – 201 Teaching practices:

10 teaching practice lessons out of which 5 lessons in class-room situation and 5 lessons for out-door activities within premises on the students of B.P.Ed course.

TP – 301 Teaching practices:

10 teaching lesson plans for Racket Sport/ Team Games/ Indigeneous Sports out of which 5 lessons internal and 5 lessons external at school.

TP – 401 **Sports Specialization: Track and field / Gymnastics / Swimming**

(4 internal lesson at prcticing school and 1 final external lesson on the students of practicing school as a sports specialization of any discipline mentioned above.)

TP- 402 **Games Specialization: Kabaddi, Kho-kho, Base ball, cricket, Football, Hockey, Softball Volleyball, Handball, Basketball, Netball, Badminton, Table Tennis, Squash, Tennis**

(4 internal lesson at prcticing school and 1 final external lesson on the students of practicing school as a games specialization of any discipline mentioned above.)

Note: Where ever details of any activities are not mentioned, it is expected to elaborate skills by the competent bodies of local Universities.

Master of Physical Education Course
Semester I: Paper I
Professional Preparation and Curriculum designs

UNIT-I

Foundation of professional preparation

1. **Ideals of Indian Democracy: Contribution of Physical Education.**

2. **Forces and factor effecting Education Policies and programmes – social, religious, economic and political. Education and professional preparation in physical education in India with those in USA, USSR and UK.**

UNIT-II

1. **Under graduate preparation of professional areas of health education, physical education and recreation. Purpose of under graduate preparation. Administration, curriculum, laboratory experiences, field experiences, Laboratory Experiences, Field Experiences, Teaching Practice and Professional competences to be developed. Facilities and special resources for Library.**

2. **Post Graduate preparation of professional personnel: Purposes of post graduate studies, admission requirements, sports, curriculum, area of specialization and concentration on core areas, Research requirement, Methods of instruction.**

3. **In service education of professional personnel: Nature and scope of in service education; Responsibility for in service training, Role of administration, Physical Education Training Institute, Supervisors, the professional, and in – service training programmes. In service through individual efforts, apprenticeship on the job projects. Survey and reports, critical appraisal of existing types of post graduate programs.**

UNIT-III

1. **Importance of Curriculum Development Factors affecting curriculum, changing needs of student, national and professional policies**

2. **The Role of the teacher in curriculum development.**

3. **Principles of Planning: Understanding the capacity characteristics and needs of the learner. Evaluation and follow up.**

4. **selecting material for instruction – classification of activities for different age group and sexes. Progress in cariculam. Cultural influences in the choice of activities flexibility of programme material.**

UNIT-IV

Selecting methods of teaching

1. **Grouping of students for instruction, lecture, projects, activities, demonstration,**
2. **Block of period, total time allotment do a given activity, teaching aids, conditioning**
3. **Special gadgets to concentrate on development of particular skills or activity, provision for individual differences.**

Development program for different levels of education: Kindergarden, elementary school, Middle School, High School and Higher Secondary School, College and University, Special institution (Technical School & orphan hostel) special days, national days etc.

UNIT V

1. **Co-education in physical education – Interrelating the Programs for boys and girls. Activities suitable for co-education, levels at which co-education is desirable, spcial provision for development of girls programme.**
2. **Evaluation and follow up process in physical education – nature, importance and procedure for evaluation in physical education, follow- up: curriculum followed in colleges of physical education – BPE, MPEd, BPEd. In physical Education, M. Phil. Etc. committees recommendation: NCE – CBSE, UGC recommendation on curriculum for schools and colleges.**

Semester I: Paper II

Test Measurement and Evaluation in Physical Education

UNIT-I

1. **Meaning of evaluation.**
2. **Nature and scope of evaluation program.**
3. **Need and importance of evaluation in the field of physical education.**
4. **Principles of Evaluation.**

UNIT-II

1. **Criteria of test selection (reliability, validity, objectivity and norms), Administrative feasibility and educational application,**
2. **Classification of test, standardized tests (objective and subjective test).**
3. **Construction of test, Knowledge tests (written and skill tests).**
4. **Suggestions for administering test - Medical Examination, Testing Personnel, Time of testing, Economy of testing, Test record, Preparation of reports, Construction of tables & graphs and Purpose of reporting.**

UNIT-III

Measurements of Organic Function, Motor Fitness and General Motor Ability.

1. **Organic function: Cardiovascular respiratory function.**
    a. **Coopr's 12 minute continuous run / walk test.**
    b. **Tuttles pulse ration test.**
    c. **Harward step test and its modification.**
2. **Motor Fitness –**
    a. **Oregon motor fitness test**
    b. **JCR test**
    c. **Canada fitness test**
    d. **AAHPER youth fitness test.**
3. **General motor ability:**
    a. **Mcloy's general motor ability test**
    b. **Methany Johnson motor educability test.**

UNIT-IV

1. **Test for strength:**
    a. **Strength, Roger's physical fitness index and suggested changes**
    b. **Kraus-weber test**

2. Test for skills:

a. **Tests Volleyball-Brady test, Russel and Lange test**

b. **Basket ball-Johnson test, Knox test**

c. **Soccer-Mc Donald test, Johnson test**

d. **Field Hockey-Harbans Singh field hockey test**

e. **Badminton-Miller test,**

f. **Dyer tennis test.**

UNIT-V

1. **Measures of posture-IOWA posture test**
2. **Mc cloys behaviour rating scale**
3. **Co-well social behaviour trend index**
4. **Sociometric Questionaire**
5. **Mental health analysis**
6. **Washburn social adjustment inventory**
7. **Personality inventory.**

Semester I: Paper III

Exercise physiology

UNIT-I

1. **Skeletal Muscle, Structure, function and Characteristics**
2. **Chemical composition of skeletal muscle**
3. **Gross structure of Skeletal Muscle**
4. **Microscopic structure, structure of the myofibril and contractile mechanism, Molecular basis of the contraction of skeletal muscle**

UNIT-II

Bio-energetics

1. **Fuel for muscular work**
2. **Energy for muscular contraction and biochemical changes during muscular contraction,**
3. **Heat production and thermo-dynamics of muscle contraction**

UNIT-III

Neuro-muscular concepts

1. **Neuron and motor unit transmission of nerve impulses, bio-electrical potentials**
2. **Nerve to nerve synapse, Neuro muscular junction and transmission of nerve impulse across it.**
3. **Propioception and kinesthesis. Tone, posture and Equilibrium.**

UNIT-IV

Physiological changes due to exercise. Effect of exercise and training on:

1. **Heart and circulatory systems.**
    a. **Blood supply to skeletal muscle and**
    b. **Regulation of blood flow during exercise.**

2. **Respiratory system [a brief discussion on other systems]**

    a. **Oxygen debt & recovery rate**

    b. **Aerobic and Anaerobic muscular activity**

    c. **Second wind.**

UNIT-V

1. **Other physiological aspects of exercise and sports**
2. **Concept of physical fitness and physical training, warming up conditioning and fatigue**
3. **Physiological aspects of development of strength, endurance, skill, speed, agility and coordination.**
4. **Work capacity under different environmental conditions hot, humid, cold, high attitude.**
5. **Energy cost of various sports activity.**

Semester I: Paper IV

Management of physical education

UNIT-I

1. **Review of principle and philosophy in of Education, Physical Education, Recreation and Health education.**
2. **Progressive concept of administration/ management. General administration theories.**
3. **Personal and material management programming for instruction and activities.**
4. **Hierarchy of education administration in Central, State local authorities and Individual Institution in India.**

UNIT-II

1. **Responsibilities of General Administration, technical Experts & Professionals.**
2. **Selected problems in Management / Administration**
3. **Professional preparation, professional ethics class discipline, student teaching.**

UNIT-III

1. **Budget and Finance: Budget heads principles of accounting financial power of different authorities, Sources of income auditing, terms of sanctions and purpose.**
2. **Staff job analysis, qualifications, requirement, supervision, training, leave, retirement deputation fringe benefits and staff meetings.**
3. **Office management's gathering data, programming and scheduling (Calendar, Timetable, thing that requires periodical attention) storing data (Filling), General office procedure like correspondence interview.**

UNIT-IV

1. **Management of sports in school, college & universities, Inter-University, District State & National level.**
2. **Indian and International Olympic association, SAI.**
3. **Public relation and promotional activities including-press relations, publications, Public speeches, assemblies, exhibitions demonstration, special events, staff, student welfare.**

UNIT-V

SUPERVISION

1. **Definition of Supervision**

2. **Scope of Supervision**
3. **Guiding Principles of supervision**
4. **Method of Supervision:**
    a. **Visitation**
    b. **Conference**
    c. **Bulleting**
    d. **Demonstration**

Functions of Supervisions

1. **Administrative duties**
2. **Duties pertaining to facility & Equipment**
3. **Duties pertaining to instruction**
5. **Duties pertaining to supervision**
6. **Duties pertaining to professional Growth**

Semester II: Paper I

Paper I -Training methods-

UNIT-I

1. **Brief historical sketch of development of Competitive sports in India.**
2. **Introduction to motor development.**
3. **Sports training.**
4. **Its aims, Tasks and characteristics.**
5. **Principles of sports training.**

UNIT-II

1. **Training Load: Important features of training load [Intensity, Density, Duration and Frequency].**
2. **Principles of Training load, Relationship between load and adaptation, conditions of adaptation, principles of over load. Causes and symptoms of over load, tackling of over load.**
3. **Training plans long term and short term plans,**
4. **Periodisation (Single double and triple). Cyclic process of training. Training session.**

UNIT-III

Training for Important Motor Components

1. **Strength – Forms of strength, characteristics of strength,, principle of strength, strength training, means and methods, strength training for children and women.**
2. **Endurance – Forms of endurance, characteristics of endurance, endurance training, means and methods.**

UNIT-IV

1. **Flexibility – Form of Flexibility, Methods of development of flexibility.**
2. **Coordinative abilities – Characteristics of coordination abilities, importance of coordinative abilities. Classification of coordinative abilities, Training means and methods.**
3. **speed – form of speed, characteristics of speed, basis of speed, training means and method.**

UNIT-V

1. **Planning and organization of training, Importance of Planning, Principles of planning, Contents for various periods of training.**
2. **Evaluation of training, Items to be included in evaluation programme, Forms of diagram and graphical presentation for evaluation and checking progress.**

Semester II: Paper II

Biomechanics

UNIT-I

Introduction

1. **Meaning of Bio-mechanics, Bio-mechanics in Physical Education, Sports and Research**
2. **Fundamental Skills - Basic and Specific**
3. **Movement Analysis - Kinensiological Analysis, Mechanical Analysis and Bio-mechanical Analysis.**

UNIT-II

1. **Linear, angular and general motion**
2. **Distance and Displacement (Linear and Angular)**
3. **Space and Velocity (Linear and Angular) Acceleration (Linear and Angular Uniform Motion)**
4. **Units of Relationship of Linear and Angular motion, Centrifugal and Centripetal Forces**
5. **Newton's Laws of motion as applicable to Linear and Angular Motion.**
6. **Lever and its application.**

UNIT-III

1. **Force – Meaning, Units of Force, Effects of Force, Sources of Force, Components and Resultant, Friction Pressure.**
2. **Work, Power and Energy**
3. **Movement of Force, Movement of Inertia**

UNIT-IV

1. **Freely falling bodies, Projectiles, Momentum and Impact**
2. **Stability (Static and Dynamic), Initiating Rotation in the Air.**
3. **Spin, Impact and Elasticity.**
4. **Fluid Mechanics, Air Resistance and Water resistance.**

UNIT-V

1. **Analysis of fundamental skills – Walking Running, Throwing, Lifting, Pulling, Catching and Climbing**
2. **Analysis of Sports Skills of games & sports: Athletics, Basket ball, Volley ball, Badminton, Foot ball, Cricket etc.**

Semester II: Paper IV

Research Process

UNIT-I

Meaning of research, Need and importance and its scope in physical education. Type of research, survey of related literature, need for library search, library sources, Preparation of Bibliography and abstract.

UNIT II

Formulation and development of research problem: location of research problem. Criteria in selecting the research problem. Formulation of hypothesis.

UNIT III

a) **Historical research: scope of historical research in Physical Education. Historical evidence, validity of historical data.**

b) **Philosophical Research: Brief Introduction.**

UNIT IV

Survey studies: Place of survey Research in Physical Education. Tools of survey research, questionnaire and interviews, case studies. Definition of case studies, Importance of case studies. Characteristics of case studies, data collection in case studies.

UNIT V

Experimental Research

a) **Meaning, scope, and nature. Control of experimental factors. Experimental designs.**

b) **Research Proposal and preparation of research report.**

Semester II: Paper III

Statistics and computer

UNIT I

Statistics

Introduction

- **Defintion,Nature and needs of statistics.**
- **Type of statical process – descriptive, comparative, relationship, inferential and predictive.**

The frequency distribution

- **Meaning of raw data, single score and grouped data.**
- **Definition of frequency table; advantages and disadvantages.**
- **Construction of frequency table – Range of score, Number of intervals, intervals size, tabulation of frequency table.**

Measure of central tendency

- **Mean, median, mode – definition and meaning.**
- **Computing mean from ungrouped and grouped data.**
- **Computing median from ungrouped and grouped data.**
- **Mode, Crude mode and computed mode, specific characteristics and uses of measure of central tendency.**

UNIT II

Measure of Variability

- **Range – Quartile deviation : Mean deviation, Standard devaiation, Probable error –-Definition and meaning and Definition.**
- **Computation of Quartile deviation, mean deviations and standard deviation from ungrouped and grouped scores.**
- **Specific characteristics and uses of measure of variability.**
- **Coefficient of variability, meaning and uses of absolute and relative variability.**

Correlation

- **Meaning of correlation**
- **Direction and degree of correlation**
- **Computing correlation using following Methods:**

  Karl Pearson Coefficient Correlation [(Product Moment method) (Ungrouped and Grouped data)]

  Rank Difference Method (Spearman Ranks Method)

- **Level of significance for correlation coefficients.**
- **Probable error and standard error.**

UNIT III

The normal curve.

- **Definition of normal curve.**
- **Principal of normal curve, Properties of normal curve**
- **Binomial Theorem relationship to normal curve**
- **Properties of normal curve**
- **Divergence from normality – skewness and kurtosis.**
- **Scoring scale – Sigma scale, S scale, T scale.**

Hypothesis: Meaning and characteristics

- **Type of Hypothesis : Null and Alternative**
- **Type I and Type II error**
- **Test of significance: Meaning parameter and statistics,Process of testing hypothesis**
- **Test of significance – Large sample (Variables), Fisher's 'Z' distribution.**
- **Test of significance in small sample**

a. **Student 't' distribution**

b.a. **Fisher's Z distribution**

c.b. **F distribution, ANOVA, Post hoc test.**

d.c. **Chi-square Test**

UNIT IV

Basic concepts:

- **Introduction to computer.**
- **History of computers. Input – output Devices, Processors, Memory, storage Devices.**
- **Type of computers, Operating system – Features, Prominent features of Windows, OS.**
- **Working with Internet – its basic concepts, creating mail account sending and receiving mail and attachment.**

UNIT V

- **Working with Microsoft Word (Creating File, Edit, View, Insert, Format, Tools, Table)**
- **Working with Microsoft Excel (Creating File, Edit, View, Insert, Format, Tools, Table)**
- **Working with Microsoft Powerpoints (Creating File, Edit, View, Insert, Format, Tools, Table)**

Practical:

Part A

Assessment of:

1. **Cardiovascular fitness**
2. **Motor fitness**
3. **Motor educability**
4. **Health related fitness**
5. **Strength**
6. **Somatotype**
7. **Body composition**
8. **Body proportion**

PART B

Field Work: a candidate has to conduct one test on at least 10 subject and prepare a report.

Seminar:

2 Seminar to be presented On field work

Semester III: Paper I

Scientific Coaching Methods

UNIT-I

1. **Historical development of coaching schemes in India.**
2. **Philosophy of coaching and qualities of coach.**
3. **Introduction to motor development, stages of motor development.**

UNIT II

1. **Technical preparation – Fundamental methods for the development of technique in sports. Stages of technical development, grounding, causes and correction of faults.**
2. **Tactical preparation – Tactical concepts, methods of tactical training.**

UNIT III

Psychological preparation

1. **Psychology of a coach and his trainees**
2. **Individual differences, psychological potentiality**
3. **Development of will power, stress, anxiety, frustration control**
4. **Planning for competitions. Main and build up competition. Frequency, preparation for competition.**

UNIT IV

1. **Preparation for competition. Competition system. Competition frequency.**
2. **Preparation for competition – Long term and Short term plans.**
3. **Arrangement of training session. Post competition plan.**

UNIT V

1. **Diet for sportsmen during training and pre-post competition, time for diet.**
2. **Use of drugs and their ill effects. Ergogenic aids – its use in competitive sports.**
3. **Talent identification, steps for talent identification.**

Semester III: Paper II

Sports Psychology

UNIT-I

1. **The meaning, nature and scope of sports psychology.**
2. **Development of sports psychology.**
3. **Relationship of sports psychology with other sports sciences.**
4. **Importance of sports psychology for physical education.**

UNIT II

1. **Methods of investigation in sports psychology, its importance.**
2. **Various methods used in sports psychology.**
3. **Different test to be used in sports psychology.**

UNIT III

1. **Growth and development, factor affecting growth and development.**
2. **Individual differences and their influence on physical activity.**
3. **Psychological aspects of action regulation.**
4. **Importance of action regulation in physical activities, psychological characteristics of physical activities.**

UNIT IV

1. **Psychological aspects of competition, psychology of sports competition.**
2. **Psychological characteristics of pre-competition, competition and post competition.**
3. **Motivation, meaning of motive, role of motive, attitudes, interest for physical activity, importance of motivation in peak performance.**

UNIT V

1. **Cognitive process in physical activities, characteristics of cognitive process in sports.**
2. **The importance of perception in physical activities.**
3. **The function of thinking and imagination in physical activity.**
4. **The role of memory in physical activities.**
5. **The importance of attention in sports and its relationship with cognitive process.**

Semester III: Paper III

Sports Medicine

UNIT-I

1. **Definition of sports medicine, it's aims and objectives**
2. **Brief History nature and effect of sports medicine, Physiological, pathological and psychological problems of sportsmen.**
3. **Care and problems of sportsmen; before competition and after competition.**

UNIT II

1. **Nutrition: Athletic nutrition malnutrition, low cost High calorie diet role of vitamins, minerals, salts. Carbohydrate loading.**
2. **Doping: Agents, effect, dope test and sanctions.**

UNIT III

1. **Work capacity under different environmental conditions. Thermoregulation and sports.**
2. **Physique and performance. Somatotypes.**

UNIT IV

1. **Prophylactic health-care. Health related fitness.**
2. **Aging & sports.**
3. **Women in sports. Pregnancy and exercises.**

UNIT V

1. **Common old age problems namely – arthritis, heart diseases and diabetes. Role of exercise in rehabilitation.**
2. **Obesity and weight control.**
3. **Adapted physical Education – Physically & Mentally challenged persons.**

Semester III: Paper IV

Specialization

UNIT-I

Skills, Techniques and strategies:

1. **Advance skills of games / sports.**
2. **Techniques, Tactics and strategies of game / sports.**

UNIT II

Officiating of games / sports.

1. **Rules and their interpretation.**
2. **Mechanics of officiating.**

UNIT III

Play field, Sports bodies and Organization.

1. **Construction, layout and maintenance of play field and equipment.**
2. **Structure and function of Federation and Associations.**
3. **National and International competition.**
4. **Organization of competitions and coaching camps.**

UNIT IV

1. **Skill test, Mechanics of games / sports.**
2. **Analysis of scientific principles applied to different skills / techniques.**

UNIT V

1. **Training Method: for improving the performance in games / sports.**
2. **Training Schedule.**

Semester IV: Paper I

Health education

UNIT-I

1. **Health**
    a. **Concept of health**
    b. **History of health in India**
    c. **Various level of health care in India**
    d. **Role of heredity and genetics in achieving positive health**
2. **Health education**
    a. **Meaning of health education**
    b. **Aim and content of health education**
    c. **Approaches of health education**
    d. **Latest trend in health education**

UNIT-II

1. **School health services**
    a. **Meaning and objectives of school health services and school health programs aspect of school health services**
        i. **Health appraisal**
        ii. **Medical examination**
        iii. **Common childhood diseases and their control**
        iv. **First aid and accident preventions**
        v. **Nutritional services**
        vi. **Mental health, dental health and eye health**
        vii. **School health records**
2. **Healthful school environment**
    a. **Meaning of healthful school environment**
    b. **Point to be kept in mind for healthful school environment**
    c. **Role of physical education teacher**

3. **Role of Physical education teacher in relation to school health services and healthful school environment.**

UNIT-III

1. **Community and environmental sanitation**
    a. **Housing**
    b. **Pollution, light, noise and temperature**
        i. **Population policy, population dynamic and population explosion**
        ii. **National family welfare program**
        iii. **Sex education**

UNIT-IV

1. **Communicable diseases**
    a. **Meaning of epidemiological approach of communicable diseases brief description of following communicable diseases and their prevention**
        i. **Tuberculoses**
        ii. **Chicken pox, measles, mumps**
        iii. **Malaria and filarial**
        iv. **Rabies**
        v. **STD and AIDS**
        vi. **Hepatitis (Jaundice)**

UNIT-V

1. **Non-communicable diseases**
    a. **Meaning of non communicable diseases**
    b. **Brief description of following non communicable diseases and their prevention: Heart diseases, Cancer, diabetes**

Semester IV: Paper II

Psychology of coaching and counseling

UNIT-I

Psychological assessment of the players, capacity of the player psychological preparation for pre, during and post competition. Pep talk, Self confidence. Emotional maturity. Emotional intelligence.

UNIT-II

Counseling process introduction. Preparation for counseling.

a. **Readiness**
b. **Pre counseling interview**
c. **Case history**
d. **Process of counseling**
e. **The first interview**
f. **Reassurance**
g. **Winning confidence**
h. **Advising**

Counseling relationship – content and process. Physical setting. Privacy value orientation. Acceptance. Understanding. Report. Communication and empathy. Attentiveness. Counseling relationship. Counseling process.

UNIT-III

Psychological testing and diagnosis – introduction. Limitation of the use of psychological tests. Type of psychological tests. Test used in counseling situations. Test interpretation in counseling. Not – test client appraisal techniques. Autobiography. Anecdotal records. Rating Scale. Cumulative records. Pupil data questionnaires. Case studies. Psychodiagnostics, limitation of diagnosis. Common diagnostic classification systems in counseling.

UNIT-IV

Counseling interview – introduction, interviewing its essential aspects association of ideas contained within interview. Shifts in conversation, Opening and closing remark, recurrent reference, Inconsistencies and gaps. Review, Non verbal communication in interview. Counselee. Counsellof relationship. Interviewing techniques in counseling. Structuring the counseling relationship degree of lead, silence. Relationship techniques. Sharing of experience.

UNIT-V

Group counseling – Introduction. Case for group counseling, emerging field of group counseling. Structuring groups, limitation and assumptions of group counseling. Mechanisms of group counseling. Types of groups. Group counseling – its value. The

process of group counseling. Individual and group counseling similarities. Differences between individual and group counseling.

Special areas in counseling – Introduction, family group consultation

Counseling families. Counseling with parents, counseling the delinquent, counseling reluctant clients, structuring. Counseling women.

Semester IV: Paper III

Sports physiotherapy

UNIT-I

Introduction

1. **Review of anatomy and physiology of various muscles, joints and their function and action, physiological changes due to exercise – cardio-respiratory muscles, nervous systems.**
2. **Causes of injuries – intrinsic, excentric factors**
3. **Types of sports injury**
4. **Load deformation curve, response to stress, inflammation healing.**

UNIT-II

Common regional injuries

1. **Mechanism of injury clinical feature of injuries**
2. **Injuries of head, neck and face**
3. **Injury involving upper limbs**
4. **injuries involving thorax, abdomen and back**
5. **injuries involving lower limbs**

UNIT-III

Common sports injuries

1. **Common injuries found in various sports**
2. **Mechanism of injuries in various sports activity**
3. **Basic on field assessment and management, RICE, first aid, moving the injured athlete**
4. **Bandaging, crape.**

UNIT IV

1. **Injury management & rehabilitation**

    (a) Cryotheraopy

(b) Electrical modulating SWD, TENS, IFT,US,LASER

(c) Exercise therapy- flexibility, strengthening endurance, neuromuscular co-ordination, CVR-Stages of rehabilitation, criteria to returr to sports.

(d) Various factors to be considered during injury-psychological nutrition, time, ecomomice.

UNIT-V

1. **Sports massage**
2. **Core stability**
3. **Protective equipment**
4. **Injury in children, women and elderly**

Practical demonstration

1. **Uses of crape bandage, banding technical**
2. **Electrical modulation**
3. **Use of thera band, exercise ball, Medicine ball**
4. **Visit to health club / fitness camps**
5. **Visit to sauna bath / steam bath**

Semester IV: Paper IV

Foundation of physical education and current trends

UNIT-I

Philosophical foundation of physical education

1. **Idealism**
2. **Pragmatism**
3. **Naturalism**
4. **Existentialism and other philosophies**

UNIT-II

1. **Journalism & Sports journalism**
    a. **Meaning, concept, scope**
    b. **Basic principles of sports reporting, source of sports news**
    c. **News gathering process**
2. **Reporting for print media and electronic media**
3. **Editing, writing for various media**
4. **Layout and design for print media**

UNIT-III

Adapted physical education

1. **Introduction to adapted physical education – meaning, definition, aims and objectives.**
2. **Classification of disabilities**
3. **Development of adapted physical education program**
    a. **Guiding principles**
    b. **Special adapted physical education program for different categories**

UNIT-IV

Communication skills. Types of communication. Methods of communication. Official communication. Reports, minutes and agenda. Circular, notice, office orders, note sheet and memo etc.

Press release, media conferencing and invitation

Verbal and non verbal communication

UNIT-V

Yoga and fitness

Yoga and fitness,

Introduction to Yog, concept, meaning and definition. Importance of Yog, benefits of yog asanas and Pranayam

Meaning , Definition and Types of fitness, Components of fitness and assessment of fitness

Practical: Physiological and Psychological assessment

Part A

Physiological assessment of:

1. **Heart Rate**
2. **Respiratory Rate**
3. **Peak flow Rate**
4. **Hemoglobin**
5. **Blood Pressure**
6. **Nutritional Assessment**
7. **Somatotype**

PART B

Psychological assessment:

1. **Paper pencil test**
2. **Psychomotor test**

Field Work: a candidate has to conduct one test on at least 10 subject and prepare a report.

Seminar: 2 Seminar to be presented on field work

Ph.D Course work Syllabus for Physical Education, Research Process & Statistics

Unit I

1. Meaning, Nature, Need and Scope of Research in Physical Education.
2. Types of Research. Research Method vs. Research methodology,
3. Planning of statistical enquiry.
4. Collection of data – Primary and Secondary

Unit II

1. Population and Sampling, Types of sampling. Different methods of Sampling.
2. Research Design.
3. Control of Experimental Variables/Groups, Control Groups and Factors

   Affecting Experimental Outcome – Subjects, Age, Sex, Physiological,

   Psychological Variables etc.

Unit III

1. Dispersion and Skewness- Mean deviation, Standard deviation, Coefficient of variation and coefficient of variation.
2. Coefficient of correlation- Carl- Pearson method, Spearman's ranking method.
3. Regression- Simple and Multiple regressions up to three variables.
4. Standard error of estimate.

Unit IV

1. Hypothesis- Meaning of hypothesis, formulation of hypothesis, Characteristics of a good hypothesis, Type I and Type II error
2. Testing of hypothesis
3. Test of significance- Parametric't' test, 'F' ratio, ANOVA, Post-hoc test, nonparametric Chi square test,.
3. Theoretical frequency Distribution- Normal distribution

Unit V

1. Introduction of computer Organization and architecture Types of Computers, Different parts of computers Input Output Devices. Processors. Memory, Storage Devices.
2. Use of computers in research- Statistical packages and Co state.
3. Working with Microsoft Word [Creating File, Edit, View, Insert, Format, Tools, Table]
4. Working with Microsoft Excel [Creating File, Edit, View, Insert, Format, Tools, Table]
5. Working with Microsoft Power Point Presentation [Creating File, Edit, view, Insert, Tools Slide Show]
6. Working With Internet – its basic concept, creating mail account sending & receiving mail and attachment.
7. Knowledge of SPSS.

SCHEME OF EXAMINATION
&
SYLLABUS
of
M.Sc. (PHYSICS)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Physics

EFFECTIVE FROM JULY 2017

School of Studies in Physics & Astrophysics
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Physics on 10 February 2017
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

M. Sc. - PHYSICS
EFFECTIVE FROM JULY 2017

M.Sc. in Physics is a full time 2-year (4-semesters course). There will be four theory papers, and two laboratory courses/project in each semester. In each semester, there will be two internal examinations/assessments. Semester-wise course structure along with distribution of marks is given below:

Semester I

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Mathematical Physics	80	16	20	04	100	4
2. Classical Mechanics	80	16	20	04	100	4
3. Electrodynamics & Plasma Physics	80	16	20	04	100	4
4. Electronics	80	16	20	04	100	4
A : General & Optics	-		-		100	2
Laboratory Course I-B : Electronics	-		-		100	2
Total Marks					600	20

Total Marks for Semester I = 600 & Credit = 20

Semester II

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Quantum Mechanics-I	80	16	20	04	100	4
2. Statistical Mechanics	80	16	20	04	100	4
3. Electronic & Photonic Devices and Optical Modulators	80	16	20	04	100	4
4. Computational Physics & Computer Programming	80	16	20	04	100	4
Laboratory Course II-A : Numerical Analysis & Computer Programming	-		-		100	2
Laboratory Course II-B : Digital Electronics & Microprocessor	-		-		100	2
Total Marks					600	20

Total Marks for Semester II = 600 & Credit = 20

Semester III

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Quantum Mechanics-II	80	16	20	04	100	4
2. Atomic & Molecular Physics	80	16	20	04	100	4
3. Solid State Physics-I	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-I (B) Electronics (Communication)-I (C) Physics of Nano-material-I (D) Space Physics-I	80	16	20	04	100	4
Laboratory Course III-A Materials Science & General	-		-		100	2
Laboratory Course III-B : Astronomy & Astrophysics **OR** : Electronics (Communication) **OR** : Physics of Nano-material **OR** : Space Physics	-		-		100	2
Total Marks					600	20

Total Marks for Semester III = 600 & Credit = 20

Semester IV

Name of the Paper	Marks					Credits
	Theory		Internal		Total	
	Max	Min	Max	Min		
1. Nuclear & Particle Physics	80	16	20	04	100	4
2. Laser Physics and Applications	80	16	20	04	100	4
3. Solid State Physics -II	80	16	20	04	100	4
4. (A) Astronomy & Astrophysics-II (B) Electronics (Communication)-II (C) Physics of Nano-material-II (D) Space Physics-II	80	16	20	04	100	4
Project Work	-		-		200	4
Total Marks					600	20

Total Marks for Semester IV = 600 & Credit = 20

In Each Semester

MAXIMUM MARKS TOTAL	PASS PER TH.	PR.
600	**36**	**36**

In semester IV, Project work in Solid State Physics/ Astronomy & Astrophysics/ Electronics/ Physics of Nano-materials/ Space Physics will lead to specialization in the respective area. It will be primarily based on research oriented topics. On completion of the project, student will submit project report in the form of dissertation which will be examined by an external examiner. The examination of project work shall consist of (a) Presentation and (b) comprehensive viva-voce.

Marks-distribution for Laboratory Courses and Project Work:

(a) Laboratory courses (Semesters I-III):

Sessional	: 20 Marks
Viva	: 20 Marks
Experiment	: 60 Marks

(b) Project Work (Semester IV) :

Report – Dissertation	: 60 Marks
Presentation	: 100 Marks
Comprehensive viva-voce	: 20 Marks
Internal assessment	: 20 Marks

Note: Paper IV of both Semesters III and IV is a major elective course. Student has to opt for any one of the courses: (A) or (B) or (C) or (D). The commencement of any one of the major elective paper is subjected to the availability of basic infrastructural facilities viz. expert faculty, laboratory etc.

Detailed Course Content

Semester - I

PAPER-I: MATHEMATICAL PHYSICS

Unit-I: Vector space and Matrices, Linear independence, Bases, dimensionality, Inner product, Linear transformation, matrices, Inverse, Orthogonal and Unitary matrices, Independent element of a matrix, Eigen values and eigen Vectors, Diagonalization, Complete orthonormal sets of functions.

Unit-II: Complex Variables: Cauchy- Riemann condition, analytic functions,Cauchy's theorem, Cauchy integral formula, Laurent series, singularities, residue theorem, contour integration, evaluation of definite integrals, problems.

Unit-III: Differential equations, first order differential equation, second order differential equation with constant coefficients, second order linear ODEs with variable coefficients, Solution by series expansion, nonhomogenous differential equations and solution by the method of Green's functions.

Unit-IV: Special functions, Legendre, Bessel, Hermite and Laguerre functions with their physical applications, generating functions, orthogonality conditions, recursion relations,

Unit-V: Integral transforms, Fourier integral and transforms, inversion theorem, Fourier transform of derivatives, convolution theorem, Laplace Transform(LT), LT of Derivatives, Inverse LT, Fourier series; properties and applications, discrete Fourier transform.

TEXT AND REFERENCE BOOKS

1. Mathematical Methods for Physics, by G. Arfken.
2. Matrices and Tensors for Physicist, by A. W. Joshi.
3. Advanced Engineering Mathematics, by E. Kroyazig.
4. Special Functions, by E. B. Rainville.
5. Special Functions, by W.W. Bell.
6. Mathematical Method for Physicist and Engineers, by K. F. Relly, M. P. Hobson and S. J. Bence
7. Mathematics for Physicists, By Marry L. Boas.

Paper - II: CLASSICAL MECHANICS

Unit-I Preliminaries, Newtonian mechanics of one and many particle systems, Conservation laws,Constraints & their classification, Principle of virtual work, Generalized coordinates, D'Alembert's principle and Lagrange's equations, Velocity-dependent potentials and dissipation function, Simple applications of the Lagrangian formulation, Hamilton's principle, Lagrange's equations from Hamilton's principle, Conservation theorems and Symmetry properties, Energy function and the conservation of energy.

Unit-II The Hamiltonian formulation of mechanics, Legendre transformations and the Hamilton's equations of motion, Cyclic coordinates and Conservation Theorems, Hamilton's equations from Hamilton's principle, The principle of least action, Simple applications of the Hamiltonian formulation.

Unit-III Canonical transformations with examples, The harmonic oscillator, Poisson's brackets, Equations of motion and conservation theorems in the Poisson Bracket formulation. Hamilton-Jacobi (HJ) theory: The HJ equation for Hamilton's principal function, Harmonic oscillator as an example of the HJ method, The HJ equation for Hamilton's characteristic function, The action-angle variables

Unit –IV The Central force: Two-body central force problem and its reduction to the equivalent one-body problem, The equations of motion and first integrals, The equivalent one-dimensional problem and classification of orbits, The differential equation of the orbit, Closure and stability of orbits, The Kepler problem, Scattering in a central force field: Rutherford scattering.

Unit – V Rigid body dynamics, The Euler angles, Euler's theorem on the motion of a rigid body, Rate of change of a vector, The Coriolis force, Angular momentum and Kinetic energy of motion about a point, The Euler equations of motion of rigid bodies. Formulation of the problem of small oscillations, The eigen-value equation and the principal axis transformation, Frequencies of free vibration and normal coordinates, Free vibration of linear triatomic molecule.

TEXT AND REFERENCE BOOKS

1. Classical Mechanics, By N.C. Rana and P.S. Joag (Tata McGraw-Hill, 1991)
2. Classical Mechanics, by H.Goldstein (Addison Wesley, 1980)
3. Classical Mechanics, by H.Goldstein, C Poole & J Fafko (Pearson Education, Inc, 2002)
4. Mechanics, by A.Sommerfeld, (Academic press, 1952)
5. Introduction to Dynamics by Perceival and D.Richaeds(Cambridge University, press, 1982).

Paper-III: ELECTRODYNAMICS & PLASMA PHYSICS

Unit-I Maxwell's equations, vector and scalar potentials and the wave equation, Gauge transformations, Lorenz gauge, Coulomb gauge, Green function for the wave equation, four-vectors, mathematical properties of the space-time in special relativity, matrix representation of Lorentz transformation, covariance of electrodynamics, transformation of electromagnetic fields.

Unit-II Radiation by moving charges, Lienard-Wiechert potential and fields for a point charge, total power radiated by an accelerated charge- Larmor's formula and its relativistic generalization, angular distribution of radiation emitted by an accelerated charge, radiation emitted by a charge in arbitrary extremely relativistic motion, distribution in frequency and angle of energy radiated by accelerated charge.

Unit -III Bremsstralung: emission from single-speed electrons, thermal Bremsstralung emission and absorption, Synchrotron radiation: spectrum of synchrotron radiation, spectral index for power law electron distribution, transition from Cyclotron to Synchrotron emission, Cherenkov radiation

Unit-IV Plasma: definition, Debye shielding phenomenon and criteria for plasma, motion of charged particles in electromagnetic field; Uniform E & B fields, Electric field drift, Non-uniform magnetostatic field, Gradient B drift, Parallel acceleration and magnetic mirror effect, Curvature drift, adiabatic invariants.

Unit-V Elementary concepts of plasma kinetic theory, the Boltzmann equation, the basic plasma phenomena, plasma oscillations. Fundamental equations of magneto-hydrodynamics (MHD), Hydrodynamics Waves; Magneto sonic and Alfven waves, Magnetic viscosity and magnetic pressure, plasma confinement schemes.

REFERENCE BOOK:

1. Jackson, classical electrodynamics.
2 Rybicki & Lightman: Radiative Processess in Astrophysics
2 Panofsky and Phillips: Classical electricity and magnetism.
3 Bittencourt, Plasma physics.
4 Chen: Plasma physics.

Paper - IV: ELECTRONICS

Unit-I Operational Amplifier- Basic Op.Amp. Differential amplifier, the emitter coupled Difference Ampl, Transfer characteristics of a Diff. Ampl., an example of an IC Op.-Amp., off set error voltage and currents, measurement of Op.-Amp. Parameters, frequency response of Op-amp.Linear analog systems: Basic Op.-Amp. Applications, Analog integration and differentiation, Electronic analog computation, Non-linear analog systems: Comparators, Waveform generators.

Unit-II Combinational Logic –Basic logic gates: OR, AND and NOT gates, NOR and NAND gates, Boolean algebra, DeMorgan's theorems, exclusive OR gate, characteristics of logic families, saturated logic families: RTL, DCTL, non-saturated logic families: TTL and ECL, Unipolar logic families.

Unit -III Sequential Logic, Flip-flops: RS Flip-flop, level clocking, Edge triggered Flip Flops, D Flip flops. JK Flip-flops, J.K.master slave Flip-flops, Registers: buffer, shift and control shift registers, counters: ripple synchronous & ring counters, tri-state registers, Buffer: controlled buffer Register, Bus organized structure, Latch, multiplexer, Demultiplexer, decoder, ALU Memories: RAM, ROM, PROM, EPROM, A/D and D/A converters.

Unit-IV Microprocessors – Building concept of microprocessors, developing inside of microprocessor , Instruction codes ,Instruction Register ,Introducing RESET Pin, Introducing on chip oscillator, Interfacing I/O devices, Introducing Interrupt lines :Stack,Push,Pop operation ,delay in servicing interrupts, multiply interrupts, location for interrupts .Introducing slow and fast data transfer, Status of microprocessor, interrupt pins, General purpose Register, flag Register, Increment/decrement register. Features of 8085 microprossor. Pin diagram of 8085, block diagram of 8085. CPU of a microprocessor, timing and control, system timings and interrupt timings of 8085, registers in 8085, interfacing memory and I/O devices- a preliminary ideas.Number system, Floating Point notation.

Unit – V Instructions set of 8085, types of instructions- Data transfer group, Arithmetic logic, branch group, stack I/O machine control group, addressing mode of Intel 8085, examples of Assembly language programs of 8085, summing of two 8-bit numbers to result a 16-bit number, summing two 16-bit number, multiplying two 8-bit number to result a 16-bit product, block transfer of data from one memory block to other, BCD to hexadecimal data, finding the largest number in a series.

Text and reference books

1. Integrated Electronics: J.Millman R.C.C.Halkias.
2. Electronics devices and circuit theory, by Robert Boylested and Louis Nashdaky PHI, New Delhi-110001, 1991.
3. Operational amplifier linear integrated circuits, by Romakanth A. Gayakwad PHI,

second edition 1991.
4. Digital computer electronics- An introduction to microcomputers-A.P.Malvino.
5. Digital finances and applications, by A.P. Malvino and Donald P.Leach, Tata McGraw Hill company, New Delhi 1993.
6. Microprocessor architecture, programming applications with 8085/8086 by Ramesh S.Gaonkar, Willey-Eastern limited 1987.
7. Introduction to microprocessors – A.P.Mathur (Tata McGraw).
8. Microprocessors-Theory and applications- M.Hafiquizzaman (Prentice hall).
9. Microprocessors fundamentals- Schanmi Outling Service Author Pocer L.Tokheim.
10. Integrated circuits : K KBotkar(Khanna publications)
11. Digital Electronics : R P Jain (Tata McGraw Hill)
12. Microprocesss : B Ram
13. 8-bit microprocessor : V.J.Vibhute & P.B. Borole(Tecn-Max Publication, Pune)

Laboratory Course

Lab I-A: General & Optics (Any ten)

1. Determination of band gap of semiconductor by four prob method.
2. Measurement of Hall Coefficient of given semiconductor: identification of type of semiconductor and estimation of charge carrier concentration.
3. Determination of wavelength of mercury light by constant deviation spectrometer using Hartmann formula.
4. Ultrasonic velocity in a liquid as a function of temperature using ultrasonic interferometer.
5. Experiment on transmission line (A) Determination of characteristics impedance, (B) Study of voltage distribution.
6. Determination of the Curie temperature of ferromagnetic material.
7. Determination of forbidden gap of a diode by plotting reverse saturation current as a function of temperature.
8. Determination of operating voltage and study the characteristics of a GM tube.
9. Determination of operating voltage of a GM tube and determine the linear absorption coefficient.
10. Determination of operating voltage of a GM tube and verify inverse-square law.
11. Determination of short half life of a given source which can be obtained from a mini generator or produced with a neutron source by activation.
12. X-ray diffraction by Telexometer.
13. Determination of ionization potential of Lithium/Mercury.
14. Determination of e/m of electron by Normal Zeeman Effect using Febry -Perot Etalon.
15. Determination of Dissociation energy of iodine (I_2) Molecule by photography, the absorption bands of I_2 in the visible region.
16. Measurement of wavelength of He-Ne Laser light using a ruler and thickness of thin wire by the laser.
17. To study Faraday Effect using He-Ne Laser.

Lab I-B: Electronics (Any ten)

1. Design & Study of Regulated Power supply.
2. Study of Transistor Amplifiers in CE, CB, and CC modes.
3. Study of Transistor Bias Stability.
4. Study of Astable, Monostable and Bistable Multivibrator.
5. Study of Silicon Controlled Rectifier.
6. Experiment of Uni – Junction Transistor and its application.
7. Experiment of FET and MOSFET characterization and application as an amplifier.
8. Study of Differential. Amplifier.
9. Basic Logic gates and verification of their Truth- Tables.
10. Combinational logic gates and verification of De-Morgan's Theorem.
11. Study of Basic Operational Amplifier (741).
12. Study of Opto- Electronics Devices.

Semester – II

PAPER - I : QUANTUM MECHANICS-I

Unit - I Inadequacy of classical mechanics, Plank quantum hypothesis and radiation law, Photoelectric effect, de-broglie's theory. Schrödinger equation, continuity equation, Ehrenfest theorem, admissible wave functions, stationary states, one-dimensional problems; walls and barriers, Schrödinger equation for harmonic oscillator and its solution, uncertainty relations, states with minimum uncertainty product.

Unit –II Superposition principle, general formalism of wave mechanics, representation of states and dynamical variables, commutation relationship, completeness and normalization of eigen functions, Dirac-delta function, Bra & Ket notation, matrix representation of an operator, harmonic oscillator and its solution by matrix method, Heisenberg equation of motion.

Unit -III Angular momentum in quantum mechanics, commutation relationships, eigen values, Spin angular momentum, Pauli`s matrices, addition of angular momentum, Clebsch-Gordon coefficients.

Unit – IV Central force problem, spherically symmetric potentials in three dimensions, separation of wave equation, parity, three-dimensional square-well potential and energy levels, the hydrogen atom; solution of the radial equation, energy levels and stationery state wave functions, discussion of bound states, degeneracy.

Unit –V Time- independent perturbation theory, non-degenerate case, first order and second perturbations with the example of an oscillator, degenerate cases, removal of degeneracy in second order, Zeeman effect without electron spin, first-order Stark effect in hydrogen, perturbed energy levels, correct eigen function, occurrence of permanent electric dipole moments.

TEXT AND REFERENCE BOOKS:

1. L.I. Schiff: quantum mechanics (McGraw-Hill).
2. S.Gasiorowicz, Quantum Physics (Wiley).
3. Landau and Lifshitz : Non-relativistic quantum mechanics.
4. B.Craseman and Z.D.Powell: quantum mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai : Modern Quantum Mechanics.
7. Mathews and Venkatesan : Quantum Mechanics.

PAPER – II: STATISTICAL MECHANICS

Unit-I Foundation of statistical mechanics : macroscopic and microscopic states, contact between statistics and thermodynamics, physical significance of Ω(N, V, E), the classical gas, entropy of mixing and Gibb's paradox, phase space of classical system, Liouville`s theorem and its consequences, quantum states and phase space.

Unit- II Elements of ensemble theory – A system in microcanonical, canonical, and grand canonical ensembles, partition functions, physical significance of statistical quantities, example of classical system, energy and energy-density fluctuations and mutual correspondence of various ensembles.

Unit -III Formulation of quantum statistics – Quantum mechanical ensemble theory, density matrix, statistics of various quantum mechanical ensembles, system composed of indistinguishable particles.
Theory of simple gases –Ideal gas in various quantum mechanical ensemble, Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac distributions, statistics of occupation number.

Unit - IV Ideal Bose and Fermi gases -Thermodynamic behavior of an ideal Bose gas, Bose-Einstein condensation and, elementary excitations in liquid helium II, Thermodynamic behavior of an ideal Fermi gas, the electron gas, nonrelativistic and relativistic degenerate electron gas, theory of white dwarf stars.

Unit -V Statistical Mechanics of interacting systems – the method of cluster expansion for a classical gas, Virial expansion of the equation of state. Theory of phase transition – general remark on the problem of condensation, Fluctuations: thermodynamic fluctuations, Spatial correlation in a fluid Brownian motion: Einstein Smoluchowski theory of Brownian motion.

TEXT & REFERENCE BOOKS –

1. R. K. Pathria, Statistical Mechanics (Pergamon Press).
2. L. D. Landau & E. M. Lifshitz (Butter worth and Heinemann Press).
3. Federick Reif, Fundamental of statistical and thermal physics (McGraw-Hill publishers).
4. Kerson Huang, Statistical Mechanics (Wiley Eastern).

PAPER –III: ELECTRONIC & PHOTONIC DEVICES AND OPTICAL MODULATORS

Unit – I: Special Bipolar devices: Thyristors- the four-layer diodes and their basic characteristics, Shockley diode, three terminal thyristor, Diac & Triac, SCR, UJT, Field controlled Thyristors.

Unit- II: Unipotar Devices : JFET, MESFET and MOSFET, basic structure, working and device I-V characteristics, small signal equivalent circuit for Microwave performance Introduction to MIS and MOS diodes, charge coupled devices (CCDs), basic structure and working principle , MOSFET-basic device characteristics, types of MOSFET.

Unit-III: Special Microwave Devices: Tunnel diode and backward diode- basic device characteristics, IMPATT diodes and their static and dynamic characteristics, Transfer electron devices- transferred electron effect, Gunn diodes.

Unit-IV : Photonic Devices : Radiative transitions, LEDs, Visible and infrared SC lasers; Photo detectors; Photo conductor, & Photodiode, Solar cells, Solar radiation and ideal conversion efficiency, p-n junction solar cells, Hetero junction. Interface thin film solar cells.

Unit -V: Optical Modulators and Display Devices :Modulation of light- Birefringence, Optical activity, Electro-optic, Magneto-optic and Acoustic- optic effects, Materials exhibiting these properties, Non-linear optics.Display devices: Luminescence, Photo-luminescence, Electro-luminescence, Liquid crystal displays, Numeric displays.

TEXT & REFERENCE BOOKS-

1. Semiconductor Devices – Physics and Technology, by S M Sze ,Wiley (1985)
2. Introduction to semiconductor device, M.S. Tyasi, John Wiley and sons
3. Measurement, Instrumentation and experimental design in physics and engineering by M.Sayer and A.Mansingh, Prentice Hall India 2000
4. Optical electronics by Ajay Ghatak and K.Thyagarajah, Cam.Univ. Press.
5. Opto electronics – An introduction: J.Wilson and JFB Hawkes (Eastern Economy Edition).
6. Optical Communications: J.H. Franz and V.K. Jain (Narosa).

PAPER – IV: COMPUTATIONAL METHODS AND PROGRAMMING

Unit –I Methods for determination of zeroes of linear and nonlinear algebraic equations and transcendental equations, convergence of solutions. Solution of simultaneous linear equations, Gaussian elimination, pivoting, iterative method, matrix inversion.

Unit –II Finite differences, interpolation with equally spaced and unevenly spaced points, curve fitting, polynomial least squares and cubic spline fitting. Numerical differentiation and integration, Newton-Cotes formulae, error estimates, Gauss method.

Unit –III Numerical solution of ordinary differential equations, Euler and Runga-Kutta methods, predictor-corrector method, elementary ideas of solutions of partial differential equations.

Unit- IV Elementary information about digital computer principles, compilers, interpreters and operating systems(Windows/Linux) Fortran programming, flow charts, integers and floating point arithmetic, expressions, built in functions.

Unit-V Executable and non-executable statements, assignments, control and input-output statements, subroutines and functions; The statement functions, main features of functions and subroutines ,subprogram, function subprogram, overall structure of FORTRAN programe, external statement, subroutine subprogram ,common statement, equivalence statement, operations with files-open and close statement, Format statements, field specifications.

TEXT AND REFERENCE BOOKS

1. Sastry: Introductory Methods of Numerical Analysis.
2. Rajaraman: Numerical Analysis.
3. Antia: Numerical methods.
4. Raja Raman: FORTRAN programming.

Laboratory Course

LabII-A: Numerical Analysis & Computer Programming (Any ten)

1. To solve simultaneous Linear equation by Gauss Elimination method.
2. To calculate the root of a transcendental equation by Newton – Raphsons method.
3. Solving the system of linear simultaneous equation by Gauss Serdel method.
4. Numerical Integration by Simpson's 1/3 Rule.
5. Solving simultaneous Linear equation by Gauss-Jordon method.
6. Solution of Differential equation by Euler's Method.
7. To invert a given matrix by Gauss-Jordon Method.
8. Solution of Differential equation by Runga Kutte Method.
9. To fit the given data in a straight line by linear regression Method.
   a) WAP to find the Largest of n number of series.
   b) To calculate the standard deviation of a given set of data.
10. To write a program to compute the complex roots of a given polynomial of N^{th} degree by Grafffe's Method.
11. To write a program to compute the Eigen values of a given matrix.
12. To integrate a given function by: (a) Trapezoidal method or by (b) Gauss Quadrature.
13. To find solutions of Ist order, ordinary differential equation by Taylor method

Lab II-B: Digital Electronics & Microprocessor (Any ten)

1. Study of R-S, D/T, J-K Flip-Flops.
2. Study of counters: Ripple, Mode 3, Mode 5 counters.
3. Study of Shift Register.
4. Study of R-2R D/A Converter.
5. Study of Random Access Memory (RAM) Read Only Memory. (ROM)
6. Study of A/D Converter.
7. Experiment with Microprocessor:- I
   (a) Convert BCD in to HEXADECIMPL
   (b) To transfer group of date blocks from one location to another location.
8. Experiment with microprocessor: - II
   (a) To write programs for addition of two 1 byte data giving results of 2 bytes.
   (b) To write programs for multiplication of two 1 byte data giving results of 2 bytes.
9. (a) To add 2 16-BIT numbers stored in locations from x x x x to x x x x + 3 and add them store the results from x x x x + 4 to x x x x+6 memory location
   (b) To find the largest of n numbers of a series.
10. To arrange N numbers in an ascending orders.
11. Experiments with Microprocessor.
    (a) Convert BCD in to binary and vice-versa.
    (b) To transfer group of data blocks from one location to another location.
    (c) To write programs for addition of two 1byte data giving result of 2byte data
    (d) To write programs for multiplication of two 1 byte data giving result of 2byte data.
12. Logic gate study DTL and RTL.
13. Study of adder/Subractor.

Semester – III

PAPER –I: QUANTUM MECHANICS -II

Unit-I Variational method, expectation value of energy, application to excited states, ground state of He-atom, Zero point energy of one dimensional harmonic oscillator, Vander-waals interaction, the W.K.B. approximation, approximate solutions, asymptotic nature of the solution, solution near turning point, connection formulae, energy levels of a potential well and quantization rule.

Unit -II Theory of scattering: differential and total scattering cross section, wave mechanical picture of scattering & the scattering amplitude, Green's functions and formal expression for scattering amplitude, The Born approximation and its validity, Partial wave analysis, asymptomatic behavior of partial waves and phase shifts, optical theorem, scattering by a square well potential, scattering by a hard sphere, scattering by a Coulomb potential..

Unit – III Time-dependent perturbation theory, first order perturbation, Harmonic perturbation, Fermi`s Golden rule, Ionization of a H-atom, absorption and induced emission, Selection rules. Identical particles, symmetric and anti symmetric wave functions

Unit –IV Relativistic quantum mechanics, formulation of relativistic quantum theory, the Klein-Gordon equation; plane wave solutions, charge and current densities, The Dirac equation for a free particle, matrices alpha and beta, Lorentz covariance of the Dirac equation, free particle solutions and the energy spectrum, charge and current densities.

Unit-V The spin of the Dirac particle, Dirac particle in electromagnetic fields and the significance of the negative energy state, Dirac equation for a central field : Spin angular momentum, approximate reduction, spin –orbit energy, separation of equation, the hydrogen atom, classification of energy levels and negative energy states.

TEXT AND REFERENCE BOOKS –

1. L.I. Schiff: Quantum Mechanics (McGraw-Hill).
2. S.Gasiorowicz: Quantum Physics (Wiley).
3. Landau and Lifshitz : Quantum Mechanics.
4. B.Craseman and Z.D.Powell : Quantum Mechanics (Addison Wesley)
5. A.P. Messiah: Quantum Mechanics.
6. J.J. Sakurai: Modern Quantum Mechanics.
7. Mathews and Venkatesan: Quantum Mechanics.
8. Bjorken and Drell : Relativstic Quantum Mechanics.

PAPER –II: ATOMIC AND MOLECULAR PHYSICS

Unit-I: Quantum states of one electron atoms-atomic orbitals, Hydrogen spectrum, spin-orbit(l-s) interaction energy, fine structure of hydrogen spectrum including l-s interaction and relativistic correction, spectra of alkali elements, fine structure in alkali spectra, penetrating and non-penetrating orbits, intensity rules.

Unit-II: Pauli's principle, equivalent and non-equivalent electrons, ground state(basic level of different elements), two electron systems, interaction energy in L-S. and J-J. Coupling, Hyperfine structure, line broadening mechanisms (general ideas).

Unit–III: Normal and anomalous Zeeman effect, early discoveries and developments, vector models of one electron system in a weak magnetic field, magnetic moment of a bound electron, magnetic interaction energy, selection rules, intensity rules, Paschen-Back(PB) effect – principal series effect, Zeeman and PB effects in hydrogen, Stark effect- discovery, Stark effect in Hydrogen, orbital model, weak and strong effect in Hydrogen.

Unit-IV: Types of molecules: linear and diatomic molecules, symmetric top, asymmetric top and spherical top molecules. Rotational spectra of diatomic molecules: rigid rotator model, energy levels, Eigen functions, spectrum, comparison with observed spectrum and non-rigid rotator model, Intensities of spectral lines, microwave spectrometer, Raman spectrum; classical and quantum theory of Raman Effect, pure rotational Raman spectrum.

Unit-V: Vibrational spectra of diatomic molecules: simple harmonic model, energy levels and spectrum, comparison with observed spectrum and anhormonic model, Vibrating rotators, Interaction of rotations and vibrations, fine structures and P-Q-R branches, IR spectrometer, Vibrational Raman spectrum, Vibrational rotational Raman spectrum.

TEXT AND REFERENCE BOOKS:

1. Introduction to atomic spectra - H.E. White (T).
2. Fundamentals of molecular spectroscopy – C.N. Banwell and E.M McCash (T).
3. Spectroscopy vol. I, II and III – Walker and straughner.
4. Introduction to Molecular spectroscopy – G.M. Barrow.
5. Spectra of diatomic molecules – Herzberg.
6. Molecular spectroscopy – Jeanne L.Mc-Hale.
7. Molecular spectroscopy – J.M. Brown.
8. Spectra of atoms and molecules –P.F.Bemath.
9. Modern spection copy, J.M. Holias.

PAPER – III: SOLID STATE PHYSICS-I

Unit- I: Electrons in Solids and Electronic Properties

Energy bands: nearly free electron model, origin of energy gap and its magnitude, Bloch function, Kronig-Penny model, Wave equation of electron in periodic potential, restatement of Bloch theorem, crystal moment of an electron, solution of Central equation, Kronig-Penny model in reciprocal space, empty lattice Approximation, approximate solution near zone boundary, Number of orbitals in a band, metals and insulators.

Unit -II: **Fermi surfaces and metals**

Effect of temperature on F-D distribution, free electron gas in three dimension. Different zone schemes, reduced and periodic zones, construction of Fermi surfaces, nearly free electrons, electron, hole, open orbits, Calculation of energy bands, Tight binding, Wigner-Seitz, cohesive energy, pseudo potential methods. Experimental methods in Fermi surface studies, quantization of orbits in a magnetic field, de Haas van Alphen Effect, External orbits, Fermi surface of copper.

Unit- III: Crystal vibration and thermal properties

Lattice dynamics in monoatomic and diatomic lattice: two atoms per primitive basis, optical and acoustic modes, quantization of elastic waves, phonon momentum, inelastic neutron scattering by phonons, Anharmonic crystal interactions-thermal expansion, thermal conductivity, thermal resistivity of phonon gas, umklapp processes, imperfections.

Unit –IV: Electron-Phonon interaction- superconductivity

Experimental survey: occurrence of superconductivity, Destruction of superconductivity by magnetic field, Meissner effect, heat capacity, energy gap, MW, and IR properties, isotope effect. Theoretical survey : thermodynamics of superconducting transition, London equation, Coherence length, Cooper pairing due to phonons, BCS theory of superconductivity, BCS ground state, flux quantization of superconducting ring, duration of persistent currents, Type II superconductors, Vortex states, estimation of Hc1 and Hc2, single particle and Josephson superconductor tunneling, DC/AC Josephson effect, Macroscopic quantum interference. High temperature superconductors, critical fields and currents, Hall number, fullerenes ring.

Unit – V: Semiconductor crystals

Band gap, equation of motion, physical derivation of equation of motion, holes, effective mass, physical interpretation of effective mass, effective masses of semiconductors Si and Ge, intrinsic carrier concentration, intrinsic mobility, impurity conductivity, donor and acceptor states, thermal ionization of donors and acceptors, thermo-electric effects.

TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).
2. J.M.Ziman: Principles of theory of solids (Cambridge Univ.Press).
3. Azaroff: X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.

5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
10. Ashcroft and Mermin: Solid State Physics.
11. Chalking and Lubensky: Principles of Condensed Matter Physics.
12. Madelung: Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.

PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS-I

Unit – I Stars-apparent magnitudes, Colour index, Spectral classification, Stellar distances, Absolute magnitude, The H-R diagram of stars.
Stellar interiors: The basic equations of stellar structure, Hydrostatic equilibrium, Thermal equilibrium, Virial Theorem, Energy sources, Energy transport by radiation and convection, Equation of state

Unit – II Formation and evolution of stars: Inter stellar dust and gas, Formation of protostars, Pre-main sequence evolution, Post main sequence evolution and Evolution on the main sequence for low and high mass stars, Late stages of evolution, Fate of massive stars, Supernovae and its characteristics.

Unit – III End states of stars, degenerate states, White dwarfs, and Chandrasekhar limit, Neutron stars and Pulsars, Black holes.
Binary stars and their classification, close binaries, Roche Lobes, Evolution of semidetached systems: Algols, Cataclysmic variables and X-ray binaries.

Unit– IV Solar Physics: Physical Characteristics of sun, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, solar wind, Helioseismology.

Unit – V Observational and Conceptual foundations of Newtonian gravity and General Theory of Relativity(GR), Principle of Equivalence, Metric tensor, Covariant differentiation, Riemann curvature tensor, Geodesics.
Stress- Energy tensor, Einstein's field equations, Schwarzschild metric, Particle trajectories in Schwarzschild space- time, Precession of Perihelion, Gravitational red-shift and bending of light.

TEXT AND REFERENCE BOOKS:

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Camb. University Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wealey Pub. Co.
3. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4th edition, Saunders college publishing.
4. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan,

Cambridge university press.
5. The Physical Universe: An introduction to astronomy, F.Shu, Mill valley : University science books.
6. Textbook of astronomy and astrophysics with elements of cosmology, V.B.Bhatia, Pb -New Delhi, Narosa publishing house.
7. The new cosmos, A.Unsold and B.Baschek, Newyork, Springer Velas.
8. Quasars and active galactic neuclei, A.K. Kembhavi and J.V. Narlikar, Cambridge university press.
9. Introductory astronomy and astrophysics, M.Zeilik and S.A.Greogry, 4 th edition, Saunders college publishing.
10. Theoretical Astrophysics, vol. I: Astrophysical processes T.Padmanabhan, Cambridge university press.
11. General relativity and cosmology, J.V. Narlikar-Delhi: Macmillan Company of India ltd.
12. General relativity, I.R. Kenyon, Oxford univ. press.
13. Classical theory of fields, vol. 2, L.D. Landau and E.M. Lifshitz, Oxford: Pergamon press.
14. First course general relativity, B.P. Schutz – Cambridge univ. press.
15. Galactic Astronomy: Binney and Merrifield.

Paper – IV (B) ELECTRONICS (Communication)-I

Unit I Microwave devices

Klystron ,magnetron & traveling wave tubes ,velocity modulation ,basic principal of two cavity klystrons & relex klystrons ,principle of operation of magnetrons ,helix traveling wave tubes .

Unit II Microwave wave guides & components

(Wave modes) rectangular wave guides: solution of wave equation in rectangular coordinates, TE modes in rectangular wave guides ,TM modes in rectangular wave guides ,excitations of modes in rectangular wave guides .

Circular wave guides :solutions of wave equation in Cylindrical coordinates, TE modes in Circular wave guides ,TM modes in Circular wave guides , TEM modes in Circular wave guides, excitations of modes in Circular wave guides .

Unit-III Microwave cavites: rectangular cavity resonator, circular –cavity resonator &semi –circular –cavity resonators Q- factor of a cavity resonator.

Transferred Electrons devices (TEDs)

Gunn effect diodes, principle of operation, modes of operations, read diodes, IMPATT diodes, TRAPATT diodes.

Microwave communications: advantages of microwave transmission, loss in free space, propagation of microwave, components of antennas used in MW communication system.

Unit-IV Radar system:

Radar block diagram & operation ,radar frequencies ,pulse consideration, radar range equation ,derivation of radar range equation ,minimum detectable single receiver noise ,signal to noise ratio ,integration of radar pulses ,radar cross

sections ,pulse reflections frequency ,antenna ,parameters ,systems losses & propagation losses ,radars transmitters receivers ,antennas displays

Unit V Satellite communication

Orbital Satellite, geostationary satellite ,orbital patterns ,look angles ,orbital spacing , satellite system ,link modules

REFERENCE BOOKS

1) "Microwaves" by K.L. Gupta Wiley Estern Ltd. Delhi.
2) Advanced Electronic communication system by Wayne Tomsi Physics education.
3) Principle of communication of system-by Toub & Schilling: 2nd ed. TMH 1994
4) Communication system: by Siman Haykin, 3rd ed. John wiley & sons inc.1994.
5) Microwave devices & circuits by : Samuel, Y. Liau.
6) Electronic communication: George kennedy.

Paper IV (C) PHYSICS OF NANO MATERIALS - I

Unit I: Nano Materials

Properties of Nano-Particles: Metal nano-clusters, theoretical modeling of nanoparticles, geometric and electronic structure, magnetic clusters, Semiconductor nanoparticles, optical properties, rare gas and molecular clusters, Bulk nano-structured materials: Solid disordered nanostructures, methods of synthesis, properties,nano-cluster composite glasses, porous silicon, nano structured crystals.

UNIT II: Carbon Nano Tubes (CNTs)

Nature of carbon bonds, different allotropies of carbon, structure and properties of C_{60}, graphene, carbon nanotubes and its types, laser vaporization techniques, arc discharge method and chemical deposition technique, purification techniques, Properties of Carbon Nanotubes and Graphene: Optical, electrical, electronic, mechanical, thermal, optical, and vibrational properties.

UNIT III: Synthesis of Nano- Materials

Top-down & Bottom-up approaches: Formation of nanostructures by mechanical milling (ball milling) and mechanical attrition, Chemical Vapor Deposition (CVD), Physical Vapour Deposition (PVD), thermal and e beam evaporation, Pulsed Laser Ablation (PLD).

Chemical Routes for synthesis of Nanomaterials:Chemical precipitation and co-precipitation, chemical bath deposition (CBD), Sol-gel synthesis, Microemulsions or reverse micelles, Solvothermal synthesis, Thermolysis routes and spray pyrolysis.

UNIT IV: Characterization of Nano-materials (a)

X-ray Diffraction (XRD), powder and single crystal Diffraction, X-ray fluorescence (XRF), X ray photoelectron spectroscopy (XPS), Energy Dispersive X-ray analysis (EDAX), Extended X ray absorption and fluorescence spectroscopy (EXAFS), Dispersive high pressure XRD and Diamond anvil cells (DAC).

Nuclear Magnetic Resonance (NMR) and Raman spectroscopy: description and analysis. Surface analysis methods: Secondary ion mass spectroscopy (SIMS), Auger Electron Spectroscopy, ESCA, Deep Level Transient Spectroscopy (DL TS), Thermo Gravimetric

Analysis (TGA), Differential Scanning Calorimetry (DSC), Differential Thermal Analysis.

UNIT V: Characterization of Nano-materials (b)

Scanning Tunneling Microscopy (STM), Contact and non contact Atomic Force Microscopy (AFM), Conductive AFM, Magnetic Force Microscopy (MFM), Scanning Tunneling Spectroscopy (STS), Nano indentation. Scanning Electron Microscopy (SEM), Transmission electron microscoy (TEM), High resolution TEM Field emission SEM, Electron Energy Loss Spectroscopy (EELS), Electron Probe Micro Analyzer (EPMA).

Spectrophotometry: UV-Vis spectrophotometers, IR spectrophotometers, Fourier Transform Infrared Radiation (FTIR), Photoluminescence (PL), electroluminesce and thermoluminescence spectroscopy, Near-field Scanning Optical Microscopy (NSOM).

References: Books/ Research Monographs

1. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.C Cammaratra
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens
3. Nanotechnology, Kohlr, Michael.
4. Nanoelectronics and Nanosystems , Karl Goser, Peter Glosekotter, Jan Dienstuhl., Springer, 2004
5. Handbook of Analytical instruments, R.S. Khandpur
6. X-ray diffraction procedures, H. P. Klung and L.E.Alexander
7. The Powder Method IV. Azaroff and M. J. Buerger
8. Elements of X-ray diffraction, B. D.Cullity
9. Differential Thermal Analysis, R.C.Mackenzie
10. Thermal Methods of Analysis, W.W.Wendlandt
11. Synthesis, Functionalization and Surface treatment of Nanoparticles :Maric Isbella and Buraton
12. Encyclopedia of Nanotechnology, H.S. Nalwa
13. Nanomaterial Systems Properties and Application, A.S.Eldestein and R.C.Cammarata.
14. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004).
15. Nanostructures and Nanomaterials- Synthesis properties and Applications by Guozhong Cao (Empirical College Press World Scientific Pub., 2004).
16. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
17. Fullerene & Carbon nanotubes, Dressel Shaus
18. Carbon Nanotubes, Elizer
19. Physical properties of CNT, Saito
20. Carbon nanotechnology, Liming Dai
21. Nanotubes and nanowires, CNR Rao and Govindaraj RCS Publishing.
22. Piezoelectric Sensors: Force, Strain, Pressure, Acceleration and Acoustic Emission Sensors, Materials and Amplifiers, G. Gautschi.
23. Block Copolymers in Nanoscience Massimo Lazzari
24. Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
25. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
26. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
27. Nanosystem characterization tools in the life sciences by Challa Kumar. Wiley-VCH, 2006.
28. Nanolithography M.Gentili et al.(edits),Springer.
29. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
30. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
31. Nanotechnlogy: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.

32. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca
33. The Physics of Quantum Information: Quantum Cryptography, Quantum Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
34. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb

PAPER –IV (D): SPACE PHYSICS - I

Unit I: Solar Physics

Physical Characteristics of sun, Source of solar energy, thermonuclear reaction and building up of higher elements, Description of solar internal and external layers, Photosphere: Limb darkening, Granulation, Faculae, Solar Chromosphere and Corona, Heating of the solar chromosphere and corona, Prominences, Solar Cycle and Sunspots, Solar Magnetic Fields, Theory of Sunspots, Solar flares, Solar wind, Coronal mass ejections, Helioseismology.

Unit II: Planetary System

Solar planetary system, Major characteristics of the Planets, Atmospheric Composition, Planetary magnetism, Magnetic fields, Magnetic dipole, Asteroids, Comets, Extra Solar Planets, Magnetic fields of Extra Solar Planets

Unit III: Celestial Mechanics

Time and Coordinate system: Celestial Sphere, Solar Time, Sidereal Time, Julian Date, Right Ascension and Declination, Azimuth and Elevation, galactic coordinates, WGS 84 coordinate system. GPS – operation, accuracy, time and position information.

Unit IV: Space and Observational tools

Electromagnetic bands of observation: radio, infrared, optical, UV, X-ray and Gamma-ray windows. Ground-based, balloon-borne and satellite-borne telescopes, Resolution of Instruments and Limitations, Optical telescopes, Photometers, Spectrographs, CCDs, Polarimeters. Radio telescopes - interferometry, X-ray and Gamma-ray detectors, Neutrino and Cosmic Ray astronomy, Radar.

Unit V: Space Missions

Planetary Exploration, Early spacecraft visits to the moon, Unmanned Lunar landers; The Apollo program - man on the moon – instruments and experiments, Lunar structures; Exploration of Mercury, Venus, Mars - the Red Planet – Structure of Mars, Martian atmosphere; ice at the poles, Martian landscapes: linear features, volcanoes, and impact craters; exotic terrains; Study of Planetary moons with space missions, The Cassini-Huygens Mission, The Deep Impact Mission. Search for extra terrestrial life – SETI experiments.

Text and Reference Books

1. Solar System Astrophysics, J. C. Brandt and P. W. Hodge
2. Introduction to Experimental Physics, W. B. Fretter.
3. The Magnetic Field of the Earth, Roland T. Merrill, Michael W. McElhinny, Phillip L. Mcfadden,Academic Press
4. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita. and W. H. Campbell, Academic Press
5. Earth's Magnetospheric Process, Ed. B. M. McCormac, D. Reidel Publishers
6. Physics of the Magnetosphere, Eds. R. L. Corovillano, J. T. McCaulley and H.

Radosky, D. Reidel Publishers
7. Solar System Plasma Physics, Vol. I, II and III, Eds. C. F. Kennel, L. J. Lanzenrutti and E. N. Parker
8. Dynamics of the Geomagnetically Trapped Radiation (Physics and Chemistry in Space, Vol II)
9. Solar Terrestrial Physics, Ed. E. R. Dyer, D. Reidel Publishers
10. Solar Magneto–Hydrodynamics, E.R. Priest; D Reidel, 1982
11. R.C. Smith, Observational Astrophysics; CUP, 1995.
12. C.R. Kitchin, Astrophysical Techniques; Adam Hilger, 1984.
13. Digital Image Processing, R. C. Gonzales and R. E. Woods, 2nd Ed, Pearson India, 2002
14. Satellite Meteorology, S. Q. Kidder and T. H. Von der Haar, Academic Press, 1995
15. Lecture Notes on Satellite Meteorology, Vol 1 and 2, SAC, Ahmedabad
16. Remote Sensing and Image Interpretation, T. M. Lillesand and R. W. Kieffer, John Wiley, 2002
17. Fundamentals of Space Systems, V. L. Pisacane and R. C. Moore, Oxford University Press, 1994
18. Fundamentals of Remote Sensing, George Joseph, 2003
19. Processing Remote Sensing Data, M. C. Girgard and C. Girgard, Oxford-IBH, 1999
20. Quantitative Remote Sensing of Land Surfaces, Shunlin Liang, Wiley Interscience, 2004
21. Scale in Remote Sensing and GIS, D. A. Quattrachi and M. F. Goodchild
22. Theory of Satellite Orbits in an Atmosphere, King-Hele Desmond, Butterworths, 1964
23. Uncertainty in Remote Sensing and GIS, Ed: G. M. Foddy and P. M. Atkinson
24. Remote Sensing by George Joseph
25. Concepts in Space Sciences Edited by R.R. Daniel
26. Mathematical Principles of Remote Sensing by A.. Milman
27. An Introduction to Ionosphere and Magnetosphere, J. A. Raticliffe
28. Solar System Astrophysics, J. C. Brandft and P. W. Hodge
29. Plasma Diagnostic Techniques, R. H. Huddlestone and S. L. Leonard
30. Introduction to Experimental Physics, W. B. Fretter
30. High Vacuum Techniques, J. Yarwood
31. Plasma Diagnostics, Vol. I, O. Anciello and D. L. Flamn
32. The Earth's Ionosphere: Plasma Physics and Electrodynamics, Michael C. Kelley, AcademicPress
33. Ionospheric Techniques and Phenomena, A. Giraud and M. Petit, D. Reidel Publish.
34. Physics of Geomagnetic Phenomena, Vol. I and II, S. Matsushita and W. H. Campbell, Academic Press
35. Introduction to Ionospheric Physics, H. Risbeth and H. Garriot, Academic Press
36. Space Weather, Physics and Effects by Volker Bothmer and Loannis.A.Depli Springer
37. Aerospace Environment by T Beer
38. Free flight of a rocket By Gantmaker
39. Orbital Mechanics, Ed. Vladimir A, Chobotov, AIAA Edn Series
39. Introduction to Celestial Mechanics, S. W. McCusky, Addison-Wesley
40. Fundamentals of Astrodynamics, R. R. Bates et al, Dover
41. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
42. Orbital Methods in Astrodynamics, P. R. Escobal, John Wiley
43. Fundmentals of Astrodynamics, R. R. Bates et al, Dover

44. Orbital Motion, A. E. Roy, Adam Hinglar Ltd
45. Design of Orbital Flights, J. Johnson et al., McGraw Hill
46. Modern Astrophyiscs, B. W. Carroll and D. A. Ostlie, Addison -Wesley
47. The Physical Universe, F. Shu, University Science Books
48. The Physics of Astrophysics, Vol. I and II, F. Shu, University Science Books
49. Theoretical Astrophysics, Vol. I, II and III, T. Padmanabhan, Cambridge Uni.Press
50. The Physics of Fluids and Plasmas, Arnab Rai Choudhuri, Cambridge Uni.Press
51. Astrophysical Concepts, M. Harwitt, Springer-Verlag
52. Galactic Astronomy, J. Binney and M. Merrifeld, Princeton University Press
53. Galactic Dynamics, J. Binney and S. Tremaine, Princeton University Press
54. Quasars and Active Galactic Nuclei, A. K. Kembhavi and J. V. Narlikar, Cambridge University Press
55. An Introduction to Active Galactic Nucleii, B. M. Peterson

Lab III-A: Materials Science & General

At least ten experiments should be performed from the following list of experiments or parallel level experiment depending upon the facilities available.

1. To determine activation energy of ionic/superionic solid by Temperature depended conductivity measurement.
2. To study Electron Spin(ESR) Resonance in DPPH (Diphenyl Pricyl Hydrazy) sample.
3. To study I-V characteristics of photovoltaic solar cell and find the efficiency.
4. To study the decay of photoconductivity of given sample and find out trap depth.
5. Study of decay of photoluminescence of a given sample.
6. Measurement of electrical conductivity using Impedance Spectroscopy technique.
7. To determine drift velocities of Ag+ ion in AgI from temperature dependence of ionic transference number study.
8. Electrical conductivity of Ball milled/Mechano-chemical synthesized materials.
9. Determination of strength of a given radioactive source.
10. Study of complete spectra of radioactive sources, and study of photo peak efficiency of NaI(Tl) crystal for different energy gamma rays.
11. Structural analysis of powder sample by XRD and particle size determination using Scherrer's formula.
12. FTIR studies of solid samples.
13. Mechanoluminescence of sucrose crystals.
14. Thermoluminescence of irradiated samples.
15. Study of Op-Amp.-IC-741 is inverting/ Non inverting amplifier and draw frequency response curve.
16. Construction of Schmitt triggers using IC-741 and study of its characteristics.
17. Study of Astable and monostable Multi Vibrator using IC 555.
18. Digital electronics experiments on bread board using IC-7400.

Lab III-B: Astronomy & Astrophysics

1. Study of Quasar.
2. Study of the orbit of a visual binary Star.
3. Determine the mass of Saturn & it's rotational velocity.

4. Verification of Hubble's law and determination of Hubble's constant.
5. Identification of element from Fraunhoffer spectrum of the sun.
6. Study of sun spots.
7. Study of light curves of Cepheid variable stars.
8. Study of Proper motion of stars.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. Study of expansion of the universe and calculate the age of the Universe.

OR III -B: Electronics

(1) Experiments with microprocessor.
   (a)Convert BCD in to binary & vice versa.
   (b) To transfer group of data blocks from one location to another location.
   (c) To write programme for addition & subtraction.
   (d) To write programme for multiplication & division.
(2) Logic gate study DTL & RTL.
(3) To study& verify the Demorgon's Theorem.
(4) Study of Adder/ Subtractor.
(5) Study of Encoder & Decoder.
(6) Study of Multiplexer & Demultiplexer
(7) Study of digital to analog converter.
(8) Study of analog to digital converter.
(9) Study of 4-bit Counter/ ripple Counter.
(10) Study of left/right shift register.
(11) Study of read only memory.
(12) Study of Random Access Memory.
(13) Study of Phase locked loop.
(14) Study of BCD to seven segment Decoder.
(15) Study of modulation & demodulation.
(16) Optical fiber based experiment.
(17) Microwave characterization and measurements.

OR III -B: Physics of Nano-material

(1) Synthesis of II-IV semiconductor nanoparticles by wet chemical method.
(2) Synthesis of nanoparticles (ZrO_2) by Combustion method.
(3) Synthesis of nanoparticles by Sol-gel method.
(4) Synthesis of nanoparticles by Ball milling method.
(5) Synthesis of Quantum cells structures using vacuum coating unit.
(6) Synthesis of nanoparticles using Solid state reaction method.
(7) Measurement of band gap energy and size of the nano particle of II-IV semiconductor using absorption spectrophotometer.
(8) To make the peak analysis of IR transmission spectra of nanoparticle using FTIR spectrometer.
(9) Study of effect of capping agent on the size of the nanoparticle during synthesis.
(10) To determine the average particle size of nano materials by XRD using Sherer's formula.
(11) To determine the Hall coefficient and carrier type for a semiconducting

nanoparticles.
(12) To determine the Band gap of a given semiconductor using Four probe method from room temperature to 100°C.
(13) To determine the average size of naonparticles using Zetasizer.
(14) To measure the change of dielectric constant and dielectric loss of nanoparticle with the change of signal frequency by impedance analyzer.
(15) To characterize the mechanical properties by tensile testing.
(16) To estimate the particle size by SEM.
(17) To perform electron diffraction analysis from TEM image.
(18) To do roughness analysis of nanostructured sample using AFM.

OR III -B: Space Physics

1. The flow of energy out of the Sun.
2. Study of Sun-spot.
3. Astrometry of asteroids.
4. Study of expansion of the universe and calculate the age of the Universe.
5. Identification of element from Fraunhoffer spectrum of the sun.
7. The transit of Venus and Murcury.
8. Jupiter's Moon and speed of light.
9. Determination of Pulsar period and distance.
10. Photo-electric photometry of Pleiades star cluster.
11. The large scale structure of the Universe.

Semester – IV

PAPER – I: NUCLEAR AND PARTICLE PHYSICS

Unit-I **Nuclear Interactions :** Nucleon-nucleon interaction, Two-nucleon system, The ground state of the deuteron, Tensor forces, Nucleon-nucleon scattering at low energy, Scattering length, Effective range theory, Spin dependence of nuclear forces, Charge independence and charge symmetry of nuclear forces, Iso-spin formalism, Exchange forces, Meson theory of nuclear forces and the Yukawa interaction.

Unit-II Nuclear Reactions : Reaction energetics: Q-equation and threshold energies, Reactions cross sections, Resonance: Breit-Wigner single-level formula, Direct and compound nuclear reactions, Formal reaction theory: Partial wave approach and phase shifts, Scattering matrix, Reciprocity theorem,

Unit-III **Nuclear Decay :** Beta decay, Femi's theory of beta decay, Shape of the beta spectrum, Total decay rate, Angular momentum and parity selection rules, Comparative half-lives, Allowed and forbidden transitions, Selection rules, Parity violation, Two component theory of neutrino decay, Detection and properties of neutrino

Gamma decay, Multiple transitions in nuclei, Angular momentum and Parity selection rules, Internal conversion, Nuclear isomerism.

Unit –IV Nuclear models : Liquid drop model, Bohr-Wheeler theory of fission, Shell Model, Experimental evidence for shell effects, Single particle shell model, Spin-orbit interaction and magic numbers, Analysis of shell model predictions, Magnetic moments and Schmidt lines, Collective model of Bohr and Mottelson.

Unit –V Elementary particle Physics: The fundamental interactions, Classification of elementary particles, Leptons and Hadrons, Symmetries, groups and conservation laws, SU(2) and SU(3) multiplets and their properties, Quark model, Properties of Quarks, the standard model.

TEXT AND REFERENCE BOOKS:

1. A.Bohr and B.R.Mottelson, Nuclear structure, vol. 1 (1969) and vol.2, Benjamin, Reading, A, 1975.
2. Kenneth S.Kiane, Introductory Nuclear Physics, Wiley, New York, 1988.
3. Ghoshal, Atomic and Nuclear Physics vol.2.
4. P.H.Perking, Introduction to high energy physics, Addison-Wesley, London, 1982.
5. Shriokov Yudin, Nuclear Physics vol.1 & 2, Mir Publishers, Moscow, 1982.
6. D.Griffiths, introduction to elementary particles, harper and row, New York, 1987.
7. H.A.Enov, introduction to Nuclear Physics, Addison-Wesley, 1973.
8. G,E.Brown and A.D.Jackson, Nucleon-Nucleon interaction North-halland Amsterdam, 1976.
9. S.D.Benedetti, Nuclear interaction, John Willey and sons, NewYork, 1964.

10. M.K.Pal, theory of Nuclear structure, affiliated East West, Madras, 1982.
11. Y.R.Waghmare,introductory nuclear physics, Oxford, IBH, Bombay, 1981.
12. J.M.Longo, elementary particles, McGraw Hill, New York, 1971.
13. R.R.Roy and B.P.Nigam, Nuclear Physics, Wiley-Easterm Ltd. 1983.

PAPER – II LASER PHYSICS AND APPLICATIONS

Unit- I Laser Characteristics –

Spontaneous and stimulated emission, Einstein's quantum theory of radiation, theory of some optical processes, coherence and monochromacity, kinetics of optical absorption, line broadening mechanism, Basic principle of lasers, population inversion, laser pumping, two & three level laser systems, resonator, Q-factor, losses in cavity, threshold condition, quantum yield.

Unit – II Laser Systems

Solid state lasers- the ruby laser, Nd:YAG laser, ND: Glass laser, semiconductor lasers – features of semiconductor lasers, intrinsic semiconductor lasers, Gas laser - neutral atom gas laser, He-Ne laser, molecular gas lasers, CO2 laser, Liquid lasers, dye lasers and chemical laser.

Unit-III Advances in laser Physics

Production of giant pulse -Q-switching, giant pulse dynamics, laser amplifiers, mode locking and pulling, Non-linear optics, Harmonic generation, second harmonic generation, Phase matching, third harmonic generation, optical mixing, parametric generation and self-focusing of light.

Unit – IV Multi-photon processes; multi-quantum photoelectric effect, Theory of two-photon process, three- photon process, second harmonic generation, parametric generation of light, Laser spectroscopy : Rayleigh and Raman scattering, Stimulated Raman effect, Hyper-Raman effect, Coherent anti-stokes Raman Scattering, Photo-acoustic Raman spectroscopy.

Unit – V Laser Applications **–** ether drift and absolute rotation of the Earth**,** isotope separation, plasma, thermonuclear fusion, laser applications in chemistry, biology, astronomy, engineering and medicine.

Communication by lasers: ranging, fiber Optics Communication**,** Optical fiber, numerical aperture, propagation of light in a medium with variable index, pulse dispersion.

TEXT AND REFERENCE BOOKS:

1. Laud, B.B.: Lasers and nonlinear optics, (New Age Int.Pub.1996).
2. Thyagarajan, K and Ghatak, A.K.: Lasers theory and applications (Plenum press, 1981).
3. Ghatak, A.K.and Thyagarajan, K : Optical electronics (Cambridge Univ. Press 1999).
4. Seigman, A.E.: Lasers (Oxford Univ. Press 1986)
5. Maitland, A. and Dunn, M.H. : Laser Physics (N.H.Amsterdam, 1969).
6. Hecht, J.The laser Guide book (McGraw Hill, NY, 1986).

7. Demtroder, W. : Laser Spectroscopy (Springe series in chemical physics vol.5,Springe verlag, Berlin, 1981).
8. Harper, P.G.and Wherrett B.S. (Ed.): Non-linear-optics (Acad.press, 1977).

PAPER – III: SOLID STATE PHYSICS- II

Unit- I*:* Plasmons, Polaritons

Dielectric function of the electron gas, Plasma optics, Dispersion relation for EM wave, Transverse optical modes in Plasma, Transparency of Alkali metals in the ultraviolet, Longitudinal Plasma oscillations, Plasmon, electrostatic screening and screened Coulomb potential, Mott metal-insulator transition, screening and phonons in metals, Polaritons, LST relation .

Unit –II: Dielectric and ferroelectrics

Maxwell's equations, polarization, macroscopic electric field, depolarization filed, E1;local electric field at an atom, Lorentz filed E2, fields of dipoles inside cavity E3; dielectric constant and polarizability, electronic polarizability; structural phase transition; ferro-electric crystals, classification; displacive transition, soft optical phonons, Landau theory of phase transitions, first and second order transition, antiferro-electricity, ferro-electric domain, piezoelectricity, ferro-elasticity, optical ceramics.

Unit –III: Magnetism

General ideas of dia- and para- magnetisms, quantum theory of paramagnetism, rare earth ions, Hund rule, iron group ions, crystal field splitting, quenching of orbital angular momentum, spectroscopic splitting factor, van vleck temperature dependent paramagnetism, Cooling by isentropic demagnetization, nuclear demagnetization, paramagnetic Susceptibility of conduction electrons.

Unit –IV: Ferromagnetism and anti ferromagnetism

Ferromagnetic order, Curie point and exchange integral, temp dependence of saturation magnetization, saturation magnetization at absolute zero; magnons, quantization of spin waves, thermal excitation of magnons; neutron magnetic scattering, Ferrimagnetic order, Curie temp and susceptibility of ferrimagnets, iron garnets. Antiferromagnetic order, susceptibity below neel temp, antiferromagnetic magnons, ferromagnetic domains.

Unit – V: Optical Processes & Excitons and defects

Optical reflectance, excitons, Frenkel and Mott-Wannier excitons, Alkali Halides and Molecular crystals Defects: lattice vacancies, Schottkey and Frenkel point effects, colour centers, F and other centres, Line defect. Shear strength of single crystals, dislocations-edge and screw dislocations, Burger vectors, Stress fields of dislocations, low angle grain boundaries, dislocation densities, dislocation multiplication and slip, strength of alloys, dislocations and crystal growth, hardness of materials**.**

TEXT AND REFERENCE BOOKS

1. C. Kittel: Introduction to Solid State Physics (Wiley and Sons).

2. J.M.Ziman: Principles of theory of solids (Cambridge univ.press).
3. Azaroff : X-ray crystallography.
4. Weertman and weertman : Elementary Dislocation Theory.
5. Verma and Srivastava: Crystallography for Solid State Physics.
6. Azeroff and Buerger: The Power Method.
7. Buerger: Crystal Structure Analysis.
8. Thomas: Transmission Electron Microscopy.
9. Omar: Elementary solid state physics.
10. Aschroft and Mermin : Solid State Physics.
11. Chalking and Lubensky: Principles of Condensed Matter Physics.
12. Madelung : Introduction to solid state theory.
13. Callaway: Quantum theory of solid state physics.
14. Huang: Theoretical Solid State Physics.
15. Kittel: Quantum theory of solids.

PAPER –IV (A): ASTRONOMY AND ASTROPHYSICS - II

Unit– I: The Milkyway Galaxy: Structure of the Milkyway, Oort's theory of galactic rotation, Dynamics of the spiral arms, Distribution of Interstellar matter, Central regions of the Milkyway.Normal Galaxies: Classification of galaxies, Hubble sequence: Elliptical, Lenticulars and Spiral galaxies, and their properties, Distribution of light and mass in galaxies, Brightness profiles, Distribution of gas and dust in galaxies.

Unit- II: Active galaxies: Active Galactic Nuclei (AGNs), Seyfert galaxies, BL Lac Objects, Radio galaxies: General properties, Superluminal motion, Quasars: Properties and Energy requirements, Nature of quasar redshifts, Supermassive black hole model and Unified model of AGNs.

Unit- III: Cosmology: Cosmological principle, Observational support and other arguments to support cosmological principle, Fundamental observers and co-moving frame, Robertson-Walker line element (without derivation), Observational features of Robertson-Walker space time e.g. Red shift etc, Models of the universe, Friedmann models, Quanlitative predictions of FRW model, Quantitative solutions, Open and closed universes, Hubble's law, Angular size, Source counts, Models with the cosmological constant, Steady state cosmology.

Unit- IV: Relics of the big bang, The early universe, Thermodynamics of the early universe, Thermal History, Primordial neutrinos, Helium synthesis and other nuclei, Microwave background, The very early universe, The formation of structures in the Universe, Jeans Mass, Growth Rate, Recombination era, Onset of matter dominated era.

Unit- V: Observations of the cosmological significance, Measurement of Hubble`s constant, Anisotropy of local large - scale velocity fields, Age of the universe, Abundance of light nuclei, Dark matter, The redshift-magnitude relation, Number counts of extragalactic objects, The variation of angular sizes with distance.

TEXT AND REFERENCE BOOKS:

1. Astrophysics for Physicists, Arnab Rai Choudhuri, Cambridge Uni.ty Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wealey Pub. Co.

3. Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4 th edition, Saunders college publishing.
4. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge university press.
5. The Physical universe: An introduction to astronomy, F.Shu, Mill valley: University science books.
6. Textbook of astronomy and astrophysics with elements of cosmology, V.B.Bhatia, Pb -New Delhi, Narosa publishing house.
7. The new cosmos, A.Unsold and B.Baschek, Newyork, Springer Velas.
8. Quasars and active galactic neuclei, A.K. Kembhavi and J.V. Narlikar, Cambridge university press.
9. Modern Astrophysics, B.W.Carroll and D.A. Ostlie, Addison Wesley publish. co.
10. Introductory astronomy and astrophysics, M.Zeilik and S.A.Greogry, 4 th edition, Saunders college publishing.
11. Theoretical Astrophysics, vol. I: Astrophysical processes T.Padmanabhan, Cambridge university press.
12. Introduction to cosmology, J.V. Narlikar, 3 rd edition, Cambridge uni. press.
13. Structure formation in the universe, T.Padmanbhan, Cambridge University, press.
14. General relativity and cosmology, J.V. Narlikar-Delhi: Macmil.Comp.of India ltd.
15. Galactic Astronomy: Binney and Merrifield.

Paper – IV (B) Electronics II (Communication)

Unit-I Digital communications

Pulse modulation systems, Sampling Theorem, Low pass &Band pass signal, PAM- Channel BE for PAM signal, Natural Sampling, Plat-top sampling, Signal through holding, Quantization of signals, quantization error.

Unit-II Digital modulation techniques

PCM, Differential PCM, Delta modulation, Adaptive, delta modulation (CVSD). BPSK, DPSK, QPSK, PSK,QASK, BFSK, FSK,MSK

Unit-III Mathematical representation of noise

Sources of noise, Frequency domain representation of noise , Effect of filtering on the probability density of Gaussian noise, Spectral component of noise, Effect of a filter on the power spectral density of noise, Superposition of noise, Mixing involving noise, binear filtering, Noise bandwidth, Quadrature component of noise, Power spectral density of n_c (t) n_s (t) & their time derivatives.

Unit-IV Data Transmission I

Base band signal receiver, Probability of error optimum filter, White noise: Matched filter & probability of error, Coherent reception correlation, PSK, FSK, Non-Coherence detection on FSK, Differential PSK, QASK, Calculation of error probability for BPSK,BSFK,QPSK.

Unit-V Data Transmission II

Noise in pulse code & delta modulation system, PCM transmission, Calculation of quantization noise output signal power, Effect of thermal noise, output signal to noise ratio in PCM, DM, Quantization noise in DM, output signal power, DM

output signal to quantization noise ratio, effect of thermal noise in delta modulation, output signal to niose ratio in DM

Text and Reference Books:

1) "Microwaves" by K.L. Gupta Wiley Estern Ltd. Delhi.
2) Advanced Electronic communication system by Wayne Tomsi Physics education.
3) Principle of communication of system-by Toub & Schilling: second edition TMH 1994
4) Communication system: by siman Haykin, third edition John wiley & sons inc.1994.
5) Microwave devices & ckts by: Samuel, Y. Liau.
6) Electronic communication: George kennedy.

Paper – IV (C) PHYSICS OF NANO MATERIALS- II

UNIT I: Application of Nano-materials

Quantum wells, wires and dots. Organic Semiconductors, Organic Light Emitting Diodes (OLEDs), self assembly of complex organic molecules, molecular switches, thermochromic switches, Motor molecules and bio-mimetic components, charge transfer complexes, conducting polymers, light emitting polymers, polymer-polymer heterostructures, plastic FETs, photodiodes & solar cells, Nano Robotics: Nano robots and NEMS, Sensors and actuators, Artificial molecular machines, Biomotors, Other nano machines, Propulsion, Control, Communication, Programming and coordination.

UNIT II: Application of CNT

Applications of Carbon NanoTubes (CNTs) in field emission, fuel cells, CNT FETs, Light Emitting Displays (LEDs) and Flat Panel Displays (FPD), hydrogen storage, solar panels. Application of functional nanomaterials: clean energy (Hydrogen Production from Biomass, Catalytic coal hydrogasification), environmental technologies (clean water and air), health care (tissue and bone repairs, bio medical sensors)

Unit III: Next Generation Applications for Polymeric Nanofibres

Background, Biomedical Applications, Medical Prostheses, Tissue Engineering Scaffolds, Drug Delivery, Wound Dressing, Cosmetics. Filtration applications, Filter media, Protective Clothing, Material Reinforcement, Electrical Conductors, Optical applications, Sensor devices, Conclusion.

Reference: Nanotechnology: Global Strategies, Industry Trends and Applications (Editor: Jurgen Schulte)

UNIT IV: Nano-Lithography

Photolithography Principles; Phase Shifting Optical Lithography; Electron Beam Lithography (EBL); Neutral Atomic Beam Lithography; Ion-Beam Lithography (IBL); X-ray Lithography (XRL); Proximal Probe Lithography, Proximal Probes, STM based Electron-Beam Lithography, Soft Lithography. Nano lithographic applications and current research.

UNIT V: Sustainable Nanotechnology and Human Health

Application of industrial ecology to nanotechnology, Fate of nanomaterials in environment, environmental life cycle of nano materials, environmental and health

impacts of nano materials, toxicological threats, eco-toxicology, exposure to nano particles – biological damage, threat posed by nano materials to humans, environmental reconnaissance and surveillance. Corporate social responsibility for nanotechnology, Nano materials in future - implications**.**

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References: Books/ Research Monographs

1. Nanostructures & Nanomaterials: Synthesis, Properties & Applications: Guozhang Cao.
2. Introduction to Nanotechnology: Charles P. Poole Jr and Franks J. Qwens.
3. Handbook of Analytical instruments, R.S. Khandpur
4. Nano materials: Synthesis properties ,characterization and application: A.S Edelstein and R.C Cammaratra
5. Nanoelectronics and Nanosystems , Karl Goser, Peter Glosekotter, Jan Dienstuhl.,
6. Springer, 2004
7. Nanomaterial Systems Properties and Application, A.S.Eldestein and R.C.Cammarata.
8. Handbook of Nanotechnology: Bhushan (Ed), Springer Verlag, New York (2004).
9. Nanocomposite Science and Technology, Ajayan, Schadler and Braun
10. Piezoelectric Sensors: Force, Strain, Pressure, Acceleration and Acoustic Emission
11. Sensors, Materials and Amplifiers, G. Gautschi.
12. Block Copolymers in Nanoscience Massimo Lazzari
13. Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
14. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
15. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
16. Nanosystem characterization tools in the life sciences by Challa Kumar. Wiley-VCH,
17. 2006.
18. Nanolithography M.Gentili et al.(edits),Springer.
19. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin
20. Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
21. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
22. Nanotechnlogy: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.
23. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele
24. Mosca
25. The Physics of Quantum Information: Quantum Cryptography, Quantum
26. Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton
27. Zeilinger
28. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb

PAPER –IV (D): SPACE PHYSICS - II

Unit I: Glimpse of Universe

Universe - description, origin, its evolution, age and size; Stars–birth, life, death, spectral analysis, stellar composition - element synthesis in stars, Exotic stars- novae, supernovae, pulsars, black holes and gamma ray bursts; Galaxies; Starbursts and Active Galactic Nucleus; Evidence for the Big Bang; Cosmic Background Radiation; Expansion Models; Dark Matter and Energy Recent innovations about the concept of Universe: Dark Energy and an accelerating universe

Unit II: Spacecrafts & Satellites

Satellite orbits and attitude: principles of satellite motion, Kepler's laws, orbital elements, satellite attitude and its control, types of orbits, polar and geostationary, earth and sunsynchronous, orbit optimization, viewing geometry, launch vehicles and spacecrafts, rocket propulsion concepts such as solid, hybrid, liquid, nuclear and antimatter. Rocket motors and their design, flight stability and recovery systems, stability and control system.

Unit III: Remote Sensing

Sensors and systems: visible, infrared, water vapour and microwave sensors, sensor characteristics, sensor materials, passive and active sensors, scanning radiometers, spectral signatures.

Satellite data processing: satellite data acquisition, satellite communications, data collection platforms, earth station, image processing, geometric and radiometric corrections, image navigation, registration, image enhancement techniques, noise removal methods, histogram methods, density slicing, image classification.

Applications of remote sensing in earth resources management, agriculture, forestry, water resources and disaster mitigation

Unit IV: Solar Wind and Interuactions

The ionospheric layers D, E, F and their formation, effect of radiation on earth's atmosphere, photochemical processes,

Geomagnetic and magnetic coordinates, poles, measurement of geomagnetic field components, micropulsation indices, variations of geomagnetic field, quiet and disturbed variations, geomagnetic storms, equatorial and auroral phenomena.

Solar wind, model of solar winds, interaction in the interplanetary medium and with the planets. Magnetosphere: interaction of solar wind with the geomagnetic field and formation of the magnetospheric tail, storm and sub-storm phenomena, Van Allen radiation belts

Unit V: Space Weather

Space Weather Effects on Communication, Space Weather Effects on Power Grids, Space Radiation Protection, Effects on Spacecrafts hardware and Operations, Effects on Satellite Navigation, Forecast of Space Weather.

Text and Reference Books
Same as mentioned in Semester III, Paper IV (D)

SCHEME OF EXAMINATION

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SYLLABUS OF

M.Phil. (PHYSICS)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Physics

EFFECTIVE FROM JULY 2017

School of Studies in Physics & Astrophysics
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Physics on 10, February 2017
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

M.Phil. - PHYSICS

The Master of Philosophy (M Phil) in Physics is a full time course for one year after completion of M Sc in Physics. Admission to M.Phil. (Physics) programme will be done through entrance examination.

The course structure will contain three Theory Papers and Dissertation, Three Seminars and Two internal examinations/assessments as outlined below.

Name of the Paper	Marks
1. Research Methodology, Quantitative Methods and Computer Applications	100
2. Physics of Advance Materials	100
3. Astronomy & Astrophysics	100
Dissertation & Seminar	200
Total Marks	500

Distribution of marks of Dissertation and seminar

(i) Seminar (best two out of three) : 50 marks

(ii) Dissertation : 150 marks
(a)Final Seminar based on dissertation : 50
(b)Dissertation (script) evaluation : 75
(c) Viva-voce : 25

Paper – I
Research Methodology& Quantitative Methods and Computer Applications

UNIT- I
Techniques for Structural, Microscopic, and Spectroscopic Characterization

X-ray diffraction: coherent scattering of X-rays, reflected intensities, experimental methods of crystallography, particle size determination.
Microscopy: Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Scanning Transmission Electron Microscopy (STEM), Scanning Tunneling Microscopy (STM), Atomic Force Microscopy (AFM).
Spectroscopy: Fourier Transform Infrared (FTIR) and Raman spectroscopy, Nuclear Magnetic Resonance (NMR), Electron Spin Resonance (ESR).

UNIT – II
Techniques for Characterization of Solid State Ionic and Luminescent Materials

Solid State Ionic Materials: Characterization of ion transport properties; AC Impedance Spectroscopy (IS) for conductivity of (σ) measurements; DC polarization methods viz, Tubandt's method, Wagher's method, Transient Ionic Current (TIC) method for ionic mobility (μ), ionic transference number (t_{ion}),mobile ion concentration (n) and ionic drift velocity (v_d) measurements. Temperature dependent studies on σ, μ, n, v_d etc. and computation of respective energies.
Techniques for ML measurement and TL measurements. Measurement techniques to study Photoluminescence response, UV-visible spectrometry.
Thermal analysis: Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC), Thermal Gravimetric Analysis (TGA).

UNIT – III
Astrophysical Techniques for Astronomical Observations

Photometry: Instrumental magnitudes and colors, seeing and atmospheric effects, extinction correction. Standard photometric systems: UBV and other systems. Transformation to a standard photometric systems. Absolute and differential photometry.
Spectroscopy: Basics of prism and grating spectroscopes.
Basics of CCD data reduction: Plate scale, readout noise and gain, signal-to-noise ratio. correction for bias, dark and flat fielding, fringing and cosmetic effects.

UNIT – IV

(I) Programming in C

Getting Started: Elementary idea about C Language, Getting Started with C,the First C Program, Compilation and Execution, Receiving Input; C Instructions: Type Declaration Instruction, Arithmetic Instruction, Integer and Float Conversions, Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators. Control Instructions in C.

Control Structures: The Decision Control Structures If Statement, If-else Statement, Use of Logical Operators, The Conditional Operators. **The Loop Control Structure:** Loops, the while Loop, the for Loop, the Odd Loop, the break Statement, the Continue Statement, the do-while Loop. **The Case Control Structure:** Decisions Using switch, switch Versus if-else Ladder The go to Keyword.

UNIT – V

(II) Programming in C

Functions & Pointers : What is a Function, Passing Values between Functions, Scope Rule of Functions calling Convention, Advanced Features of Functions; Function Declaration and Prototypes Call by Value and Call by Reference , An Introduction to pointers, Pointer Notation, Back to Function Calls, Conclusions.

Storage classes in C: Automatic Storage Class, Register Storage Classes, Static Storage Classes, External Storage Classes, Which to Use When.

The C Preprocessor: Features of C Preprocesor, Macro Expansion, File Inclusion, Conditional Compilation, #if and #elif Directives, Miscellaneous Directives.

Arrays: What are Arrays; A Simple Program using Array. More on Arrays; Array Initialization, Bounds Checking, Passing Array Elements to a Function. Pointers and Arrays; Passing an Entire Array to a Function.

Recommended Text and Reference books:

1. Characterization of Materials: Wachtman J B (Butterworth-Heinemann)
2. Introduction to Nanotechnology by Charles P. Poole Jr. and Frank J. Owens (Willey Inter. Science Pub. 2003)
3. Condensed Matter Physics by Michal P. Marder (Willy Inter. Science Pub., 2000)
4. Superionic Solids- Principle and applications by S. Chandra (NH Pub., 1980)
5. Luminescence of Solids : R Vij (Plenum Press)
6. Digital Image processing: Gonzalez R. C. and Woods R. E. (Addision-Wesley)
7. Astronomical Photometry: Henden A. A. and Kaitchuck R H (Willmann-Bell)
8. Astrophysical techniques: Kitchin C R , third edition (IOP publishing)
9. Optical Astronomical Spectroscopy: Kitchin C R (IOP Publishing).
10. Let us C by Yaswant Kanitkar
11. C Programming by Dennis Riche and Brian Karnighan
12. C Programming by Schauam Series

Paper II
Physics of Advance Materials

Unit I
Nano Particles and Nano Structured Materials

Properties of Individual Nano-Particle: metal nano clusters, theoretical modeling of nanoparticles, geometric and electronic structure, magnetic clusters, Semiconductor nanoparticles, optical properties, rare gas and molecular clusters, methods of synthesis of nano particles, Carbon nanostructure, C_{60} carbon cluster, carbon nanotube and applications. Bulk nano structured materials: Solid disordered nanostructures, methods of synthesis, properties, metal nano-cluster composite glasses, porous silicon; Nano structured crystals.

Unit II
Quantum Nanostructures and Nano- Machines/ Devices

Quantum wells, wires and dots, preparation, size & dimensionality effects, excitons, single electron tunneling, applications of quantum nanostructures, Super conductivity, Self assembly, process of self assembly, semiconductor islands, monolayers, Catalysis, surface area of nanoparticles, porous, and colloidal materials, Nanomachines and nano devices; microelectromechanicalsystems (MEMSs), nanoelectromechanicalsystems (NEMSs).

UNIT III
Solid State Ionic Materials

Bonding types in solids, formation of ionic bond, simple theory of ionic structures; Super ionic materials and structures, alkali ion conductors, β- aluminas, silver ion conductors, copper ion conductors, structural principles for fast Ag^+ & Cu^+ ion conductors, oxygen and halide ion conductors, proton conductors, electronic conductors with ion transport, broad classification of super ionic conductors: polycrystalline/ crystalline, glass/ amorphous, composite, polymeric electrolytes, Mechanism of ion conduction in solid state ionic materials theoretical models. Applications of super ionic solids: sensors and partial pressure gauges, fuel cells, solid state batteries, coulometer-timers, electrochemical capacitors, electro chromic display devices etc.

UNIT IV
Luminescence of solids

Introduction, characteristics of luminescence,Luminescence power, Luminescence spectrum, excitation spectrum, Luminescence Rise and Decay.
Thermo luminescence - models: Jablonski model, Configuration-coordination model, energy band model, thermoluminescence mechanisms, Method of analysis; methods using different rates, half width method, initial rise method, Applications of thermoluminescence in radiation dosimetry and dating.

Mechanoluminescence: Mechanoluminescent materials, Characteristics, mechanisms, theories of Mechanoluminescence, applications.
Lyoluminescence, LL reader, Inorganic lyoluminescence phosphors, mechanisms, enhancements and spectra.

UNIT V
Electro-Optic Materials

Electronic transitions-absorption and excitations, trapping and capture, recombination, radiative and non radiative recombination's, emission spectra, luminescence efficiency, light emitting diodes, LED configuration & performances, Solar radiation & ideal conversion efficiency, p-n junction solar cells, spectral response, I-V characteristics, heterojunction and thin film solar cells.
General mechanisms of photoconductivity processes, life time, photo-sensitivity, capture cross sections; recombination kinetics in absence of trapping; demarcation between trapping levels & recombination levels, effects of trapping.

Recommended Text & Reference Books:

[1] **Introduction to Nanotechnology** by Charles P. Poole Jr. and Frank J. Owens (Willey Inter. Science Pub. 2003).
[2] **Condensed Matter Physics** by Michal P. Marder (Willy Inter. Science Pub., 2000)
[3] **Nanostructures and Nanomaterials- Synthesis properties and Applications** by Guozhong Cao (Empirical College Press World Scientific Pub., 2004).
[4] **Superionic Solids- Principle and applications** by S. Chandra (NH Pub., 1980).
[5] **Superionic Solids and Solid Electrolytes- Recent Trends** by A.L. Laskar & S. Chandra (Eds.) (Academic Press, 1989).
[6] **Physics of Semiconductor devices** by S.M.Sze (Willey Int., 1981).
[7] **Photoconductivity of Solids** by R.H.Bube (Willey Int., 1967).
[8] **Luminescence of Solids:** R Vij (Plenum Press)

PAPER – III ASTRONOMY & ASTROPHYSICS

UNIT – I
Stellar Physics

Time and Coordinate system: Celestial Sphere, Solar Time, Sidereal Time, Julian Date, Right Ascension and Declination, Azimuth and Elevation, Magnitude, Luminosity and Stellar Distances.

A review of formation, structure and evolution of stars, final stages of stellar evolution of stars: white dwarfs, neutron stars and black holes.

Binary stars: close binary systems and their evolution; algols, cataclysmic variables, and x-ray binaries, Supernovae: Types, Characteristics and Energetics, Pulsars: Models and Energetic, Binary pulsars.

UNIT – II
Radiative processes

Synchrotron Radiation: Total emitted power, Spectrum of synchrotron radiation, Spectral index for Power law electron distribution, Spectrum and Polarization of synchrotron radiation, Transition from cyclotron to synchrotron emission, Distinction between received and emitted power, Synchrotron self absorption.

Compton scattering: Thomson scattering, Cross section and Energy transfer, Inverse Compton scattering, power and spectrum from single Compton scattering, multiple Compton scattering**.**

UNIT -III
Inter-Stellar Matter(ISM)

Inter-Stellar Matter (ISM) : an overview of evidence of matter between stars, distribution of dust and gas in the Galaxy, methods of detection of dust and gas.

Interstellar dust: dust extinction and reddening, properties of the dust grains, diffuse interstellar absorption bands. Neutral interstellar gas : atomic interstellar absorption lines, 21cm line of HI, HI clouds, interstellar molecular lines and Molecular clouds. Ionized gas : HII regions, Planetary nebulae, supernova remnants and hot interstellar gas.

UNIT – IV
Surface Photometry of Galaxies

A review of morphological classification of galaxies, surface photometry of galaxies: Isophotes and ellipse fitting procedure, surface brightness profiles and geometrical profiles, color profiles. Photometry of elliptical galaxies: de Vaucouleurs law and other fitting functions and characteristics parameters. Isophote shapes: deviation from elliptical shapes, boxy and disky isophotes, faint features (dust, stellar disk shells etc) in elliptical galaxies. Correlations among global parameters and scaling laws: Faber-Jackson relation, the Fundamental plane and its interpretation.

UNIT – V
Active Galactic Nuclei (AGN)

Taxonomy of AGNs: Seyfert galaxies, Quasars, Radio galaxies, LINERS, BL Lac Objects and OVVs, Narrow line X-ray galaxies.
Black hole paradigm: mass of central object, fueling quasars, accretion disk structure.
Continuum emission: UV-optical continuum, infrared continuum, radio continuum and compact radio sources, superluminal motion.
The broad-line region (BLR): broad-line spectra, basic parameters, photoionizaion of the BLR, line profiles.
The narrow-line region: narrow-line spectra, physical conditions in low density gases, basic parameters, line profiles. Unified models of AGNs.

Recommended Text & Reference Books:

- Astrophysics for Physicists, Arnab Rai Choudhuri, Cambridge University Press, 2010.
- Introductory Astronomy and Astrophysics, M.Zeilik and S.A. Gregory, 4 th edition, Saunders college publishing.
- Theoretical Astrophysics, vols – I, II & III, T. Padmanabhan, Cambridge university press.
- The Physical Universe: An introduction to astronomy, F.Shu, Mill valley: University science books.
- The new cosmos, A.Unsold and B.Baschek, Newyork, Springer Velas.
- Quasars and Active Galactic Nuclei, A.K. Kembhavi and J.V. Narlikar, Cambridge university press.
- Galactic Astronomy: Binney and Merrifield (Princeton Univ Press).
- An introduction of AGN: B M Peterson (CUP).
- The Physics of the ISM: J E Dyson and D A Williams (IOP Publishing)**.**
- Radiative processes in Astrophysics: G B Rybicki and A P Lightman (JOHN WILEY).

SCHEME OF EXAMINATION

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SYLLABUS OF

Course Work for Ph.D. (PHYSICS)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Physics

EFFECTIVE FROM JULY 2017

School of Studies in Physics & Astrophysics
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Physics on 10, February 2017
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

SCHEME OF EXAMINATION & SYLLABUS PRESCRIBED FOR THE EXAMINATION OF Ph.D. Course Work (Physics)

EFFECTIVE FROM JULY 2017

Scheme of Examination

The Course Work for Ph.D degree in Physics is a six month course after completion of P.G. degree in the subject. There shall be two compulsory papers based on the research areas of Physics. The structure of the course is given below:

S.No.	Theory Paper	Marks
1.	Research Methodology, Quantitative Methods & Computer Applications	100
2.	Review of Literature in Concerned Subject, Seminar/ Project Report	100
Total		**200**

Paper – I

Research Methodology& Quantitative Methods and Computer Applications

UNIT- I

Techniques for Structural, Microscopic, and Spectroscopic Characterization

X-ray diffraction: coherent scattering of X-rays, reflected intensities, experimental methods of crystallography, particle size determination.

Microscopy: Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Scanning Transmission Electron Microscopy (STEM), Scanning Tunneling Microscopy (STM), Atomic Force Microscopy (AFM).

Spectroscopy: Fourier Transform Infrared (FTIR) and Raman spectroscopy, Nuclear Magnetic Resonance (NMR), Electron Spin Resonance (ESR).

UNIT – II

Techniques for Characterization of Solid State Ionic and Luminescent Materials

Solid State Ionic Materials: Characterization of ion transport properties; AC Impedance Spectroscopy (IS) for conductivity of (σ) measurements; DC polarization methods viz, Tubandt's method, Wagher's method, Transient Ionic Current (TIC) method for ionic mobility (μ), ionic transference number (t_{ion}),mobile ion concentration (n) and ionic drift velocity (v_d) measurements. Temperature dependent studies on σ, μ, n, v_d etc. and computation of respective energies.

Techniques for ML measurement and TL measurements. Measurement techniques to study Photoluminescence response, UV-visible spectrometry.

Thermal analysis: Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC), Thermal Gravimetric Analysis (TGA).

UNIT – III

Astrophysical Techniques for Astronomical Observations

Photometry: Instrumental magnitudes and colors, seeing and atmospheric effects, extinction correction. Standard photometric systems: UBV and other systems. Transformation to a standard photometric systems. Absolute and differential photometry.

Spectroscopy: Basics of prism and grating spectroscopes.

Basics of CCD data reduction: Plate scale, readout noise and gain, signal-to-noise ratio. correction for bias, dark and flat fielding, fringing and cosmetic effects.

UNIT – IV

(I) Programming in C

Getting Started: Elementary idea about C Language, Getting Started with C,the First C Program, Compilation and Execution, Receiving Input; C Instructions: Type Declaration Instruction, Assignment Instruction, Integer and Float Conversions, Type Conversion in Assignments, Hierarchy of Operations, Associativity of Operators. Control Instructions in C.

Control Structures: The Decision Control Structures, If Statement, If-else Statement, Use of Logical Operators, The Conditional Operators. **The Loop Control Structure:** Loops, the while Loop, the for Loop, the Odd Loop, the break Statement, the Continue Statement, the do-while Loop.**The Case Control Structure:** Decisions Using switch, switch Versus if-else Ladder The goto Keyword.

UNIT – V

(II) Programming in C

Functions & Pointers : What is a Function, Passing Values between Functions, Scope Rule of Functions calling Convention, Advanced Features of Functions; Function Declaration and Prototypes Call by Value and Call by Reference , An Introduction to pointers, Pointer Notation, Back to Function Calls, Conclusions.

Storage Classes in C: Automatic Storage Class, Register Storage Classes, Static Storage Classes, External Storage Classes, Which to Use When.

The C Preprocessor: Features of C Preprocesor, Macro Expansion, File Inclusion, Conditional Compilation, #if and #elif Directives, Miscellaneous Directives.

Arrays: What are Arrays; A Simple Program using Array. More on Arrays; Array Initialization, Bounds Checking, Passing Array Elements to a Function. Pointers and Arrays; Passing an Entire Array to a Function.

Recommended Text and Reference books:

1. Characterization of Materials: Wachtman J B (Butterworth-Heinemann)
2. Introduction to Nanotechnology by Charles P. Poole Jr. and Frank J. Owens (Willey Inter. Science Pub. 2003)
3. Condensed Matter Physics by Michal P. Marder (Willy Inter. Science Pub., 2000)
4. Superionic Solids- Principle and applications by S. Chandra (NH Pub., 1980)
5. Luminescence of Solids : R Vij (Plenum Press)
6. Digital Image processing: Gonzalez R. C. and Woods R. E. (Addision-Wesley)
7. Astronomical Photometry: Henden A. A. and Kaitchuck R H (Willmann-Bell)
8. Astrophysical techniques: Kitchin C R , third edition (IOP publishing)
9. Optical Astronomical Spectroscopy: Kitchin C R (IOP Publishing).
10. Let us C by Yaswant Kanitkar
11. C Programming by Dennis Riche and Brian Karnighan
12. C Programming by Schauam Series

Paper – II
Review of Literature in Concerned Subject, Seminar/ Project Report

Approved by Board of Studies in Physics on 20th September 2013

M.A. PSYCHOLOGY

[SEMESTER EXAM]

SYLLABUS

2017-18

M. A. – I SEMESTER (PSYCHOLOGY)

The curriculum frame – work is as under.

COMPULSORY PAPERS

PAPER	NAME	MARKS		Credits		
		Theory	Internal Assessment	Theory	Practical	Total
I	Basic Psychological processes – I	80	20	4		4
II	Social Psychology	80	20	4		4
III	Basic Research Methodology	80	20	4		4
IV	Psychopathology	80	20	4		4
V	Practicum : Experiments.	100			4	4
	Total Marks	**420**	**80**	**16**	**4**	**20**

NOTE: Internal Assessment will be done on the basis of Class Testing/Seminar/Tutorials.

PAPER – I

BASIC PSYCHOLOGICAL PROCESSES – I

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

Unit – I. Psychophysics and Perception

- Signal detection theory, subliminal perception and related factors, information processing approach to perception, culture and perception, perceptual styles. Ecological perspective on perception.

Unit 2. Perceptual Processes

- Approaches to the Study of Perception : Gestalt and physiological approaches.
- Perceptual Organization : Gestalt, Figure and Ground, Laws of Organization.
- Perceptual Constancy : Size, Shape and Brightness, Illusion; Perception of Depth and Movements.
- Role of motivation and learning in perception.

Unit 3. Attention: Concept, Theories, and determinants

Unit 4 . Motivation

- Basic Motivational Concepts : Instincts, needs, drives, incentives, motivational cycle.
- Approaches to the Study of Motivation : Psychoanalytical, ethological, S – R Cognitive, humanistic.
- Biological Motives : Hunger, thirst, sleep and sex.
- Social Motives : Achievement, affiliation, approval
- Exploratory behaviour and curiosity

Unit 5 . Motivation and Emotion

- Physiological correlates of emotions.
- Theories of emotions : James – Lange, Canon – Bard, Schachter and Singer.
- Conflicts : Sources and types.

BOOK RECOMMENDED :

1. Snodgrass, J. Gray. Et. Al (1985) Human experimental psychology, New York : Oxford University Press.
2. Galott, K. M. (1999) Cognitive psychology in and outside laboratory, Mumbai : Thompson Asia.
3. D. Amato M.R. (1970) Experimental Psychology, New York, Mc. Graw Hill.
4. Sen Anima : Attention & Destraction New Delhi.
5. S. Stenvens, (1959) Handbook of Experimental Psychology, A Wiley Publication in Psychology.

PAPER – II

SOCIAL PSYCHOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Current trends in Social Psychology. Historical Background: Growth of social psychology, Methods of social psychology. Theoretical perspective: Cognitive dissonance, Social comparison, Attribution, Field Psychoanalytic, Symbolic interactions, Socio-biology.

UNIT – II Social cognition. Person perception, impression management. Role of Stereotypes in person Perception types of influence process.

UNIT – III Social Influence Processes: Leadership

UNIT – IV Attitude : Nature and Characteristics, Development and change. Theories of attitude change.

UNIT – V Prosocial behaviour, aggression and violence. Nature, Characteristics, Determinants, Theories.

BOOK RECOMMENDED :

1. Billing, M. (1976) Social Psychology and inter group relations, NY: Academic Press Lindsey, G. & Aronson, E (Eds) (1985) The Handbook of social psychology. NY : Random House.
2. Mishra, G. (1990) Applied social psychology in India ND: Sage
3. Eiser, J.R. (1986) Social Psychology, London : Cambridge University Press.
4. Dalal, A.K. (1989) Attribution theory and research ND wiley limited .
5. Feldman R.S. (1985) Social Psychology, New York, Mc Graw hill.
6. Baran A.B. & Byre, D (1991) Social Psychology, - Boston allyn & Bacon.
7. Pandey, J. (1988) Psychology in India; the state – 7 the art Vol – 2 ND. Sage.

PAPER – III

BASIC RESEARCH METHODOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Research Methodology

- Types of psychological research.
- Methods of Psychological Research : Experimental, Quasi – experimental, case studies, field studies and cross – cultural studies.
- Variables: Nature and types. Techniques of experimental manipulation, control in experiment.

UNIT – II Sources of bias. Ethical issues in psychological research, Research Process: Consideration of research problem and hypothesis, Operationalization. Sampling: probability and nonprobability sampling.

UNIT – III Research designs : Cross Sectional and Longitudinal Correlational, factorial, randomized block, matched group, quasi – experimental, Graceo Latin Square time series design.

UNIT – IV Central tendencies, Dispersion, Normal Probability Curve, its properties and utility in inferential statistics, Null hypothesis, Type I and Type II errors, Levels of significance.

UNIT – V Method of Collecting data – I: Observation, Questionnaire, and Interview. Test & Scales

BOOK RECOMMENDED :

1. Kerlinger D & Katz L. : Foundation of behavioural research (2nd ed) Surjeet Publication, Kamlanagr, Delhi, 1983
2. Kothari C.R.: Research methodology : methods and techniques. Wiley eastern Ltd. New Delhi 1986
3. Broota, K.D. : Experimental design in behavioural research Wiley eastern Ltd. New Delhi 1992
4. Black T.R. : Quantative research designs for social sciences thousand oaks: sage 1988
5. Winer, B.J. : Stastical principles in experimental design, New York, Mc graw hill, 1971
6. Edwards, A.K.: Experimental designs in psychological research. New York Holt 1976
7. Mason, J. : Qualitative Researching, thousand oaks: sage 1997.

PAPER – IV

PSYCHOPATHOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Concept of Psychopathology, Classification systems in psychopathology: W.H.O. (ICD-10) and multiaxial systems (DSM-IVTR): Evaluation of classification system.

UNIT – II Theoretical background, approaches to psychopathology (1) Psychodynamic; (2) Behavioural; (3) Cognitive; (4) Phenomenological; (5) Biological and (6) Socio cultural; Diagnosis – purposes of diagnosis, reducing undesirable variability: diagnostic system.

UNIT – III Anxiety disorder : Panic, Phobic, OCD, Post – Traumatic, GAD, somatoform disorders, Impulse control disorder, eating disorder, Sleep disorder, dissociative: Types, symptoms and management.

UNIT – IV Psychotic disorders: Schizophrenia, Mood disorder.
Personality disorder (cluster categories and problems), types & symptoms: Types, Symptoms and management.

UNIT – V Substance related disorders. Mental Retardation and developmental disorders.

BOOK RECOMMENDED :

1. Aboud, T.D.: Health psychology in global perspective. Thousand oaks, C.A: Sage (1988).

2. Page, J.D.: PSYCHOPATHOLOGY : The Science of understanding Deviance. (2nd ed.) (1975)
3. Carson, C.R., Butcher J. N. : Abnormal psychology and modern life (9th ed) Harper Collins publisher. (1992).
4. Adams, H.E. & Sutkar. P.B. : comprehensive handbook of psychopathology New York, Plenum Press.
5. Prokap, C.R. & Bradly, L.A.: Medical psychology: Contribution to Behavioural medicine, Academic press, (1991)
6. Davison G.C. and Neal J.N. Abnormal Psychology – 8th Ed. Wiely Publishers, 2000.

PAPER – V

PRACTICUM

M.M. - 100

This paper consists of the laboratory (experimental) and field – work done throughout the semester and will be evaluated at the time of examination along with the other papers. Distribution of marks would be as under:

		Marks
A.	Record of lab practical and field work	25
B.	Evaluation of one lab. Experiment of be conducted in the examination	50
C.	Viva-Voce on practicum	25

Note : No candidate would be allowed to appear in the practical examination unless his/ her day-to-day practical work and report are found satisfactory.

List of Practicum : **(Any five experiments and one field study)**

Experiments :-

1. Constancy- size/shape/brightness
2. Digital tapping test.
3. Wechsler Adult performance intelligence scale of Indian Adaptation.
4. Bender-Gestalt test
5. Mental fatigue
6. Self concept scale
7. Verbal conditioning test

Field Work :

1. Work motivation	2. D.A.T.
3. Mental health	4. Frustration tolerance
5. Occupational stress	6. Depression

Note : Field studies topics would be allotted by the departmental committee.

M. A. – II SEMESTER (PSYCHOLOGY)

The curriculum frame – work is as under.

COMPULSORY PAPERS

PAPER	NAME	MARKS		Credits		
		Theory	Internal Assessment	Theory	Practical	Total
VI	Basic Psychological processes – II	80	20	4		4
VII	Group Processes and Cultural Psychology	80	20	4		4
VIII	Advance Research Methodology	80	20	4		4
IX	Physiological Psychology and Health Behaviors	80	20	4		4
X	Practicum : Testing	100			4	4
	Total Marks	**420**	**80**	**16**	**4**	**20**

NOTE : Internal Assessment will be done on the basis of Unit Test/ Seminar/Tutorials.

PAPER – VI

BASIC PSYCHOLOGICAL PROCESSES - II

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

Unit I. **Learning Process:**Classical conditioning : Procedure, Phenomena and related issues. Instrumental learning : Phenomena, Paradigms and theoretical issues. Process, Escape Conditioning, Avoidance Conditioning, Generalization. Reinforcement: Basic variables and schedules.

UNIT II Experimental analysis of behaviour : Behaviour modification, shaping Discrimination learning. , Neurophysiology of learning.

Unit III. Verbal learning : Methods and materials, organizational processes

UNIT IV Learning theories : Hull, Tolman, Skinner.

- Cognitive approaches in learning: Latent learning, observational learning.

Unit V. Memory and forgetting

- Memory Processes : Encoding, Storage, Retrieval.
- Stages of Memory : Sensory memory, Short-term Memory (STM) and Long – term Memory (LTM).
- Episodic and Semantic memory.
- Theories of Forgetting : Interference, decay, retrieval.

BOOK RECOMMENDED :

1. Snodgrass, J. Gray. Et. Al (1985) Human experimental psychology, New York : Oxford University Press.
2. Galott, K. M. (1999) Cognitive psychology in and outside laboratory, Mumbai : Thompson Asia.
3. D. Amato M.R. (1970) Experimental Psychology, New York, Mc. Graw Hill.
4. Sen Anima : Attention & Destraction New Delhi.

PAPER – VII

GROUP PROCESSES AND CULTURAL PSYCHOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Group Dynamics and Group behaviour, Group effectiveness, and Group Cohesiveness : meanings, formation, decision making, problem solving and group level behaviours.

UNIT – II Leadership : Meaning and nature, function, styles and effectiveness.

UNIT – III Social issues : Poverty, Caste, gender, population issues in India, Communal tension and harmony.

UNIT – IV Culture and Behaviour I : Culture and Cognition and emotion. Culture and Organisation.

UNIT – V Culture and Behaviour II : Culture and Health. Culture and Personality.

- social psychology : Health, Environment and Law.

BOOK RECOMMENDED :

1. Billing, M. (1976) Social Psychology and inter group relations, NY: Academic Press Lindsey, G.
2. Aronson, E (Eds) (1985) The Handbook of social psychology. NY : Random House.
3. Mishra, G. (1990) Applied social psychology in India ND: Sage
4. Eiser, J.R. (1986) Social Psychology, London : Cambridge University Press.
5. Dalal, A.K. (1989) Attribution theory and research ND wiley limited .
6. Feldman R.S. (1985) Social Psychology, New York, Mc Graw hill.
7. Baran A.B. & Byre, D (1991) Social Psychology, - Boston allyn & Bacon.
8. Pandey, J. (1988) Psychology in India; the state – 7 the art Vol – 2 ND. Sage.

PAPER – VIII

ADVANCE RESEARCH METHODOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Experimental Design : Single Factor, Ranomized block, 2X2 factorial design, Repeated measures (on one factor),

UNIT – II ANOVA : one – way and two – way : Randomized and Repeated Measure Design. ANCOVA, Post ANOVA tests.

UNIT – III Measures of relationships : bi-serial, point bi-serial, tetracoric and phi, Multiple and partial Correlations.

UNIT – IV Regression : simple and multiple, Factor analysis : Assumptions, Methods Rotation and interpretation

UNIT – V Use of computer in psychological researches,
Research report writing (APA style).

BOOK RECOMMENDED :

1. Kerlinger D & Katz L. : Foundation of behavioural research (2^{nd} ed) Surjeet Publication, Kamlanagr, Delhi, 1983
2. Kothari C.R.: Research methodology : methods and techniques. Wiley eastern Ltd. New Delhi 1986
3. Broota, K.D. : Experimental design in behavioural research Wiley eastern Ltd. New Delhi 1992
4. Black T.R. : Quantative research designs for social sciences thousand oaks: sage 1988
5. Winer, B.J. : Stastical principles in experimental design, New York, Mc graw hill, 1971
6. Edwards, A.K.: Experimental designs in psychological research. New York Holt 1976
7. Mason, J. : Qualitative Researching, thousand oaks: sage 1997.

PAPER – IX

PHYSIOLOGICAL PSYCHOLOGY AND HEALTH BEHAVIOURS

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Methods and Basic concepts

- Methods of Physiological psychology : Lesion and Brain Stimulation.
- Receptors, effectors and adjuster mechanisms.
- Neural impulse: Origin, conduction and measurement.

UNIT – II

- Sensory system: Vision and Audition.
- Human nervous system: Structure and functions.

UNIT – III Sleep and waking: Stages of sleep, Disorders of sleep and Physiological mechanisms of sleep and waking.

- Drinking and its neural mechanism; hunger and its neural mechanism.
- Endocrine System: Chemical and glandular.

UNIT - IV Approach to therapy (Psychoanalytic, Biological Behavioural, Behavioural medicine and spiritual therapy).

UNIT - V Mental health promotion and maintenance, present issues and trends in health psychology.

BOOK RECOMMENDED :

1. Aboud, T.D.: Health psychology in global perspective. Thousand oaks, C.A: Sage (1988).
2. Page, J.D.: PSYCHOPATHOLOGY : The Science of understanding Deviance. (2^{nd} ed.) (1975)
3. Carson, C.R., Butcher J. N. : Abnormal psychology and modern life (9^{th} ed) Harper Collins publisher. (1992).
4. Adams, H.E. & Sutkar. P.B. : comprehensive handbook of psychopathology New York, Plenum Press.
5. Prokap, C.R. & Bradly, L.A.: Medical psychology: Contribution to Behavioural medicine, Academic press, (1991)
6. Davison G.C. and Neal J.N. Abnormal Psychology – 8^{th} Ed. Wiely Publishers, 2000.

PAPER – X

PRACTICUM

M.M. 100

This paper consists of the laboratory (experimental and testing) and field – work done throughout the semester and will be evaluated at the time of examination along with the other papers. Distribution of marks would be as under:

		Marks
C.	Record of lab practical and field work	25
D.	Evaluation of one lab. Testing of be Conducted in examination	50
E.	Viva-Voce on practicum	25

Note : No candidate would be allowed to appear in the practical examination unless his/ her day-to-day practical work and report are found satisfactory.

List of Practicum : **(Any five tests and one field study)**

Tests :-

1. 16 P.F.
2. Problem solving ability
3. Aptitude
4. Mixed type group Intelligence test
5. Levenensons Scales for Locus of Control
6. Digit memory scope
7. Aggression.
8. Semantic ink block test.

Field Work :

1. Achievement motivation
2. Intelligence
3. Personality
4. Parent child relationship
5. inferiority & insecurity

Note : Field studies topics would be allotted by the departmental committee.

M. A. – III SEMESTER (PSYCHOLOGY)

The curriculum frame – work is as under.

COMPULSORY PAPERS (Three)

No.of Paper	Name of Paper	MARKS		Credits		
		Theory	Internal Assessment	Theory	Practical	Total
(XI)	Personality and Indigenous Psychology	80	20	4		4
(XII)	Psychological Assessment - I	80	20	4		4
(XII)	Cognitive Psychology	80	20	4		4
	Group A : Psychology of Management					
(XIII)	Organizational Behaviour	80	20	4		4
	Group B : Educational Psychology					
(XIII)	Educational and Instructional Psychology	80	20	4		4
	Group C : Clinical Psychology					
(XIII)	Clinical Diagnosis	80	20	4		4
(XV)	Practicum	100			4	4

NOTE: Internal Assessment will be done on the basis of Classroom Tests / Seminars /Assignments.
The syllabus will be implemented from July 2017.

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PAPER – XI (COMPULSORY)

PERSONALITY AND INDIGENOUS PSYCHOLOGY – I

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Personality

Personality Meaning, Perspectives & Measurement of Personality. Determinants of personality : Biological and socio – cultural.

UNIT – II Approaches to the study of personality : Psychoanalytic, Neo – Freudian, social learning, trait and type, cognitive.

UNIT – III Psychodynamic perspectives: Freud, Erikson, Adler: theory of personality – the structure, dynamics and development of Personality .

UNIT – IV Trait approach: Allport, Cattel and Eysenck-theory of personality: The structure dynamics and development of Personality.

UNIT – V Cognitive, Behavioural and Humanistic approaches: Kelly, Bandura and Rogers' theory of Personality: Structure, dynamics and development of Personality . Indigenous concepts and Models of Personality – Yogic Model

BOOK RECOMMENDED :

1. Liebert, R.M. & Spiegler, M.P. (1993): Person aligy: Strategies & issues, P.C. California Books Cole Pub. Co.
2. Hall C.S. and Lindsey, G. (1996) theories of Personality N.Y.J. Wiley & Sons.
3. Pervin L.A. (1975): Psychology of personality readings in theory, Chigos. Rand Meznally College Lab.
4. Sinha J.N. (1969) : Indian Psychology, Calcutta.
5. Mukkopadhyay, Swami Niranjanand Saraswati Yoga Darshan Munger : Bihar School of Yoga.

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(COMPULSORY)

PSYCHOLOGICAL ASSESSMENT – I

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Psychological scaling : Purpose and methods.

- Nature of Psychological Assessment, Differences between Physical & psychological assessment. Problems in Psychological Assessment., Sources of bias in psychological testing.
- Ethical issues in psychological testing.

UNIT – II Measurement and Testing

Scaling: Unidimensional and Multidiensional. Scale construction techniques. Difference among tests, scales, questionnaire and schedule. Characteristics of a good psychometric test. Difference between psychometric and projective technique.

UNIT – III Construction of Psychometric tools: Steps in test Construction, item writing, pre try out, item difficulty level discrimination power,

UNIT – IV Standardization process of psychometric tools/tests: Reliability : Concept, type, methods of determining reliability, Validity: Concept, type, methods to determine validity, factor affecting reliability and validity. Norms : Types, Uses and Method to determine various types of norms

UNIT – V (a) Adaptation of tests.
(b) Test taking Response Styles: Social desirability, Acquiescence and Faking.
(c) Psychological testing in Applied Field of Life: Diagnosis, Psychotherapy, Education, Occupations and Organizations.

BOOK RECOMMENDED :

1. Anastasi, A. (1988) Psychological Testing London: Mc Millan Publishing Co. Crowback. L.J. Essentials of Psychological Testing.
2. Rreeman F. Theory and Practice of Psychological Testing.

3. Gheselli Theory of Psychological Measurement New Delhi Tata HeGraw Hill Publication.
4. Guilford, J.P. Psychometric Methods. New Delhi Tata Mc Graw Hill.
5. Nunally, J.C. Introduction to Psychological Measurement, Tokyo Mc Graw Hill.
6. Nunally, J.C. Psychometuric Theory, New Delhi: Tata Mc.Graw Hill Publishing Co.

Semester III

PAPER – XIII (COMPULSORY)

COGNITIVE PSYCHOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

Unit I

Cognitive Psychology, Methods and paradigms.
The Brain : Structure and Function.

Unit II – Perception and Attention

Perception: Bottom up processes, Top down processes, Direct perception, disruption in perception, visual, Agnosis. Attention Neuro scientific studies of attention, Automaticity and effects of practice, Divided attention.

Unit III –

Thinking and Problem solving : Classic problems and general method of solution, Blocks of problem solving, The problem space hypothesis, Expert system, Finding creative solutions, critical-thinking.

Unit IV - Memory: Models of memory :

Atkinson & shiffrin, Craik and LockHart, Tulving Trace model and Net work in Memory, Long Term Memory, Retrieval cues, Hart bulb Memory, constructive process in Memory, Eye witness Testimony, Autobiographical Memory.

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Unit V –

Biological Basis of Memory:-

Neurological Studies of Memory process. The search of the enagram, PET Scan, and biochemical. factors in Memory Improving Strategies.

BOOK RECOMMENDED :

1. Snodgrass, J. Gray. Et. Al (1985) Human experimental psychology, New York : Oxford University Press.
2. Galott, K. M. (1999) Cognitive psychology in and outside laboratory, Mumbai : Thompson Asia.
3. D. Amato M.R. (1970) Experimental Psychology, New York, Mc. Graw Hill.
4. Sen Anima : Attention & Destraction New Delhi.
5. S. Stenvens, (1959) Handbook of Experimental Psychology, A Wiley Publication in Psychology.

GROUP - A

PAPER – XIV (OPTIONAL: Psychology of Management)

ORGANIZATIONAL BEHAVIOUR

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Introduction : Organizational Behavior – Scope and Concepts.

UNIT – II Groups and Organizational Dynamics: : Types of Groups, Processes, Group Culture and Social Influence, Team Building. Organizational Power & Politics., Organizational Conflict, Conflict Management, Union Management interface.

UNIT – III Organizational Change and Development : Types of Change, Sources of Change, Process, Human element in change. Concepts, objectives and goals of OD, process Behavioural Science approach to organizational development.

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UNIT – IV Leadership and Supervision: Concept, Factors influencing leadership role, Essentials of Leadership, Leadership Styles, Supervision and patterns of supervision.

UNIT – V Decision Making and Communication: Concepts, Decision Making process, types of decisions, factors influencing decision making, Management decision techniques. Communication : Nature, Types, Application of different types of Communication, Role of TA in Communication.

BOOK RECOMMENDED :

1. Udai Pareek: Organizational learning R. Gibson (1997) Rethink the future London Nicholas Brealey Publishing.
2. Luthans Fred: Organizational Behaviour (1995) Mc Graw Hill international Edition.
3. Stephens P. Robbins: Organizational behaviour (9th edition) (2000) Prentie Hall India, New Delhi 110001.
4. Jerald Greenbery, Robert, A aburon: Behaviour in organization (1999) PrentieHall of India. New Delhi 110001.

GROUP - B

PAPER – XIV (OPTIONAL: Psychology of Education)

EDUCATIONAL INSTRUCTIONAL PSYCHOLOGY

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Conceptual and theoretical perspectives in Educational Psychology. Behaviouristic, Social learning, Piaget's, cognitive Developments and their application in teaching. Learning and motivation, study habit, importance, Levels of Learning

UNIT – II Information processing Models, Instructional Models, Programmed learning concept, Characteristics and models.

UNIT – III Human diversity and education. Learning styles: Nature, approaches to learning style, measurement of learning styles, attempt to modify learning styles.

UNIT – IV Effective Teaching and Classroom Management Planning and setting objectives for Teaching, Characteristics of effective teachers. Teaching methods instruction lecturing and explaining, questioning, student centred Teaching ,Teaching in small groups: The discussion method and cooperative learning.

UNIT – V Exceptionality' and social education: Categories of exceptionality, labeling and educational relevance Physically disabled students, students with cognitive disabilities, brain dysfunction and communication disorders.

Students with emotional and behavior disorder. Attention deficit disorder (ADD), Attentional Deficit Hyperactive Disorder (ADHD), Gifted and talented students. Intervention and special education for various forms of exceptionality, mainstreaming.

BOOK RECOMMENDED :

1. De Secco, J.P. & Croford, W.R. : The Psychology of Learning and Instruction, New Delhi. Prentice Hall.
2. Ellis, R.S.: Educational Psychology, A Problem approaches affiliated, New Delhi, ease West Press.
3. Bruce & Marshvell : Models of Teaching (2nd Ed.) 1980.
4. Travers, J.F. : Educational Psychology (2nd Ed.) 1979.
5. Woolbtk, A.E. (1995), Educational Psychology (6th Ed.) Allya & Bacon, Londan/ Bostan.
6. Gage, N.L. & Berliner (1998). Education of Psychology (6th Ed.), Hought Miffir, New Yark.

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GROUP - C

PAPER – XIII (OPTIONAL: Clinical Psychology)

CLINICAL DIAGNOSIS

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I History and current trends. Growth of the branch: Growth in numbers, differentiation. Professionals spiral of growth. Growth in India. Approach of clinical psychology: Psychodynamic, Behaviouristic, Humanistic, cognitive and socio-cultural.

UNIT – II Personality assessment : Projective, psychometric and behavioural measures. Projective tests: Characteristics and clinical use, Rorschach & TAT.

UNIT – III Psychometric tests: MMPI, WAIS & WISC.

UNIT – IV Dynamic diagnosis: Observation, Case history, and Interview.

UNIT – V Neuro Psychological examination: Approaces; Halstead Neuropsychological test battery, Luria Nabraska

BOOK RECOMMENDED :

1. Iscope, I.; Block B.L. and Spielberger, C.D. (eds) Community psychology: Perspectives in training and research. NY: Appleton, 1977.
2. Mann. A.P.; Community Psychology: Concepts and applications. Free Press, 1978.
3. Rapaport, J. Community Psychology: Values, Research and action. NY : Holt Rinehart. 1977.
4. Korchin, S.Modern Clinical Psychology. Harper and Row, 1978.
5. Wolman, B.B. (ed) Handbook of Clinical Psychology, Mc Graw Hills, 1972.

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PRACTICALS (COMPULSORY)

M.M. - 100

Practical will be conducted in two sections - 1 Lab Experiment
- 2 Project

Distribution of marks :-

1-	Sessional	- 20
2-	Experiment	- 30
3-	Projects	- 30
4-	Viva voce	- 20

LAB PRACTICALS :-

NOTE : Any five of the following to be completed in the Laboratory training.

1. Knowledge of results.
2. Attention.
3. Attribution of achievement outcomes.
4. Zeigarnik effect.
5. Level of aspiration as a function of success or failure.
6. Reminiscence in motor learning.
7. Short Term Memory.
8. Long Term memory.

NOTE : This syllabus will be implemented from July 2017.

M. A. – IV
SEMESTER (PSYCHOLOGY)

The curriculum frame work is as under :

COMPULSORY PAPERS (Three)

No.of Paper	Name of Paper	Marks		Credits		
		Theory	Internal	Th	Pr	Total
(XVI)	Life Span Development	80	20	4		4
(XVII)	Psychological Assessment – II	80	20	4		4
(XVIII)	Psychology of Cognitive Abilities	80	20	4		4
	Optional Papers : One papers from any one of the three groups					
	Group A : Psychology of Management					
(XIX)	Human Resource Development and Management	80	20	4		4
	Group B : Psychology of Education					
(XIX)	Basics of Psychological Guidance and Counselling	80	20	4		4
	Group C : Clinical Psychology					
(XIX)	Psychotherapeutic Counselling	80	20	4		4
(XX)	Practicum	100			4	4

NOTE: Internal Assessment will be done on the basis of Classroom Tests / Seminars /Assignments

The syllabus will be implemented from January 2018.

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PAPER – XVI (COMPULSORY)

LIFE SPAN DEVELOPMENT

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Scope, Nature and Principles of Development,

concepts – maturity, experience, factors in development : Biogenic, Psychogenic and Sociogenic.

Factors influencing development: Heredity, Environment, Motivation and Learning. Development processes : Nature, Principles and related.

UNIT – II Methods; Cross-sectional, longitudinal approach, Research strategies: Correlational, Experimental and other sequential techniques. The Developmental tasks and theories of Development: Psychoanalytic, Behaviouristic and cognitive.

UNIT – III How life begins, Infancy, babyhood and childhood: The Characteristics, adjustment, hazards and Personality Development.

UNIT – IV Adolescence and Adulthood: Characteristics, Physical, Social and Cognitive development psychosocial changes and adjustment.

UNIT – V Middle and Old age: Characteristics, problems. personal social and vocational adjustment.

BOOK RECOMMENDED :

1. Baltes, P.B. & Brim O.G. (1978): Life span development behaviour, N. Y. Academic Press.
2. Thomas, M. R. (2000): Recent theories of Human Development, thousand Oaks: sage Publication.
3. Zanden, J.W. & Vander (1997): Human Development (7th Ed.) New York: Mc Graw Hill.
4. Elizabeth B. Hurlock (1977): Development Psychology. A life span approach, (5th Ed.)
5. Jere E. Brothy & Sherry L. Willis (1981): Human Development and Behaviour, St. Maitins Press, NY.

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PAPER – XVII (COMPULSORY)

PSYCHOLOGICAL ASSESSMENT – II

M.M. - 80

NOTE: This paper consist of five units. From each unit minimum two questions will be set and candidates will have to be answer one question from each unit.

UNIT – 1 Concept and Measurement of Intelligence, Major Tests of Intelligence developed under Western and Indian Cultural set up.

UNIT – II Concept and Measurement of Aptitude; Major Test of Aptitude developed under Western and Indian Cultural set up. Achievement; concept and measurement of achievement Test. Major Test of Achievement developed under Indian Cultural set up.

UNIT – III Test of Personality: Projective and Psychometric Approaches, Major Test of Personality developed under Western and Indian Cultural set up.

UNIT – IV Test of Adjustment, Values, Interest, Stress and Anxiety developed under Indian condition.

UNIT – V Psychological Testing in Applied Field: Neuro-Psychological Testing : Objectives and Major Neuropsychological Test.
Emotional Intelligence: Concept and Major Test of Emotional Intelligence developed under western and Indian cultural set up.

BOOK RECOMMENDED :

1. Psychological Studies – 2004, Vol.-49.
2. Danial Golman: Emotional Intelligence (1995) New York: Bantam Books.

BASIC BOOK :

1. Anastasi, A. (1988) Psychological Testing London: Mc Millan Publishing Co.
2. Crowback. L.J. Essentials of Psychological Testing.
3. Freeman F. Theory and Practice of Psychological Testing.

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4. Gheselli Theory of Psychological Measurement New Delhi Tata HeGraw Hill Publication.
5. Guilford, J.P. Psychometric Methods. New Delhi Tata Mc Graw Hill.
6. Nunally, J.C. Introduction to Psychological Measurement, Tokyo: Mc Graw Hill.
7. Nunally, J.C. Psychometuric Theory, New Delhi: Tata Mc.Graw Hill Publishing .

PAPER – XVIII (COMPULSORY)
PSYCHOLOGY OF COGNITIVE ABILITIES

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

Unit I –

Concept and Imagery,

Concept and Categorization : Theoretical description of the nature of concepts, forming new concepts, and clarifying new instances.

Visual Imagery and Spatial cognition : Mnemonics and memory codes, empirical investigation of imagery, the nature of mental imagery, Cognitive maps, neuropsychological findings.

Unit II –

Language and reasoning

Language : The structure of Language comprehension and production Language and Cognition.

Reasoning : Types of Reasoning, patterns of reasoning, performance, approaches to study of reasoning, Neuro-Psychological [illegible] of Reasoning.

Unit III –

Decision making : Phases of decision Making, basic concepts of probability, cognitive illusion in decision making, Descriptive models of decision-making.

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Unit IV-

Individual and Situational differences in cognition, cognitive development, Piagetion Theory. Neo-Piagetion approaches to cognitive development. Individual differences in Cognition. Effect of aging in Cognition.

Unit V-

Cognition in cross-cultural perspective, Studies of cross- cultural cognition, Effect of Schooling and Literacy, Cognition in every day setting.

BOOK RECOMMENDED :

1. Snodgrass, J. Gray. Et. Al (1985) Human experimental psychology, New York : Oxford University Press.
2. Galott, K. M. (1999) Cognitive psychology in and outside laboratory, Mumbai : Thompson Asia.
3. D. Amato M.R. (1970) Experimental Psychology, New York, Mc. Graw Hill.
4. Sen Anima : Attention & Destraction New Delhi.
5. Cognitive Psychology ~~XI~~ VI Edition .]Robert L. ~~Srtas~~ Pearson Education 2001.

GROUP - A

PAPER – XIX (OPTIONAL: Psychology of Management)

HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Assumptions about HRM, Structure and Role of HRM. The Indian Contest of HRM Models of HRM. Current and future Challenges to HRM. Human Resource Planning: Steps and stages in manpower planning. Structure of manpower planning HRD in India.

UNIT – II Human Resource policies and practices, changing trends in work environment, developing the human resource. Maintaining Human Resource: Safety and Health Stress Management, Labour Relations.

UNIT – III Job analysis and job design. Recruitment and selection. Training and development: Nature of Training and development, Importance of Training and development. How to make training effective.

UNIT – IV Job evaluation, Wage and salary administration. Employment incentives.

UNIT – V Performance appraisal, Factors distorting appraisal and how to improve appraisals. Type of appraisal.
Employee counselling, challenges of Human Resource Management.

BOOK RECOMMENDED :

1. Human Resource Management. A contemporary perspective I. Board Well & Holden.
2. Personnel Human Resource Management. D.A. centre & S.P. Robbins.
3. Designing and Management. Human Resources Systems U. Pareek & T.V. Rao.
4. Human Resource Management. Fisher. Scheenfeldt and show.
5. Human Research and Personnel Management by Aswathappo. (2002) 3rd edition; Tata McGraw Hill.
6. Udai Pareek: Organizational learning R. Gibson (1997) Rethink the future London Nicholas Brealey Publishing.

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7. Luthans Fred: Organizational Behaviour (1995) Mc Graw Hill international Edition.
8. Stephens P. Robbins: Organizational behaviour (9th edition) (2000) Prentie Hall India, New Delhi 110001.
9. Jerald Greenbery, Robert, A aburon: Behaviour in organization (1999) PrentieHall of India. New Delhi 110001.

GROUP - B

PAPER – XIX (OPTIONAL: Psychology of Education)

BASICS OF PSYCHOLOGICAL GUIDANCE AND COUNSELLING

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Nature, Need and Functions of Counselling. Counselling and Psychotherapy. Intervention, Goal and objectives of Counselling. Approaches of Counselling: Directive, Non-directive, Eclectic. Individual and group counselling. Evaluation of counselling. Follow up and placement services.

UNIT – II Techniques of Appraising the client: Standardized Techniques, Intelligence, Personality, Aptitude and Interest Interview. Characteristics of a good Counsellor. Counsellors, Training, Issues and trends in guidance and counselling. Ethical standards.

UNIT – III Nature, Need and Functions of Guidance. Principles of Guidance. Techniques of Appraising the client: Non-Standardized Methods. Anecdotal Record, Autobiography, Case study, Sociometric, Observation, Rating scale, Questionnaire.

UNIT – IV Various survices in guidance : Program information survice , self inventory survice , preparatory survice follow up placement , Individual data collection , counseling and research.

UNIT – V Special areas of Guidance and Counselling: Marital, Family. Counselling for the pre-school and elementary school children adolescent.

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Special areas of Guidance – Vocational Guidance, Educational Guidance, personal Guidance Problems of Guidance in India.

BOOK RECOMMENDED :

1. De Secco, J.P. & Croford, W.R. : The Psychology of Learning and Instruction, New Delhi. Prentice Hall.
2. Ellis, R.S.: Educational Psychology, A Problem approaches affiliated, New Delhi, ease West Press.
3. Bruce & Marshvell : Models of Teaching (2nd Ed.) 1980.
4. Travers, J.F. : Educational Psychology (2nd Ed.) 1979.
5. Woolbtk, A.E. (1995), Educational Psychology (6th Ed.) Allya & Bacon, Londan/ Bostan.
6. Gage, N.L. & Berliner (1998). Education of Psychology (6th Ed.), Hought Miffir, New Yark.
7. Axrual Review (2006), Vol 57, P 487-
8. Sharma R. A. (2007), Advance Educational Technology, Revised Edition International Publishing House P 25-42, 43-65, 66-668
9. Mohan, A.J. (2003) Educational Psychology, Neel Kamal Publications.
10. Anastasi, Z., 1 Lewis, E.C. (1970): Counselling Psychology, New York, Holt Rinehart and Winster, Inc.
11. Harson, J.C. (1978): Counselling Processes and Procedures. New York, McMillan Publishing Co. Inc.
12. Narayan Rao. S. (1981): Counselling Psychology, New Delhi, Tata McGraw Hill.
13. Kemp. C.G. (1970): Foundations of group counselling., New York, McGraw Hill.
14. Lewis, E.C. (1970): Counselling Psychology, New York, Holt Rinehart and Winster, Inc.
15. Steffler, B.(Ed.) 1965. Theories of counselling, New York, McGraw Hill Book Co.
16. Warters, J. (1964): Techniques of counselling, New York, McGraw Hill Book Co.
17. Rappaport, D. Gill, M.M. and Schafer, R. (1968): Diagnostic Psychological testing.
    (Revised edition, edited by Holt, R.R.) New York, International Universities Press.

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UNIT – V Methods for altering fears and anxiety and treating psychophysiological disorders: test-anxiety, generalized anxiety, stress, school phobia, snake phobia, combination of fears, CHD, asthama and peptic ulcer.

BOOK RECOMMENDED :

1. Iscope, I.; Block B.L. and Spielberger, C.D. (eds) Community psychology: Perspectives in training and research. NY: Appleton, 1977.
2. Mann. A.P.; Community Psychology: Concepts and applications. Free Press, 1978.
3. Rapaport, J. Community Psychology: Values, Research and action. NY : Holt Rinehart. 1977.
4. Korchin, S.Modern Clinical Psychology. Harper and Row, 1978.
5. Wolman, B.B. (ed) Handbook of Clinical Psychology, Mc Graw Hills, 1972.
6. Carson & Butcher : Abnormal Psychology and modern life.
7. Wolpe, R. & Dryden, W. (eds) (1996) : Handbook of counselling psychology, New Delhi
8. Woolberg, L.R. (1998) : The Techniques of Psychotherapy, Barcour Brace : Groune and stration.
9. Toukimarian, S.G. & Rennie D.C. (1992): Psychotherapy Process and Research, Sage
10. Gelso; C.J. and Fretz, B.R. (1995): Counselling Psychology, Bangalore, Prism Books Ltd.
11. Abate, L. & Milan, M.A. (ed.) (1985) : Handbook of social skill training & Research, New York: John Wiley & Sons.
12. Gorey, G (1986)Theory and Practices of Counselling and Psychotherapy, Montery California, books coley publishing.
13. Adelson, D. & Kalis, B.L. (1970) : Community Psychology and Mental Health. Perspectives Seanto.
14. Mann. A.P. (1978): Community Psychology : Concepts and applications, Free Press.
15. Iscoe. I. Block, B.L. & Spielberger, C.D. (eds.) (1977): Community Psychology : Perspectives in training and research N.Y. : Appleton.

15-12

15/12

GROUP - C

PAPER – XIX (OPTIONAL: Clinical Psychology)

PSYCHOTHERAPEUTIC COUNSELLING

M.M. - 80

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Methods for preventing problems and developing resourcefulness : Training family members, sibling as behavior change agents, Maintenance of parent training. Development of academic skills – Teaching study skills to adults, improving study behavior through self-control technique.
Assertiveness Training, Developing Assertive Behaviour through Converts Modeling. Personal Appearance, Improving client's grooming.

UNIT – II Methods for Promoting Wise Decision- Making: With Children, Career Decision Making Evaluation of Problem Solving Competence.
Social Interaction: Conversational Skills, Weight: Control: Psychological techniques, improving Physical Fitness, Cardio Vascular Problems: Psychological prevention.
Drug Abuse: Drug abuse perception Reimforment for alternatives Peer Counselling: Peer Guidance program and behavioural interventions, Counseller Accountability System.

UNIT – III Psychotherapeutic Counselling : Psychoanalytic Technique, Behavioural. Technique, Client centered technique, Community interventions and Group therapeutic techniques.
Methods for Altering Maladaptive Behavioural deficits: Shyness, delinquency, depression, speech and sexual dysfunctions.

UNIT – IV Methods of altering inappropriate behaviour: Marital maladjustment, child-misbehaviour, homosexuality, and exhibitionism.
Methods for altering maladaptive behavioural excesses: Excessive smoking, alcoholism, drug addiction and temper-out burst, physical aggression.

15.12

15/12

PAPER – XX

PRACTICALS (COMPULSORY)

M.M. 100

Practical is divided in two sections (1 from each section)

1. **Administration of psychometric / Projective test**
2. **Field study**

Distribution of marks :-

1- Sessonal	- 20
2- Psychological assessment	- 30
3- Field Study	- 30
4- Viva voce	- 20

NOTE : This syllabus will be implemented from January 2018.

15/12

15.12

M.A. PSYCHOLOGY

[ANNUAL EXAM]

SYLLABUS

2017-18

M. A. PREVIOUS (PSYCHOLOGY)

The curriculum frame – work is as under.

COMPULSORY PAPERS

PAPER	NAME	MARKS	HOUR
I	Experimental and Cognitive Psychology	100	3 hours
II	Social and Cultural Psychology	100	3 hours
III	Research Methodology and Statistics	100	3 hours
IV	Psychopathology and Health Psychology	100	3 hours
V	Practicum	100	4 hours
	Total Marks	**500**	

PAPER – I
EXPERIMENTAL AND COGNITIVE PSYCHOLOGY

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I **Attentional and Perceptual Processes:**
Attention: selective attention and its theories, Biological basis. Motivation: Perception: Nature, Principles of perceptual organization, Picture perception, and Determinants.

UNIT – II Memory & forgetting: Memory process: Encoding, Storage, Retrieval: stages of memory: Sensory. STM, LTM Episodic, Memory improvement Meta-Cognition, Tip of the tongue Phenomenon, Meta memory.
Theories of forgetting: Interference, decay.

UNIT – III Thinking & Problem solving: Theories of thought Process, Reasoning, Problem solving: Problem solving approaches strategies, Role of Concepts in thinking.
Decision-making: Algorithms and heuristics.

UNIT – IV Learning: Nature and Types, Classical Conditioning Instrumental learning, Verbal learning, reinforcement.

UNIT – V Creativity and Reasoning
Creativity: Nature and Measurement, Factors affecting creativity.
Reasoning: Types and errors in reasoning process: deductive and inductive.

BOOK RECOMMENDED :

1. Snodgrass, J. Gray. Et. Al (1985) Human experimental psychology, New York : Oxford University Press.
2. Galott, K. M. (1999) Cognitive psychology in and outside laboratory, Mumbai : Thompson Asia.
3. D. Amato M.R. (1970) Experimental Psychology, New York, Mc. Graw Hill.
4. Sen Anima : Attention & Destraction New Delhi.

PAPER – II

SOCIAL AND CULTURAL PSYCHOLOGY

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Historical Background & Theoretical perspective: Growth of social psychology, Methods of social psychology. Theoretical perspective: Cognitive dissonance, Social comparison, Attribution, Field Psychoanalytic, Socio-biology.

UNIT – II Social cognition and Influence Processes : Social and Person perception, impression management.
Communication.
Attitude : Nature and Characteristics, Development and change.
Leadership : Meaning and nature, function, styles of leadership, effectiveness.

UNIT – III Understanding Relationship and Group Processes: Social Motivations,
Pre-social Behaviour.
Aggression and Violence.
Group Dynamics and cohesiveness: Group Dynamics: meanings, formation, decision making, group level behaviour.

UNIT – IV Applied Social Psychology: National character.
Poverty, Grader and Population Issues.
Social tension and group conflict.
Problems of social change

UNIT – V Culture and Behaviour: Culture and Cognition.
Culture and Organisation.
Culture and Personality.
Culture and Health.
Prejudice and discrimination.
Stereotypes.

BOOK RECOMMENDED :

1. Billing, M. (1976) Social Psychology and inter group relations, NY: Academic Press Lindsey, G. & Aronson, E (Eds) (1985) The Handbook of social psychology. NY : Random House.
2. Mishra, G. (1990) Applied social psychology in India ND: Sage
3. Eiser, J.R. (1986) Social Psychology, London : Cambridge University Press.
4. Dalal, A.K. (1989) Attribution theory and research ND wiley limited .
5. Feldman R.S. (1985) Social Psychology, New York, Mc Graw hill.
6. Baran A.B. & Byre, D (1991) Social Psychology, - Boston allyn & Bacon.
7. Pandey, J. (1988) Psychology in India; the state – 7 the art Vol – 2 ND. Sage.

PAPER – III

RESEARCH METHODOLOGY AND STATISTICS

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Nature of scientific research in behavioural sciences. Experimentation in psychology Variables: Nature and types. Techniques of experimental manipulation, control in experiment. Sources of bias. Ethical issues in psychological research, Research Process: Consideration of research problem and hypothesis.

UNIT – II Sampling: probability and nonprobability sampling. Research report writing (APA style). Normal Probability Curve, its properties and utility in inferential statistics, Null hypothesis, Type I and Type II errors, Levels of significance.

UNIT – III Method of Collecting data: Observation, Questionnaire, Interview. Case Study, Psychological tests and Content - Analysis.

UNIT – IV Experimental Design : Single Factor, Ranomized block, 2X2 factorial design, Repeated measures (on one factor) Design : Graceo Latin – Square Design, t-test, NOVA : one – way and two – way : Newman - Keul tests.

UNIT – V Cross sectional and longitudinal designs. Measures of relationships: Multiple regression, factor analysis: the centroid method, calculation of factors, content analysis.

BOOK RECOMMENDED :

1. Kerlinger D & Katz L. : Foundation of behavioural research (2^{nd} ed) Surjeet Publication, Kamlanagr, Delhi, 1983
2. Kothari C.R.: Research methodology : methods and techniques. Wiley eastern Ltd. New Delhi 1986
3. Broota, K.D. : Experimental design in behavioural research Wiley eastern Ltd. New Delhi 1992
4. Black T.R. : Quantative research designs for social sciences thousand oaks: sage 1988
5. Winer, B.J. : Stastical principles in experimental design, New York, Mc graw hill, 1971
6. Edwards, A.K.: Experimental designs in psychological research. New York Holt 1976
7. Mason, J. : Qualitative Researching, thousand oaks: sage 1997.

PAPER – IV

PSYCHOPATHOLOGY AND HEALTH PSYCHOLOGY

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Classification systems in psychopathology: W.H.O. (ICD-10) and multiaxial systems (DSM-IV TR): Evaluation of classification system. Theoretical background, approaches to psychopathology (1) Psychodynamic; (2) Behavioural; (3) Cognitive; (4) Phenomenological; (5) Biological (6) Socio-cultural approach Diagnosis – purposes of diagnosis, Method of diagnostic assessment.

UNIT – II Intervention models and Psychotherapies Psychodynamic, Behavioural, Biological, Behavioural medicine socio-cultural, Phenomenological and spiritual approach to therapy.

UNIT – III Theories and models of Anxiety disorder: (a) Panic, Phobic, OCD Post – Traumatic. Stress disorders, Generalized Anxiety Disorders, (b) somatoform disorders, Impulse control disorder, eating disorder and Sleep disorder.

UNIT – IV Schizophrenia Mood disorder. Mental Retardation and Personality disorder (cluster categories and problems), types & symptoms substance related disorders.

UNIT – V Psychophysiological disorder, Theories of Personality-dispositions, coronary heart desease (CHD), Asthma, Allergy, Eczema Itching, Rheumatoid, Arthritis, Peptic. Ulcer, Diabetes and Menstrual disorders, sexual and gender identity disorder. Mental Health Promotion and Maintenance.

BOOK RECOMMENDED :

1. Aboud, T.D.: Health psychology in global perspective. Thousand oaks, C.A: Sage (1988).
2. Page, J.D.: PSYCHOPATHOLOGY : The Science of understanding Deviance. (2^{nd} ed.) (1975)
3. Carson, C.R., Butcher J. N. : Abnormal psychology and modern life (9^{th} ed) Harper Collins publisher. (1992).
4. Adams, H.E. & Sutkar. P.B. : comprehensive handbook of psychopathology New York, Plenum Press.
5. Prokap, C.R. & Bradly, L.A.: Medical psychology: Contribution to Behavioural medicine, Academic press, (1991)
6. Davison G.C. and Neal J.N. Abnormal Psychology – 8^{th} Ed. Wiely Publishers, 2000.

PAPER – V

PRACTICUM

M.M. 100

This paper consists of the laboratory (experimental and testing) and field – work done throughout the academic session and will be evaluated at the time of annual examination along with the other papers. Distribution of marks would be as under:

		Marks
A.	Record of lab practical and field work	25
B.	Evaluation of one lab. Experiment of be conducted in the examination	25
C.	One test to be administered in the examination	25
D.	Viva-Voce on practicum	25

Note : No candidate would be allowed to appear in the practical examination unless his/ her day-to-day practical work and report are found satisfactory.

List of Practicum : **(Any five experiments four tests and one field study)**

1) Experiments :-

1. Meaningfulness and selective attention.
2. Effect of types of information on impression formation.
3. Memory improvement.
4. Episodic memory
5. Chunking
6. Proactive inhibition
7. Problem solving
8. Retroactive inhibition
9. Meaningfulness in verbal learning
10. Feedback in verbal learing.

Tests :-

1. E.P.Q.
2. Locus of control
3. Picture frustration
4. Intelligence test (performance/non-verbal)
5. Thinking style
6. Cognitive style
7. Trait-state anxiety
8. Projective test.

Field Work :

1. Person perception
2. Impression management
3. Attitude measurement
4. Group conformity
5. Value judgement
6. Identity crisis
7. Gender discrimination
8. Communal tension
9. Interpersonal interaction
10. Pro-social behaviour
11. Social loafing.

Note : Field study Workshop on topics would be allotted by the departmental committee.

M. A. FINAL (PSYCHOLOGY)

The curriculum frame – work is as under.

COMPULSORY PAPERS (Two)

No.of Paper	Name of Paper	Marks	Hours
(vi)	Life Span Development and Personality Psychology	100	3 hours
(vii)	Psychological Assessment	100	3 hours
	Optional Papers : Two papers from any one of the three groups		
	Group A : Psychology of Management		
(viii)	Organizational Behaviour Management	100	3 hours
(ix)	Human Resource Development and Management	100	3 hours
	Group B : Psychology of Education		
(viii)	Educational and Instructional Psychology	100	3 hours
(ix)	Guidance and Counselling Psychology	100	3 hours
	Group C : Clinical Psychology		
(viii)	Clinical Diagnosis and Community Mental Health	100	3 hours
(ix)	Psychotherapeutic Counselling	100	3 hours
(x)	Practicum	100	4 hours

PAPER – VI (COMPULSORY)

LIFE SPAN DEVELOPMENT AND PERSONALITY PSYCHOLOGY

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Scope, Nature and Principles of development, Factors influencing development: Heredity, Environment, Motivation, Learning. Methods; Cross-sectional, longitudinal approach, Research strategies: Correlation, Experimental and other sequential techniques. The Developmental tasks and theories of Development.

UNIT – II How life begins, Infancy, baby hood and childhood. Characteristics, adjustment, hazards and Physical, Emotional, Social and Personality Development.

UNIT – III Adolescence, Adulthood, Middle and Old age- Characteristics. Physical, Social, Cognitive and Spiritual development psychosocial Changes and adjustment.

UNIT – IV Personality Meaning and Concept of Mature Personality,
Theories of Personality, Psychodynamic: Approch Freud, Erikson, Adler.
Trait: Approch Allpert, Cattell and Eysenck, Cognitive: Approch Kelly, Behavioural Approch Bandura.

UNIT – V Humanistic approach: Maslow & Rogers,
Indigenous concept and Models of Personality – Yogic, Sankhya and Buddhist View. Structure, Dynamics, Development and Current Researches in the field of Personality.

BOOK RECOMMENDED :

1. Baltes, P.B. & Brim O.G. (1978): Life span development behaviour, N. Y. Academic Press.
2. Thomas, M. R. (2000): Recent theories of Human Development, thousand Oaks: sage Publication.
3. Zanden, J.W. & Vander (1997): Human Development (7^{th} Ed.) New York: Mc Graw Hill.
4. Elizabeth B. Hurlock (1977): Development Psychology. A life span approach, (5^{th} Ed.)
5. Jere E. Brothy & Sherry L. Willis (1981): Human Development and Behaviour, St. Maitins Press, NY.
6. Liebert, R.M. & Spiegler, M.P. (1993): Person aligy: Strategies & issues, P.C. California Books Cole Pub. Co.
7. Hall C.S. and Lindsey, G. (1996) theories of Personality N.Y.J. Wiley & Sons.
8. Pervin L.A. (1975): Psychology of personality readings in theory, Chigos. Rand Meznally College Lab.
9. Sinha J.N. (1969) : Indian Psychology, Calcutta.
10. Mukkopadhyay, Swami Niranjanand Saraswati Yoga Darshan Munger : Bihar School of Yoga.

PAPER – VII (COMPULSORY)

PSYCHOLOGICAL ASSESSMENT

M.M.- 100

NOTE: This paper consist of five units. From each unit minimum two questions will be set and candidates will have to be answer one question from each unit.

UNIT – 1 Nature of Psychological Assessment, Differences between Physical & psychological assessment. Problems in Psychological Assessment., Levels of Assessment.

UNIT – II **Scaling:** Unidimensional and Multidimensional. Scale construction techniques. Difference among tests, scales, questionnaire and schedule. Characteristics of a good psychometric test. Difference between psychometric and projective technique.

UNIT – III **Construction of Psychometric tools:** Step in test construction. Item writing, Pretry out, item difficulty level, discrimination power Reliability; Concept, type, method of determining reliability, Validity: Factors affecting reliability and validity. Norms: Types, uses and method to determine various types of norms.

UNIT – IV Cognitive and Non-Cognitive Tests

(a) Major Tests of Intelligence, Aptitude and Achievement developed under Western and Indian Cultural Setup.

(b) Projective and Psychometric tests of Personality, adjustment, Values Interest, Stress and Anxiety developed under Indian and Western conditions.

(c) Psycho-Physical and Neuro-Psychological test.

UNIT – V (a) Adaptation of tests.

(b) Test taking Response Styles: Social desirability, Acquiescence and Faking.

(c) Psychological testing in Applied Field of Life: Diagnosis, Psychotherapy, Education, Occupations and Organizations.

BOOK RECOMMENDED :

1. Anastasi, A. (1988) Psychological Testing London: Mc Millan Publishing Co. Crowback. L.J. Essentials of Psychological Testing.
2. Rreeman F. Theory and Practice of Psychological Testing.
3. Gheselli Theory of Psychological Measurement New Delhi Tata HeGraw Hill Publication.
4. Guilford, J.P. Psychometric Methods. New Delhi Tata Mc Graw Hill.
5. Nunally, J.C. Introduction to Psychological Measurement, Tokyo: Mc Graw Hill.
6. Nunally, J.C. Psychometuric Theory, New Delhi: Tata Mc.Graw Hill Publishing Co.

GROUP - A

PAPER – VIII (OPTIONAL)

ORGANIZATIONAL BEHAVIOUR MANAGEMENT

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Historical overview of the field Old and Emerging forms of organizations, Psychological processes in organizations: person, learning principles perceptions and motivation.

UNIT – II Organizations Processes: Influence and power in organization leadership: Nature and theories of communication. Barriers, effectiveness, current issues, role of T.A. in communication decision making, nature of rational process of decision-making. Group decision-making, techniques of good DM.

UNIT – III Interpersonal Processes in organizations: Group dynamics and team work in organization, conflict, decision Making negotiation in organization, Union Management interface, TQM, bench marking, Re-engineering, changing organizational culture.

UNIT – IV Marketing Research: Nature and function: consumer behavior, sales promotion strategies.

UNIT – V Organizational change and development: Managing the OD process, OD approaches and techniques, theoretical development and emerging OD technique, organization change, process and models.

BOOK RECOMMENDED :

1. Udai Pareek: Organizational learning R. Gibson (1997) Rethink the future London Nicholas Brealey Publishing.

2. Luthans Fred: Organizational Behaviour (1995) Mc Graw Hill international Edition.

3. Stephens P. Robbins: Organizational behaviour (9^{th} edition) (2000) Prentie Hall India, New Delhi 110001.

4. Jerald Greenbery, Robert, A aburon: Behaviour in organization (1999) PrentieHall of India. New Delhi 110001.

GROUP - A

PAPER – IX (OPTIONAL)

HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Some assumptions about HRM, Structure and Role of HRM. The Indian Contest of HRM Models of HRM. Current and future Challenges to HRM.

UNIT – II Human Resource Planning: Steps and stages in manpower planning. Structure of manpower planning HRD in India. Job analysis and job design. Recruitment and selection. Job and Careers in HRM

UNIT – III Performance appraisal, Factors distorting appraisal and how to improve appraisals. Type of appraisal system., wage and salary administration. Employment incentive.

UNIT – IV Human Resource policies and practices, changing trends in work environment, developing the human resource, the employment relationship. Professional bodies.

UNIT – V Maintaining Human Resource: Safety and Health Stress Management, Labour Relations and Collective Bargaining. Employee involvement, Employee counselling.

BOOK RECOMMENDED :

1. Human Resource Management. A contemporary perspective I. Board Well & Holden.
2. Personnel Human Resource Management. D.A. centre & S.P. Robbins.
3. Designing and Management. Human Resources Systems U. Pareek & T.V. Rao.
4. Human Resource Management. Fisher. Scheenfeldt and show.

GROUP - B
PAPER – VIII (OPTIONAL)

EDUCATIONAL INSTRUCTIONAL PSYCHOLOGY

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Conceptual and theoretical perspectives in Educational Psychology. Theories, Behaviouristic, Social learning and Piaget and their application in teaching. Information processing Models, Instructional Medels, Programmed learning concept, Characteristics and models.

UNIT – II Human diversity and education.
Learning styles: Nature, approaches to learning style, measurement of learning styles, attempt to modify learning styles.
Individual and group differences in intelligence. Theories of intelligence, multiple intelligence, Gender differences issues in the classroom. Multilingualism and minority language issues in education, tongue education, bilingual or multilingual education.

UNIT – III Effective Teaching and Classroom Management
Planning and setting objectives for Teaching, Taxonomy of objectives. Types of objectives and their utility, characteristics of effective teachers. Teaching methods instruction lecturing and explaining, questioning, aptitude – treatment interaction, student centred teaching, individualized instruction, class room management and teaching in small groups: The discussion method and cooperative learning, computer-assisted instruction.

UNIT – IV Exceptionality and social education:
Categories of exceptionality, labeling and educational relevance Physically disabled students, students with cognitive disabilities, brain dysfunction and communication disorders.
Students with emotional and behavior disorder. Attention deficit disorder (Add), attentional deficit hyperactive disorder (ADHD), Gifted and talented students. Intervention and special education for various forms of exceptionality, mainstreaming.

UNIT – V Educational Assessment
Measurement and evaluation (Norm reference and criteria referenced tests), Test scores- meaning and types, standardized test: Meaning Types and interpretation Classroom assessment and grading: Techniques of Class room evaluation. Observation, questionnaire.

BOOK RECOMMENDED :

1. De Secco, J.P. & Croford, W.R. : The Psychology of Learning and Instruction, New Delhi. Prentice Hall.
2. Ellis, R.S.: Educational Psychology, A Problem approaches affiliated, New Delhi, ease West Press.
3. Bruce & Marshvell : Models of Teaching (2nd Ed.) 1980.
4. Travers, J.F. : Educational Psychology (2nd Ed.) 1979.

GROUP - B

PAPER – IX (OPTIONAL)

GUIDANCE AND COUNSELLING

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Definition, Nature, Need and Functions of Guidance and Counselling. Counselling and Psychotherapy. Intervention, Goal and objectives of Counselling.

UNIT – II Techniques of Appraising the client: Standardized and Non-Standardized Techniques, Intelligence, Personality, Aptitude and Interest. Observation, Auto biography, Case study, interview, Rating scales.

UNIT – III Approaches of Counselling: Directive, Non-directive, Eclectic. Individual and group counselling. Evaluation of counselling. Follow up and placement services.

UNIT – IV Characteristics of a good Counsellor. Counsellors, Training Organization of guidance program in educational institution. Relevance of guidance under 10+2+3 educational pattern. Issues and trends in guidance and counselling. Ethical standards.

UNIT – V Special areas of Guidance and Counselling: Vocational, Marital, Educational, Family. Counselling for the pre-school and elementary school children adolescent.

BOOK RECOMMENDED :

1. Lewis, E.C. (1970): Counselling Psychology, New York, Holt Rinehart and Winster, Inc.
2. Harson, J.C. (1978): Counselling Processes and Procedures. New York, McMillan Publishing Co. Inc.
3. Narayan Rao. S. (1981): Counselling Psychology, New Delhi, Tata McGraw Hill.
4. Kemp. C.G. (1970): Foundations of group counselling., New York, McGraw Hill.
5. Steffler, B.(Ed.) 1965. Theories of counselling, New York, McGraw Hill Book Co.
6. Warters, J. (1964): Techniques of counselling, New York, McGraw Hill Book Co.
7. Rappaport, D. Gill, M.M. and Schafer, R. (1968): Diagnostic Psychological testing. (Revised edition, edited by Holt, R.R.) New York, International Universities Press.
8. Anastasi, Z. (1992): Psychological Testing (Seventh Ed.) New York, McMillan.

GROUP - C

PAPER – VIII (OPTIONAL)

CLINICAL DIAGNOSIS AND COMMUNITY MENTAL HEALTH

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I History and current trends. Approaches: Psychodynamic, Behaviouristic, Humanistic, Cognitive and Socio-cultural.

UNIT – II Clinical diagnosis: Symptomatic vs. dynamic. Symptomatic diagnosis: ICD-10, DSM-IV (R). Dynamic diagnosis: Observation, Case history and Interview.

UNIT – III Clinical Assessment : Basic principles, Psychometric tests: MMPI, WAIS & WISC. Projective tests: Rorschach & TAT.

UNIT – IV Impressionistic approach of diagnosis: Informal assessment, Psycho-Physiological Assessment: EEG, ECG, and PGR, Blood pressure, Pulse-rate; Neuro-Psychological testing. Clinical report writing.

UNIT – IV Community Psychology: Perspectives of Community Psychology, Social Interventions: Methods and Strategies.

BOOK RECOMMENDED :

1. Iscope, I.; Block B.L. and Spielberger, C.D. (eds) Community psychology: Perspectives in training and research. NY: Appleton, 1977.

2. Mann. A.P.; Community Psychology: Concepts and applications. Free Press, 1978.

3. Rapaport, J. Community Psychology: Values, Research and action. NY : Holt Rinehart. 1977.

4. Korchin, S.Modern Clinical Psychology. Harper and Row, 1978.

5. Wolman, B.B. (ed) Handbook of Clinical Psychology, Mc Graw Hills, 1972.

GROUP - C

PAPER – IX (OPTIONAL)

PSYCHOTHERAPEUTIC COUNSELLING

M.M. - 100

NOTE : This paper consists of five units. From each unit minimum two questions will be set and candidates will have to answer one question from each unit.

UNIT – I Psychotherapeutic Counselling: Psychoanalytic Technique, Behavioural. Technique, Client centered technique, Community interventions and Group therapeutic techniques.

UNIT – II Methods for Altering Maladaptive Behavioural deficits: Shyness, delinquency, depression, speech and sexual dysfunctions.

UNIT – III Methods for altering maladaptive behavioural excesses: Excessive smoking, alcoholism, drug addiction and temper-out burst, physical aggression.

UNIT – IV Methods of altering inappropriate behaviour: Marital maladjustment, child-misbehaviour, homosexuality, and exhibitionism.

UNIT – V Methods for altering fears and anxiety and treating psychophysiological disorders: test-anxiety, generalized anxiety, stress, school phobia, snake phobia, combination of fears, CHD, asthama and peptic ulcer.

BOOK RECOMMENDED :

1. Carson & Butcher : Abnormal Psychology and modern life.
2. Wolpe, R. & Dryden, W. (eds) (1996) : Handbook of counselling psychology, New Delhi
3. Woolberg, L.R. (1998) : The Techniques of Psychotherapy, Barcour Brace : Groune and stration.
4. Toukimarian, S.G. & Rennie D.C. (1992): Psychotherapy Process and Research, Sage
5. Gelso; C.J. and Fretz, B.R. (1995): Counselling Psychology, Bangalore, Prism Books Ltd.
6. Abate, L. & Milan, M.A. (ed.) (1985) : Handbook of social skill training & Research, New York: John Wiley & Sons.
7. Gorey, G (1986)Theory and Practices of Counselling and Psychotherapy, Montery California, books coley publishing.
8. Adelson, D. & Kalis, B.L. (1970) : Community Psychology and Mental Health. Perspectives Seanto.
9. Mann. A.P. (1978): Community Psychology : Concepts and applications, Free Press.
10. Iscoe. I. Block, B.L. & Spielberger, C.D. (eds.) (1977): Community Psychology : Perspectives in training and research N.Y. : Appleton.

PAPER – X (OPTIONAL)

PRAACTICALS (COMPULSORY)

M.M. - 100

Note :- This Paper Consists of two parts: Part –I and Part – II

PART – I LAB PRACTICALS :-

(Any five of the following to be completed in the Laboratory training.)

1. Knowledge of results.
2. Effect of social support on conformity.
3. Attribution of achievement outcomes.
4. Zeigarnik effect.
5. Level of aspiration as a function of success or failure.
6. Reminiscence in motor learning.
7. Short Term Memory.
8. Effect of group on individual judgement.

PART – I FIELD STUDY

This part of the practical paper comprises of completion of two field studies, one (I) from the area of compulsory papers and another (II) from the area of optional papers of the specialization group.

(I) Any one of the areas given below from the compulsory papers be selected by the candidate and its field studies be completed under supervision of the departmental supervisor.

DEVELOPMENTAL PSYCHOLOGY:

1. Childhood
2. Adolescence
3. Adulthood
4. Old age
5. Home environment

DEVELOPMENTAL PSYCHOLOGY:

1. Leadership Styles
2. Matured Personality
3. Personality type ‘A’ and ‘B’
4. Neuroticism
5. Psychopathic personality

(II) candidate is required to complete one field study from the optional group under supervision of a concern teacher. The optional group prescribed along with the areas of specialization is given below:

Optional Group 'A" Psychology of Management: Any one of the following:

1. Study of Job Analysis
2. Communication Network
3. Organizational Structures
4. Management Style
5. Role Stress

OR **Optional Group 'A" Psychology of Education: Any one of the following:**

1. Test Anxiety
2. Exceptional Children
3. Teaching Style
4. Educational Guidance
5. Vocational Guidance

OR **Optional Group 'A" Psychology of Mental Health: Any one of the following:**

1. Neuro-Psychological evaluation of a stroke patient.
2. Identification of stressors
3. Drug abuse
4. Study of faith healers
5. Study of yoga or Vipashyana

The distribution of marks of Paper X (Practical) will be as under:

1.	Conduction of Laboratory experiments.	:	30
2.	Completion of Field Study Reports		
	(a) Compulsory area	:	20
	(b) Optional area	:	20
3.	Viva – Voce on Practical	:	30

School of Studies in Psychology
Pt. Ravishankar Shukla University, Raipur (C.G.)

POST GRADUATE DIPLOMA IN PSYCHOLOGICAL GUIDANCE AND COUNSELLING (PGC)

1. SCOPE :

The P.G. Diploma in Psychological Guidance and Counselling is meant for those students. Who intend to take up position of Director of Guidance Bureau, School Counsellor, Career Master, Rehabilitation Officer, Marriage Counsellor and such other positions in private and public settings. It is also meant for those persons who intend to start their own guidance and counseling centers or consultancy services. The main purpose of this job-oriented course is to enable the student to understand the psychodynamics involved in the problems of human adjustment and their effective management.

2. Examination System

Title		Min. Marks	Max. Marks
A.	Theory Papers PAPER I – Psychological Guidance PAPER II – Counselling Theories and Techniques	 40 40	 100 100
B.	PAPER III – Field Exploration 1. Field Internship – 30 2. Case Study Report – 70	40	100
C.	PAPER IV – Laboratory Practical 1. Construction of Guidance tool – 30 2. Psychological testing – 70	40	100
	GRAND TOTAL	**160**	**400**

NOTE : Candidate securing at least 40% marks of the aggregate in (a) Theory paper in (b) Field exploration and (c) Lab practical separately shall be declared Successful at the examination. Candidates obtaining 60% marks or more in total shall be declared to have passed with merit and these obtaining 40% or more but less than 60% marks shall be declared as passed.

Course content of P.G. Diploma in P.G.C.

PAPER – I

PSYCHOLOGICAL GUIDANCE

100 Marks

This paper has five units. At least two questions are to be set from each unit candidate is required to attempt five questions in all selecting one question from each unit.

UNIT – I

The Guidance

Meaning and Functions of guidance. The bases of present guidance approach Basic Principle and assumption of guidance. Guidance services. Difference between Guidance and Counselling.

UNIT – II

Techniques of Guidance

Understanding Individual (use of interviews and questionnaires) Appraisals of Aptitude for guidance appraisal of personal qualities and interest : (Test and Inventories rating scale, behavior descriptions. Anecdotal records. Socio- metric devices evaluation of achievement, Comulative Records, Case study and follow-up.

UNIT – III

Organization of guidance programme in school. Problems of guidance in India. Types of guidance services, characteristics of a well organized guidance programme.

UNIT – IV

Guidance Services for children. Guidance of young children. Elementary School Children, Junior high school children. Adolescents.

UNIT – V

Guidance services to adults, vocational guidance. Guidance of adults. Guidance towards family life, guidance in personal adjustment, guidance to deviates, guidance in group situation appraisals of guidance programmes, Emerging Trends in guidance.

BOOK RECOMMENDED :

1. Traxler. E. Arthur and North D Robert (1996). Technique of Guidance IIIrd Edition Halper & Row, Publishers New York and London.

2. Crow, L. and Crow, A. (1962), An Introduction to Guidance IInd Ed. Eurasia Publishing House (P) Ltd.
3. Asch. M. (2000) Principals of Guidance and counselling 1st Ed. Sarun & sons New Delhi.
4. Jones, J. Arthur, eta (1952), Principal of Guidance 6th Edl Tata McGraw Hill Publishing Company.
5. Gupta S.K. (1985), Guidance and counselling in India education 1st Ed. Mittal Publishers Trinagar Delhi.

PAPER – II

COUNSELLING THEORIES AND TECHNIQUES

100 Marks

This paper has five units. At least two questions are to be set from each unit candidate is required to attempt five questions in all selecting one question from each unit.

UNIT – I

COUNSELLING : The art and Science of helping.

a. Meaning, Purpose and goats of Counselling with special reference to India.
b. Professional issues, ethics, education and training of the counsellor.
c. Counselling relationship.

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UNIT – II

COUNSELLING PROCESS : Theories and Techniques of Counselling.

a. Psychodynamic Approach, Freudian, Neo Freudian, Modern.
b. Humanistic Approach : Existential client centred.

UNIT – III

a. Cognitive Approach : rational emotive, Transaction analysis.
b. Behavioural Apporach : Operant conditionaing. Behaviour modification.
c. Indian contribution – Yoga and Meditation.

UNIT – IV

COUNSELLING APPLICATION - I

a. Counselling in schools.
b. Career Counselling.
c. Alcohal and Drug Abuse.
d. Group counselling.
e. Crises Intervention Counselling – Case Studies for each of the above types of counselling applications, counselling interview.

UNIT – V

COUNSELLING APPLICATION - II

Management of

a. Shyness.
b. Smoking.
c. Depression.
d. Stress.
e. Marital Maladjustment
f. Old age problems.
g. Eurenesis
h. Phobias
i. Fear of interview
j. Fear of stage performance.
k. Problems in decision making.

Book Recommended :-

1. Windy, D. (1988) (Ed.) Counselling in Action New York; Sage Publication.
2. Nelson, J. (1982) The theory and practice of counselling Psychology. New York. Renehart and Winston.
3. Belkin, G.S. (1988) Introduction to counselling. W.G. Brown Publishers.

PAPER – III

FIELD EXPLORATION (INTERNSHIP PROGRAMME : 100 Marks

A. INTERNSHIP PROGRAMME : 70 MARKS.

The Internship Programme consists of two phases, about 30 days each. The students would be attached to the institute organization for a period of about two months. During this period they have to explore and identify the problem for investigation, and prepare Study-report (case) under the guidance of the Supervisor (faculty member). This report would carry 70 marks and would be evaluated by both internal and external examiner, each examiner awarding marks out of 35, as per university rules.

B. INTERNSHIP EVALUATION : 30 MARKS.

i. Presentation of the report in the departmental Seminar – 20 Marks.
ii. Attendance for the programme certified by the supervisor – 30 Marks

PAPER – IV
Lab Practical

100 Marks

1. Construction of guidance tools related to the area of specialization – 30 marks
2. Psychological Testing – Candidates would be required to administer, score and interpret at least 10 Psychological tests 50 marks.
3. Practical Record book – 10 marks.
4. Viva – Voce – 10 marks.

SCHOOL OF STUDIES IN PSYCHOLOGY
Pt. RAVISHANKAR SHUKLA UNIVERSITY RAIPUR (C.G.)

M. Phil. COURSE IN PSYCHOLOGY

(Duration : One Year)

This will be two theory papers of 100 marks each and one Lab Courses of 100 marks each. In addition, each student will have to Two seminars and write a dissertation on a topic approved by the Department Committee. The distribution of marks will be as follows:

PAPER			**MARKS**	
			Theory	Internal Assessment
i.	Theory Paper – I	Research Methods and Advanced Statistics	80	20
ii.	Theory Paper – II	GROUP A : Clinical Psychology or GROUP B : Educational Psychology or GROUP C : Organizational Psychology	80	20
iii.	Lab Course		100	
	Total : -		**160**	**+ 40**
iv.	Seminars –Based on Theory		50	
v.	Dissertation :			
	(a) Seminar on dissertation		50	
	(b) Script		75	
	(c) viva-voce		25	
	Total :-		**200**	
		GRAND TOTAL	**500**	

NOTE: Internal Assessment will be done on the basis of Class Testing/Seminar/Tutorials.

PAPER – I

RESEARCH METHODS AND ADVANCED STATISTICS

M.M. - 80

UNIT - I

Psychological Research

Nature of scientific research.
Types of psychological research.
Ethical issues of behavioral research viz. APA, ICMR.
Complex Problems of Psychological Research.

UNIT – II

Design

Single subject designs.
Quasi Experimental Design
Greco – Latin square design.
Factorial experiments with repeated measures.
Ex-Post Facto research design
Correlational research deign.

UNIT – III

Statistics -I

Pre ANOVA test,
ANOVA (Within and between groups): up to 3 WAY.
Post Hock analysis.
Correlation Analysis: Simple, Partial, Rank order.
Regression Analysis: Simple, Stepwise, Multiple, hierarchical.

.

UNIT – IV

Statistics -II

Logistic regression analysis
Factor Analysis: type- viz. exploratory and confirmatory analysis; Factor, extracting by Principal component method
Reliability analysis
Content analysis: Nature and applications.

UNIT – V

Computer Application

APA Reference witting with the help of Microsoft word,
Presentation preparation with the help of Microsoft Power Point,
Research paper search method
Database viz. Psychoinfo, Medline, UGCinfo,
Plagiarism checker online software viz. duplichekar,
Statistical analysis software viz. SPSS, MS Excel, Strata.
UGC research related websites viz, UGC inflibnet, Shodh Ganga, Shodh gangotri.
Knowledge of National and International Journals: Impact Factor, Citation Index, SCI Journals.

WEBSITE LINKS RECOMMENDED:

1. http://www.apa.org/ethics/code/principles.pdf
2. http://owl.english.purdue.edu/owl/resource/560/01/
3. http://icmr.nic.in/ethical_guidelines.pdf
4. http://www.inflibnet.ac.in/econ/
5. http://shodhganga.inflibnet.ac.in/
6. http://shodhgangotri.inflibnet.ac.in/
7. http://www.apa.org/pubs/databases/psycinfo/index.aspx
8. http://www.nlm.nih.gov/bsd/pmresources.html
9. http://jccc-ugcinfonet.in/Search/QuickSearch.asp
10. http://www.duplichecker.com/

BOOK RECOMMENDED:

1. Kerlinger. F.N. (1978), Foundations of Behavioural Research.
2. Broota, K. D. Experimental Design in Behavioural Research. Milar Fastern. N. Delhi (1989).
3. Naval Bajpai (2008), Business Statistics, Person Publication, New Delhi.
4. Statistics in Psychology and Education: H.E. Garrett, Cosmo (Publications,India), 01-Dec 2006.
5. Applied Logistic Regression Analysis, Issue 106: Scott Menard, 2002.
6. Psychological testing: Anne Anastasi, Susana Urbina, Prentice Hall PTR, 2009.
7. Psychometric Theory. Nunally, PP 151-188
8. Statistical analysis in Psychology and Education : Ferguson, George, PP 316-334
9. Statistical Design in Experimental Research. Winer (1971) Mc Graw Hill
10. An Introduction to Psychological Statistics DUBOIS, Philip M.V.
11. Festinger, D. & Katz L: Research Methods in Behaviour Science. Holt Rinchart. N. Y. (1973)

PAPER II (Optional)

Group A : CLINICAL PSYCHOLOGY

M.M. - 80

NOTE : This paper is consists of five units. From each unit two questions will be set. Selecting one question from each unit the examinees are required to make answer of five questions.

UNIT – I

(a) Current controversies in Clinical Psychology.
(b) Cultural Issues in Clinical Psychology.
(c) Ethical Issues in Clinical Psychology.
(d) Conducting Research in Clinical Psychology

UNIT – II

(a) Diagnosis and Classification issues.
(b) Assessment of Cognitive Functions.
(c) Personality and behavioural assessment.
(d) Neuro-Psychological Assessment.

UNIT – III

(a) Psychodynamic Psychotherapy
(b) Humanistic Psychotherapy
(c) Behavioural Psychotherapy
(d) Cognitive Psychotherapy

UNIT – IV

(a) Groups and Family Therapy
(b) Psychotherapy for Children
(c) Indigenous Psychotherapy
(d) General Issues in Psychotherapy

UNIT – V

(a) Community Psychology : Issues and Current Status.
(b) Clinical Implications: Stress and Weight Management.
(c) Clinical Implications : Management of Smoking, Alcohal and Drug dependence
(d) Pain Management and Biofeedback

BOOK RECOMMENDED :

1. Andrew M. Pomerantz.
   Clinical Psychology – Science, Practice and Culture
   New Delhi : Sage Publications (2008)
2. Carson, C. R. Buteher, J. N. (1992) Abnormal Psychology and Modern Life 9th Edition. New York : Harper Collins.
3. Adams, H. E. and Sutkar, P.B. Comprehensive Handbook of Psychopathology. New York : Plenum Press.
4. Pra , C.R. and Bradley I.A. (1991) Medical Psychology : Contribution to Behavioural Medicine. Academic Press.

PAPER – II (Optional)

Group B : EDUCATIONAL PSYCHOLOGY

M.M. - 80

NOTE : This paper is consists of five units. From each unit two questions will be set. Selecting one question from each unit the examinees are required to make answer of five questions.

UNIT – I

Educational Psychology – Meaning nature & scope, Methods of Research in Educational Psychology, Significance of Educational Psychology to teachers.

UNIT – II

The Learner : - Growth and Development, Dimensions of Development, Physical, Motor, Cognitive, (Piaget, Vygotsky theory of Cognitive Development) Moral D.V. (Kohl berg Theory) Social D.V. :- Key Factors in Social Dev.
Learning :- Process of Acquisition of knowledge, structure and goals in educational setting, Class room goal structures, and ach motivation.

UNIT – III

Pedagogies of Education – Meaning, Competency based teacher education, Teacher effectiveness, Classification of effective teacher trait, Class room Management, Planning & setting objectives.

UNIT – IV

Instructional Design :
Bruner's theory of instruction, Programmed learning, play way education, Cybernetic Psychology, System based Education instructional Design.

UNIT – V

Guidance and Counselling, Educational, Vocational, Personal Guidance, Non-Directive, Eclectic Counselling, Mental Health. Counselling and Remedial education to dyslexic children

BOOK RECOMMENDED :

1. De Secco, J.P. & Croford, W.R. : The Psychology of Learning and Instruction, New Delhi. Prentice Hall.
2. Ellis, R.S.: Educational Psychology, A Problem approaches affiliated, New Delhi, ease West Press.
3. Bruce & Marshvell : Models of Teaching (2^{nd} Ed.) 1980.
4. Travers, J.F. : Educational Psychology (2^{nd} Ed.) 1979.
5. Woolbtk, A.E. (1995), Educational Psychology (6^{th} Ed.) Allya & Bacon, Londan/ Bostan.
6. Gage, N.L. & Berliner (1998). Education of Psychology (6^{th} Ed.), Hought Miffir, New Yark.
7. Annual Review (2006), Vol 57, P 487-
8. Sharma R. A. (2007), Advance Educational Technology, Revised Edition International Publishing House P 25-42, 43-65, 66-668
9. Mohan, A.J. (2003) Educational Psychology, Neel Kamal Publications.

PAPER II (Optional)

Group C : ORGANIZATIONAL BEHAVIOUR

M.M. - 80

NOTE : This paper is consists of five units. From each unit two questions will be set. Selecting one question from each unit the examinees are required to make answer of five questions.

UNIT – I

Work Health & Well being :
Stress – Nature, Sources, Causes and effect of stress. Organizational technique. Individual techniques strategies for achieving well being
Organizational Conflict : Role conflict, interpersonal conflicts, Intergroup conflict, Causes and mode of resolving them.

UNIT – II

Psychological Assessment : Principles of Psychological Testing, Administration, Type, Limitation.
Consumer Psychology (Behaviour) : Scope of consumer Psychology, Research Methods, Nature and Scope of Advertising, Consumer Behaviour and Motivation

UNIT – III

Decision Making : Classical decision making : Steps assumption of classical theory and assessment of classical theory.
Behavioural theory of decision making, bounded rationality, Satisfying stress and decision making procedural rationality.
Group decision making : quality of decision, Creativity of decision, Group thinking, alternative group technique, quality circle.

UNIT – IV

Organizational Development and Employee counselling :
OD – Nature of plan, power, personal relationships, pace, price, professional relationship, performance criteria
OD Intervention – Role analysis technique, role negotiation technique, organization mirror, third party peace making
Employee counselling : Life and career planning, Rogerian perspective.

UNIT – V

Power and Politics : Defined, Importance, Character Role of Power in Leadership, Politics defined, dimensions of political behavior, occurrence of political behavior, Dyfunctional political Behaviours, Factors, political Tactics.

BOOK RECOMMENDED :

1. Greenberge, J.S. Baron, R.A. (2005) Behaviour in organization, (8th ed) New Delhi : Pearson Education.
2. Berry, L. (1998) Psychology of work (2nd Ed) New York: McGraw Hill
3. Robbins, S. (2001), organizational behavior (9th ed) New Delhi, Prentice hall of India.
4. Mcshane, S. L. & Von Glinow, M.A. (2000) organizational behavior : Emerging realities for the work place revolution, New Delhi: Tata McGraw Hill.
5. Mc Gill, M.E. (1997) organizational development for operating Managers new York: (Am A – OH), A division of American Mangemnet.
6. Luthans F (1995) organization behavior (7th Ed) McGraw Hill. Inc.
7. French, W.L. Bell. C.H. & Vohra V. (2007)Organization development : Behavioural Science Intervention for organization improvement (6th ed) New Delhi : Pearson Education
8. Duane Schultz (2008) Psychology and work today 8 th Ed. Pearson Education (New Delhi)

PAPER – III
III- Lab Course

Total Practicals : 05

Marks: 50

Part – I (Any Three)

1. Nested factorial research design:
2. Hierarchical Regression analysis
3. Repeated measure ANOVA
4. Exploratory and confirmatory factor analysis.
5. Textural analysis.

Part – II : Any Two from relevant Group

Group A:

1. Raven Standered Progressive Matrices (k)
2. P. G. T. B. B. D. of Brain Dysfunction
3. Bio-feed back.
4. Bender Visual Motor Gestalt tests.
5. Somatic ink block test.

Group B : Any two

1. Mental Health – Students
   Teachers
2. Dyslexia – Screening
3. Need for Guidance among students
4. Creativity
5. Emotional Intelligence
6. Cognitive Style
7. Thinking Style
8. Identification of problem behaviours of Students
9. Self Efficacy –
10. Self Confidence
11. Adjustment

Group C : Any two

1. Occupational Stress
2. Job Satisfaction
3. Work – motivation
4. Leadership style

Marks: 70 + 25

Seminar : Each student will give two seminars based on both theory papers. The topic will be decided by the Department M. Phil committee.

Dissertation :

Each student shall submit a dissertation based on empirical work performed under the supervision of a approved guide. The topic shall be approved by the departmental committee comprising of all the teachers and the guide shall be approved by Head of the Department. The Supervisor shall submit quarterly evaluations of the progress of the students. Each student have to give a seminar on his/her dissertation before its submission.

PRE – Ph. D. COURSE

Subject :- PSYCHOLOGY

DURATION : SIX MONTHS **M.M. 200**

	COURSE	MARKS
COURSE I	Research Methods and Advanced Statistics	100
COURSE II	Project Based on Review of Research work	50
	Seminar	50
	TOTAL	**200**

PRE – Ph. D. COURSE

COURSE – I RESEARCH METHODS AND ADVANCED STATISTICS

M.M. 100

UNIT - I Psychological Research : Nature types, Complex Problems of Psychological Research : Research Designs, Types.

UNIT – II **Design :** Single subject designs, Quasi experimental design. Greco – Latin square design factorial experiments with repeated measures : One and two factors with repeated measures.

UNIT – III ANOVA up to 3 WAY.
Pre and Post ANOVA

UNIT – IV **Factor Analysis :** Theory and factor, extracting by centered method. Content analysis : Nature and applications.

UNIT – V **Basic Knowledge of Computer Application :** Internet learning, USE of SPSS

BOOK RECOMMENDED:

1.Statistical analysis in Psychology and Education : Ferguson, George, PP316-334
2.Psychology Theory , Nunally, Pp151-188.
3. Psychology Methods. Gulford, J.P. 470-482.
4.Introduction to factor Analysis, Fruchter. B.
5.Statistical design in Experimental Research, Winer (1971) MC Graw Hill,
6.Foundations of Behavioural Research. Kerlinger. F.N. (1978)
7.An introduction to Psychological Statistics DUBOIS, Philip M.V.
8.Research Methodology : Methods and Techniques : Kothari, C.R.(1985)
9.Festinger, D. & Katz L. : Research Methods in Behaviour Science. Holt Rinchart. N.Y.(1973)
10. Broota, K.D. Experimental de4isgn in Behavioural research,. Milar Fastern, N. Delhi (1989)

COURSE – II **M.M. 100**

1. **Projects Based on Reviews of Research Work** : Use of Literature, knowledge of National and International Journals, Impact factor, Citation Index, SCI Journals. (To be supervised and evaluated by guide concerned.)

2. **Seminars** : Open seminar, evaluation will be done by member of DRC.

Curriculum Framework

POSTGRADUATE DIPLOMA IN REHABILITATION PSYCHOLOGY

(P.G.D.R.P.)

Norms, Regulations & Course Content

March, 2017

Effective from Academic Session 2018-19
One Year Duration

Rehabilitation Council of India
B-22, Qutab Institutional Area,
New Delhi - 110 016

Email: rehabstd@nde.vsnl.net.in , rehcouncil_delhi@bol.net.in

www.rehabcouncil.nic.in

Postgraduate Diploma in Rehabilitation Psychology (PGDRP)

1.0 INTRODUCTION

The aim of the course is to prepare rehabilitation counselors who promote understanding of the situations and needs of people with disabilities and perform a vital role in the personal, vocational and educational adjustment of persons with disability within self-advocacy and community development model. The program is an ideal model for entry into the field of professional rehabilitation counseling and allows for the easiest avenue to registration under CRR.

The training program prepares prospective candidates in a variety of concepts, theories, and techniques to function in numerous settings such as state or private run rehabilitation centers, public and private schools and other organizations serving persons with physical, sensory or cognitive disabilities. The coursework for the program includes: history of the rehabilitation movement and its legislation, models of disability and rehabilitation theory, psychosocial implications of disabling conditions, theoretical understanding of psychological assessment and testing methods, evaluation of the psychosocial problems and counseling, education and vocational needs of clients, case management skills utilizing community resources and multidisciplinary approach. In summary, the successful trainees have the broad base of rehabilitation knowledge to serve people with disabilities and they also have the ability to counsel, support, and deal with their clients from a humanistic and holistic approach.

1.1 Distinguishing Features

Rehabilitation counseling is first level (entry) of a two-level series within rehabilitation psychology services and is distinguished from the second higher level (M. Phil in Rehabilitation Psychology) training program. The later is an independent full-fledged professional training with higher level of competency, responsibility and authority for providing services to clients with disability. The Rehabilitation Counselor cadre shall not be used as an under fill class for existing Rehabilitation Psychologist positions for providing services to clients with disability.

1.2 Typical Tasks

The successful candidates screen and evaluate referrals to determine potential eligibility for services; may make referrals to other resources as appropriate; assess family background, prior work experience and education, disability, and functional limitations; determine needs and coordinate medical and psychological assessments with concerned specialists and/or medical/psychology consultants; advice/refer for aptitude, intelligence and personality tests and provide interpretation of results to clients and their families; determine physical restoration requirements (e.g., surgery, physical therapy, artificial limbs, hearing aids) and training necessary for employability; coordinate needed services with other agencies and organizations; provide psychological, behavioral, career and vocational counseling to clients; develop and implements rehabilitation plans with each client and track progress through successful termination of the case.

2.0 AIM

The aim of the program is to train candidates in basic knowledge and skills necessary for rehabilitation counseling practice. The program includes core counseling courses (e.g. theories of counseling) and rehabilitation-specific coursework (e.g. assessment of persons with physical/sensory/developmental/ cognitive disability). The program allows the trainees to develop expertise in any one areas of rehabilitation counseling (for eg. school counseling) during the one-month extra-institutional placement, which occurs in the third quarter of the course/training.

2.1 Objectives

On completion of the course the trainees are expected to demonstrate:

2.1.1 An understanding of basic physical, sensory, developmental and cognitive impairments and effects such impairments have on functional performance.

2.1.2 Knowledge of commonly accepted interventions for various impairments and skill in communicating verbally and in writing the decisions made and explaining and answering questions.

2.1.3 Skill in interviewing and providing support and empathy to clients with disability and their families.

2.1.4 Ability to utilize the principles and practices used in counseling and in the provision of services to rehabilitation clients and facilitate the development of problem solving skills in individuals with disability.

2.1.5 Demonstrate an understanding of caregiver and family burden, suggest and/ or undertake interventions drawing on their knowledge and problem solving skills.

2.1.6 Ability to develop plans for vocational rehabilitation clients, and counsel, motivate, and inspire clients.

2.1.7 Ability to work within specific agency programs, operations, policies, and procedures affecting assigned work, and to coordinate the provision of services to clients with other agencies and organizations.

2.1.8 Ability to read and interpret psychometric reports (intelligence, aptitude, personality assessment etc.) provided by rehabilitation/clinical psychologists and explains the implications of findings to clients and their families and carry out the suggested counseling and/or remedial training with the clients (for eg. remedial training/intervention in children with disorders of scholastic skills, and counseling of families and children with behavioral and emotional disorders occurring in the home/school context)

2.1.9 Ability to develop and maintain effective working relationships with local employers and community social service agencies, and market clients' skills and abilities to potential employers.

3.0 INSTITUTIONS ELIGIBILE TO CONDUCT THE COURSE

3.1 Centers already recognized by the RCI for conducting M. Phil. Rehabilitation Psychology program are eligible to conduct the course. However, such centers need to apply for Council's permission before starting the course.

3.2 Institute/center catering to people with following disability are eligible to conduct the program.

A) Specific developmental disability such as mental retardation, cerebral palsy, autism spectrum disorders, epilepsy or any disabling conditions found to be closely related to development processes, that limits/disrupt life activities such as learning, speech and language, mobility, self-help, and independent living begin anytime during developmental period (up to 18 years of age), and lasting throughout a person's lifetime.
B) Locomotor disability-congenital or acquired, including leprosy-cured.
C) Sensory impairments such as hearing or vision and both.
D) Multiple disabilities.
E) Traumatic/burn injuries.
F) Postgraduate Department of Psychology at universities having attachment or an MOU with any of the Rehabilitation centers (specified in A to E) to place the trainees for hands-on experience

3.3 There shall be at least two regular rehabilitation/clinical psychology faculty members on fulltime basis at the center, one of them with at least 5 years of post-qualification (RCI recognized M.Phil. Rehabilitation Psychology or Clinical Psychology degree) experience.

4.0 REGULATIONS OF THE COURSE

4.1 Number of Seats

Since the course involves hands-on training, the number of candidates registered for the course will depend on the availability of qualified clinical psychology/ rehabilitation psychology faculty working fulltime in the concerned institute and the clinical material available at the center. In order to make the training effective, therefore, the intake of the students shall not exceed the following ratio.

RCI Registered Rehabilitation/Clinical Psychologist working fulltime on regular basis - Candidate ratio shall be, 1: 5

4.2 Entry requirement

Minimum educational requirement for admission to this course will be

a. Bachelor's degree (regular mode) with general psychology courses in all the three years, or
b. Master's degree in any branch of psychology either in regular or distance mode, or
c. Master's degree in counseling psychology either in regular or distance mode

with a minimum of 55% marks in aggregate. For SC/ST/OBC category, minimum of 50% marks in aggregate is essential. Entry qualification shall be from a UGC recognized university.

4.3 Admission Procedure

A selection committee constituted by the University/ Institute shall make admission on the basis of aggregate percentage of marks, academic achievements and experience, if any, in the field of rehabilitation.

4.4 Duration

4.4.1 This is a fulltime training course with opportunities for appropriate practicum and supervised experiences for one academic year.

4.4.2 The candidates shall be posted at any other specialty center for a period of one-month duration during the third quarter of the training.

4.5 Attendance

4.5.1 Course of training must continuously be pursued and complete all the course requirements within a stipulated period from the date of enrollment.

4.5.2 A minimum attendance of 80% shall be necessary for appearing for qualifying examination.

4.5.3 Fifteen days leave shall be permitted during the entire course period.

4.6 Fee Structure

The prescribed tuition and examination fee as laid down from time to time by the concerned institution shall be paid by the candidates.

4.7 Content of the Course (See section 5.0 for subject wise syllabus.)

Group – A

Paper I : Disability and Rehabilitation

Paper II : Psychosocial Issues in Disability

Paper III : Rehabilitation Assessment and counseling

Papers IV : Community Based Rehabilitation

Practical : Rehabilitation Interventions and viva voce

Group – B

Submission :Five fully worked-out Rehabilitation Counseling Records which include case formulation, problem areas elicited, type and technique/s employed to resolve the problems, and the processes of counseling. Out of five records, two shall be related child cases including one from multiple disabilities.

4.8 Minimum prescribed clinical work during the training.

	By the end I year
1) Assessment & workup of client and/or family	25
2) Counseling of persons and/or family with disability (Out of 25 cases 5 shall be related to children)	25

4.9 Internal Assessment

In each subjects of Group – A, 30% marks shall be determined on the basis of two internal exams (theory and practical), each conducted for 50 marks. The marks so obtained are added to the marks allocated to the respective subjects in the final examinations. The results of the final examinations will be declared on the basis of the total so obtained.

4.10 Examination

a) Before appearing for the qualifying examination a candidate should have done the minimum prescribed clinical work as outlined in section 4.8. The logbook duly certified by the concerned supervisors shall be submitted at the time of examination for an evaluation of the clinical work done by the board of examiners.

b) A candidate failing in any of the Group – A subjects has to appear again in all the Group – A subjects.

c) A candidate failing in Group – B has to resubmit five fully worked-out counseling records.

d) A candidate shall appear for both Group A and B examinations when appearing for the first time.

e) All candidates have to complete the course successfully within a period of three years from the year of admission to course, and within three attempts.

f) The qualifying examination is held twice a year. The dates for supplementary examinations shall be worked out by the concerned universities depending upon the start of the academic year.

g) The medium of instruction and examination shall be in English.

h) 4.11 Scheme of Examination

Papers Title	Duration	Marks		
		Final Examination (Maximum)	Internal Assessment (Maximum)	Total
Group – A				
Paper I: Disability and Rehabilitation	3 hr.	70	30	100
Paper II: Psychosocial Issues in Disability	3 hr.	70	30	100
Paper III: Rehabilitation Assessment and Counseling	3 hr.	70	30	100
Paper IV: Community Based Rehabilitation	3 hr.	70	30	100
Practical: Rehabilitation Interventions and viva voce		70	30	100
Group – B				
Submission of five fully worked-out Counseling record – formulation, type, technique/s and processes of counseling	None		100	100

4.12 Board of Examination

The University will conduct the examinations having a board consisting of two examiners of which one shall be an external Rehabilitation/Clinical Psychology faculty appointed for this purpose, and the other shall be an internal Rehabilitation/Clinical Psychology faculty. Both internal and external examiners shall evaluate each theory paper and conduct the practical including viva-voce examination.

4.13 Minimum for Pass

No candidate shall be declared to have passed the course unless he/she obtains not less than 50% of the marks in:

i) Each of the theory paper (Group – A)
ii) Practical and viva-voce examination (Group – A)
iii) Submission (Group – B)

5.0 SUBJECT WISE SYLLABUS

The syllabus for each theory paper is as appended below. It is desired that each units of papers be covered with at least 4-hr. of input in the form of didactic lectures, seminars, tutorials/topic discussion as deemed fit depending on content nature of the units. Approximately 80-hr of theory teaching shall be required in the entire course (in all 20 units have been worked out from four theory papers), in addition to opportunities for learning through rehabilitation case management and work-ups.

6.0 CERTIFICATION AS A REGISTERED PROFESSIONAL

It is mandatory as per Section 13 of RCI Act for every teacher of special education to obtain a “Registered Professional Certificate” from the Rehabilitation Council of India to work in field of professional rehabilitation counseling in India. As continuous professional growth is necessary for the renewal of the certificate, the **Rehabilitation Counselors** should undergo in-service programme periodically to update their professional knowledge.

Amendments, if any, to the regulations of the course will be made periodically by the Rehabilitation Council of India. Any deviation from the above regulations should have the prior approval of the Rehabilitation Council of India. The successful students will be registered as **Rehabilitation Counselors** (Professional). The training institution/organization should ensure that all passed out students are registered with the Council.

Syllabus

Paper – I : Disability and Rehabilitation

Hours: 60 Hours

Unit I: Introduction – Overview of the profession, history and growth of rehabilitation field, areas of specialization, current issues and trends in different areas of rehabilitation, magnitude and incidence of disability, cost of disability, major national reports and surveys

Unit II: Concepts and theory – Impairment, disability and handicap, types and causes of impairments, realms of impairments, concept of functional capacity, coping and well-being, quality of life and its functional domains, content areas, methods of assessment, specific and global indicators of quality of life

Unit III: Disability and Rehabilitation – Models of disability and rehabilitation, enabling–disabling processes, impact of the physical, social and psychological environments on the enabling–disabling processes, effects of disability on participation, psychosocial theories of adjustment, strategies to enhance adjustment, functional limitations and strategies to reduce and accommodate limitations

Unit IV: Disability through life-cycle – Specific problems pertaining to each stage of life - childhood, adolescence, young adulthood, middle age, and older adulthood, and adapting strategies

Unit V: Ethics and policy issues – Rehabilitation ethics, rehabilitation policies and Acts(Persons with Disabilities Act, The National Trust Act, Mental Health Care Act, Rehabilitation Council of India Act, UNCRPD), assistance, concessions, social benefits and support from government, and voluntary organizations; contemporary challenges, civil rights and legislation, empowerment issues

References:

Book should be of Latest Edition

Encyclopedia of Disability, Gary L. Albrecht, Vol. 1 – 5, Sage Publications, Chicago, 2006

Encyclopedia of Disability and Rehabilitation, Arthur E. Dell Orto and Robert P.Marinelli (Eds.), MacMillan Reference Books, 1995

Perspectives on Disability and Rehabilitation: Contesting Assumptions, Challenging Practice, Karen Whalley Hammell, Churchill Livingstone, 2006

Status of Disability in India – 2012, Rehabilitation Council of India, New Delhi.

Development and Disability, Lewish, Blackwell Publishers, U.K., 2003

Learning Disabilities: The interaction of students and their environments, Smith, C.R., Allyn and Bacon, Boston, 2004

The handbook of Autism: A guide for parents and professionals, Aarons, M. and Glittens, T., Routledge, New York, 1992

The Persons of Persons with Disabilities Act, Ministry of Social Justice & Empowerment, Government of India, New Delhi, 2016

The National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act, Government of India, New Delhi, 1999

Yuker, H. E. (Ed). (1988). Attitudes Toward Persons with Disabilities. New York: Springer Publishing Company.

Dell Orto, A. E., & Marinelli, R. P. (Eds.) (1995). Encyclopedia of disability and rehabilitation. NY: Simon & Schuster Macmillan.

Eisenberg, M. G., Glueckauf, R. L., & Zaretsky, H. H. (Eds.) (1999). Medical aspects of disability: A handbook for the rehabilitation professional (2nd ed.). NY: Springer.

Jena, S.P.K.(2013). Learning Disabilities: Theory to Practice, New Delhi. Sage Publication

Sagar, R. (Ed.) (2014). Specific Learning Disorder: Indian Scenario. New Delhi: Department of Science and Technology, Govt. of India

Smart, J. (2012). Disability across the Developmental Life Span: For the rehabilitation counselor. New York: Springer Publishing Company.

Paper II : Psychosocial Issues in Disability

Hours: 60 Hours

Unit I: Stress and Coping Style – Stress due to disability, threat to life and physical well being, body image, independency, autonomy and control, self-concept, self esteem, life goals and future plan, invisible disabilities, marginalization, Denial, regression, compensation, rationalization, emotional reaction – grief, loss, guilt and fear, coping styles and strategies, stages of adaptation and adjustment, factors impeding adjustment to disability and disabling processes, psychological control

Unit II: Mental health issues – Psychopathological reactions such as anxiety, depression, adjustment problems, other co-existing mental morbidity, emotional and behavioral disorders in children and adolescents, problems related to marital and sexual life, abuse and exploitation, substance use, interventions for mental illnesses

Unit III: Family issues – Relationship issues with family, problems of families of disabled adults and children, impact of disability on family, family burden, needs of family and models of family adaptation, intervention to strengthening family support to disabled

Unit IV: Social issues – Societal attitudes toward disabilities, measurement of attitude and strategies for attitude change, social environment, social participation, social interaction, social network and support, disabling factors, prejudice, stigma, discrimination, marginalization, gender disparity

Unit V: Vocational issues - Career competency, career development issues, work related stress, economic independence, well-being, assistive devices for activities of daily living, mobility aids, at work place, sensory devices, environment modifications and universal designs, needed support system

References:

Book should be of Latest Edition

Mary Ann Bruce and Barbara Borg (2001). Overview - Psychosocial Frames of Reference, SLACK, Incorporated, 2001

Dunn, D. S. (2000). Social psychological issues in disability. In R. G. Frank & T. R. Elliott (Eds.), Handbook of Rehabilitation Psychology. Washington, D.C.: American Psychological Association.

Wright, B. A. (1983). Physical Disability: A Psychosocial Approach, 2nd ed. New York: Harper and Row.

Backman, M. (1989). The Psychology of the Physically Ill Patient: A Clinician's Guide. New York: Plenum Press.

Caplan, B., & Shechter, J. (1987). Denial and depression in disabling illness. In B. Caplan (Ed.) Rehabilitation Psychology Desk Reference. Aspen Systems Corp.

Cash, T. & Pruzinsky, T. (2002). Body Image: A Handbook of Theory, Research, and Clinical Practice. New York: Guilford Publications.

Rohe, D. E. (1998). Psychological aspects of rehabilitation. In J. A. DeLisa & B. Gans (Eds.)

Rehabilitation Medicine: Principles and Practice , 3rd Edition. Philadelphia: Lippencott-Raven, 189-212.

Snyder, C. R. (1999). Coping: The Psychology of What Works. London: Oxford Press.

Wortman, C. B., & Silver, R. C. (1989). The myths of coping with loss. J Consult Clin Psychol, 57(3), 349-57.

Devy John (1994). Introduction to Social Psychology

Ahuja, N. (2011). A Short Textbook of Psychiatry. New Delhi: Jaypee Brothers Medical Publishers Pvt. Ltd..

Jahan, M. (2016). Manasik Rog. Ahuja Book Company Pvt. Ltd., New Delhi

Singh, R., Yadava, A. & Sharma, N. R. (Eds) (2005). Health Psychology. New Delhi: Global Vision Publishing House.

Goreczny, A. J. (Ed) (1995). Handbook of Health and Rehabilitation Psychology. New York: Plenum Press.

Paper III : Rehabilitation Assessment and Counseling

Hours: 60 Hours

Unit I: Assessment – Need for assessment in counseling, assessment-based model for decision making, planning, and implementing individualized interventions, various instruments used for assessing cognitive, learning, behavioral, and emotional functioning, social and emotional development, assessment of perception of the problems and potential to participate and benefit from interventions, and assessing intervention efficacy

Unit II: Theory and concepts – Definition and goals of rehabilitation counseling, theories and techniques, counselor role, boundaries of confidentiality, ethical guidelines in counseling activities, concept of dual relationships, professional challenges in counseling and conflict resolutions, models, spiritual, culture and gender issues in counseling

Unit III: Intervention Approaches – Individual counseling approaches viz. non-directive, existential, humanistic, person-centered, cognitive and behavioral counseling, and behavior modification, techniques of remedial training for scholastic/learning problems

Unit IV: Specific Interventions – Specific intervention for developing social skills, academic skills, assertiveness, anger management, addressing anxiety/mood disorders, assessing family functioning, its strengths and resources, family counseling, crisis intervention

Unit V: Vocational counseling – Assessment and components of vocational counseling viz. identifying interests, goals and plans, and counseling during the training and job placement processes, scheme related to skill development

References:

Book should be of Latest Edition

Carpener B, (2002). Families in Context, Emerging Trends in Family Support and Intervention, David Fulton Publishers Ltd., London.

Ben-Yishay, Y. & Diller, L. (1993). Cognitive remediation in traumatic brain injury: Update and issues. Archives of Physical Medicine and Rehabilitation, 74, 204-213.

Hansen, S. L., Guenther, R., Kerkhoff, T. & Liss, M. (2000). Ethics: historical foundations, basic principles and contemporary issues. In R. G. Frank & T. R. Elliott (Eds.), Handbook of Rehabilitation Psychology. Washington, D.C.: American Psychological Association.

Kerkhoff, T., Hanson, S., Guenther, R., & Ashkanazi, G. (1997). The foundation and application of ethical principles in rehabilitation psychology. Rehabilitation Psychology, 42 (1),17-30.

Shewchuk, R., & Elliott, T. (2000). Family caregiving in chronic disease and disability. In R. G. Frank & T. R. Elliott (Eds.), Handbook of Rehabilitation Psychology. Washington, D.C.: American Psychological Association

Goodheart, C. & Lansing, M. H. (2001). Treating People with Chronic Disease: A Psychological Guide. Washington, D.C.: American Psychological Association.

Meichenbaum, D., & Turk, D. (1987). Facilitating treatment adherence: A practitioner's guidebook. New York: Plenum Press.

Radnitz, C. L., Bockian, N., & Moran, A. I. (2000). Assessment of psychopathology and personality in people with physical disabilities. Handbook of Rehabilitation Psychology. Eds. Frank, R.G., Elliott, T.R. Washington, D.C.: American Psychological Association. 287-309.

Corthell, D. S. (Ed.) (1997). Traumatic Brain Injury and Vocational Rehabilitation. Menomonie, WI: University of Wisconsin- Stout.

Fraser, R. (1991). Vocational evaluation. Journal of Head Trauma Rehabilitation, 6, 46-58.

Rao, N., & Kilgore, K. U. (1992). Predicting return to work in traumatic brain injury using assessment scales. Archives of Physical Medicine and Rehabilitation, 73, 911-916.

Rohe, D. E., & Athelstan, G. T. (1982). Vocational interests of persons with spinal cord injury. Journal of Counseling Psychology, 29 (3), 283-291.

Rohe, D. E., & Athelstan, G. T. (1985). Change in vocational interests after disability. Rehabilitation Psychology, 30 (3), 131-143.

Rohe, D. E. & Krause, J. S. (1998). Stability of Interests After Severe Physical Disability: An 11-Year Longitudinal Study. Journal of Vocational Behavior, 52, 45-58.

Szymanski, E. M. (2000). Disability and vocational behavior. In R. G. Frank & T. R. Elliott (Eds.), Handbook of Rehabilitation Psychology. Washington, D.C.: American Psychological Association

Gladding, S. T. (2014). Counselling: A comprehensive profession. Pearson Education Inc. (Published by Dorling Kindersley (India) Pvt. Ltd., Noida for India).

Hough, M. (2014). Counselling Skills and Theory. Italy: Hodder Education.

Whiston, S. C. (2009). Principles and Applications of Assessment in Counselling. CA: Brooks/Cole Cengage Learning.

Paper IV : Community Based Rehabilitation

Hours: 60 Hours

Unit I: Goals and Objectives – Definition of CBR, Goals and objectives, key principles - equality, social justice, solidarity, integration and dignity

Unit II: Components – Creation of a positive attitude, provision of rehabilitation services, education and training opportunities, creation of micro and macro income generation opportunities, provision of long term care facilities, prevention of causes of disabilities and monitoring & evaluation

Unit III: Role of CBR professionals – As local advocates, liaison and continuity of care, continued supervision of home programs, community initiatives to remove barriers that affect exclusion, advocacy

Unit IV: Initiatives – Social counseling, training in mobility and daily living skills, community awareness raising, facilitating access to loans, vocational training, information for local self-help groups, contacts with different authorities, school enrolment

Unit V: Empowerment issues – Approaches for empowering - social mobilization, political participation, communication, self help groups and organization working for persons with disabilities

References:

Book should be of Latest Edition

Helander Einar (1999). Prejudice and Dignity – An Introduction to Community Based Rehabilitation, Second Edition, United Nations Development Program, NY

Community Based Rehabilitation and the health care referral services (1994), World health Organization

Community Based rehabilitation for and with people with disabilities (1994), UNESCO (Special Education) , WHO

Jonsson Ture (1994). Inclusive Education – United Nations Development Program

David Werner. Disabled Village Children: a guide for community health workers, rehabilitation workers families, The Hesperian Foundation, USA.

Einar Helander, Padmani Mendis and Gunnel Nelson. Training disabled people in the Community — a manual on CBR for developing countries, WHO, Switzerland.

Community Based Rehabilitation —Report of a WHO International Consultation, Colombo, Lanka,

Scheme of assistance to Organizations for disabled persons, Ministry of Social Welfare, Govt. of India, New Delhi.

Govt. of India Scholarships for the disabled persons: Ministry of Social Welfare, Govt. of India, New Delhi.

Programmes and Concessions for the disabled persons: Ministry of Social Welfare, Govt. of India, New Delhi.

Einar Helander (1984). Rehabilitation For All: a guide to the management of CBR

M.C. Narasimhan and A.K. Mukherjee. Disability: a Continuing Challenge, Wiley Eastern Ltd.,

Training Manual for Village Rehabilitation Workers, District Rehabilitation Centre Scheme, Ministry of Welfare, Govt. of India published by Wiley Eastern Ltd.

Mrs.Achala Pahwa (Ed.). Manual on Community Based Rehabilitation. Ministry of Social Welfare, Govt. of India.

Pilling, A. (1991). Rehabilitation and Community Care. London: Routledge

Expert Committee of following members for the development of training programmes for the categories of professionals/personnel, namely, Clinical Psychologists and Rehabilitation Psychologists

Prof. Amool Ranjan Singh, Head, Department of Clinical Psychology, RINPAS Kanke, Ranchi, 834006
Dr. S. P.K Jena, Dept. of Applied Psychology, South Campus, University of Delhi New Delhi-110021
Prof. P. Jeyachandran, Vijay Human Services,4, Laxmipuram, 3rd Street, Royapeetah Chennai-600 014
Dr. Tej Bahadur Singh, 38-42/1 House No.1,Mohinikunj Colony, Mahmoorganj, Varanasi-221010
Dr. K.B. Kumar, Amity Foundation for Developmental Disabilities, Sector 125, Noida, Uttar Pradesh 201303
The Head, Department of Clinical Psychology,Regional Institute of Medical Sciences (RIMS)Lamphelpat, Imphal, Manipur - 795 004
Dr. Rajeev Dogra, Professor & Head Psycho Social Unit, Dept. of Psychiatric Pt. B.D. Sharma PGIMS, Rohtak 124001
The Head, Department of Clinical Psychology, NIMHANS, Hosur Road, Bangalore-560 029
The Head, Dept. of Rehabilitation Psychology, NIMH, Manovikas Nagar, PO Bowenpally, Secunderabad- 500003
The Head, Department of Clinical Psychology, Institute of Mental Health and Hospital Billochpura, Mathura Road, Agra, 282002
Dr. Thomas Kishor, Department of Clinical Psychology, NIMHANS, Hosur Road, Bangalore-560 029
Prof. S S Nathawat, Amity University, NH 8, Kantkalwar, Jaipur, Rajasthan 303002
Shri Jagdish Sadiza, Institute of Human Behaviour & Allied Sciences, Shahdara, New Delhi 110095
Dr. Jashobanta Mahapatra, H.O.D. Clinical Psychology S.C.B Medical College & Hospital, Cuttack-753007, Odisha
S K Srivastava, Member Secretary, RCI- Member (Ex-Officio)
Suman Kumar, Deputy Director (Prog.), RCI-Convener (Ex-officio)

School of Regional Studies and Research

Syllabus

M.A. in Rural Development
Session: 2017-2019

Pt. Ravishankar Shukla University, Raipur -492010
Chhattisgarh, India

(Dr. Mitashree Mitra)
Professor & Head
School of Regional Studies and Research
Pt. Ravishankar Shukla University

School of Regional Studies and Research
Pt. Ravishankar Shukla University Raipur (C.G.)
M.A. in Rural Development
Semester wise distribution of Courses and Credit

Semester/paper	Course Code	Title of the Paper	External Marks		Internal Marks		Credit
		2017-2018	**Maxi.**	**Min.**	**Maxi.**	**Min.**	
First	RD 101	Rural Development: Indian Context	80	16	20	4	4
	RD 102	Rural Development: Planning and Management	80	16	20	4	4
	RD 103	Rural Development Programmes and Evaluation	80	16	20	4	4
	RD 104	Rural Social Problem	80	16	20	4	4
	RD 105	Panchayati Raj and Rural Administration	80	16	20	4	4
		Total	**400**		**100**		**20**
Second	RD 201	Urban Planning	80	16	20	4	4
	RD 202	Rural Economy & Industrialization	80	16	20	4	4
	RD 203	Rural Health Care	80	16	20	4	4
	RD 204	Scientific Research Methodology in Rural Development	80	16	20	4	4
	RD 205	Tribal Development	80	16	20	4	4
		Total	**400**		**100**		**20**
		2018-2019					
Third	RD 301	Communication and Extension in Rural Development	80	16	20	4	4
	RD 302	Rural Social Development	80	16	20	4	4
	RD 303	Voluntary Action in Rural Development	80	16	20	4	4
	RD 304	Land Reforms and Rural Development	80	16	20	4	4
	RD 305	Project Report based on Field Work	80	16	20	4	4
		Total	**400**		**100**		**20**
Fourth	RD 401	Entrepreneurship and Rural Development	80	16	20	4	4
	RD 402	Natural Resources & Sustainable Development	80	16	20	4	4
	RD 403	Internship	80	16	20	4	4
	RD 404	Presentation	80	16	20	4	4
	RD 405	Viva	80	16	20	4	4
		Total	**400**		**100**		**20**
		Grand Total	**1600**		**400**		**80**

Choice Based Credit Program(CBCP) (For Students of School of Regional Studies and Research)

CBCP	CBCP 101	Regional Demography & Development			3

Choice Based Credit Program(CBCP) (For Students of other Department)
(Other department students may opt any one of it)

1. CBCP	CBCP 102	Rapid Assessment			3
OR 2. CBCP	CBCP 103	Applied Research Methodology			3
OR 3. CBCP	CBCP 104	Corporate Social Responsibility			3

Note:-

1. The Credit of the Core Subject are mandatory based on the Course selected.
2. 20% marks in each subject are earmarked for assignments/seminar/unit test/viva
3. Any one paper proposed under Choice Based Credit Programme (CBCP) may be obtained by the students of other department in Semester – III.
4. CBCP will be run only when minimum ten students will opt. it.
5. CBCP paper proposed for internal students may be obtained in Semester – III.

M.A. in Rural Development
Session: 2017-18
Semester- I
Paper-I
Course Code: RD 101
Title: Rural Development: Indian Context

Credit: 4

Unit- I

Rural Development – An overview, Importance, Scope & Objectivities, Traditional and Modern Concept of Development: Indicators of development: Theoretical approach to development (Marx, Rostov, Myrdal, International Dependence Theory).

Unit- II

Introduction to Rural Development, Rural Demography, Rural Social Structure, Rural Economy Structure, Rural Poverty, Strategy of Rural Development.

Unit- III

Agrarian Movement, Land Reforms, Green Revolution, Agricultural Extension Services.

Unit- IV

Various approaches to Rural Development – Gandhian approach for Community development, I.A.D.P., I.R.D.P., N.R.E.G.A., Neo Gandhian, (PURA), Need Based and demand based centers. Rural Development experiences of some Asian Countries – China,Malaysia, Sri Lanka, Bangladesh.

Unit -V

Social Change : Mobility & Mobilization, Empowerment, Information, Education and Communication, Information Technology and Rural Development.

Books Recommended:

1. Desai, Vasant. **Rural Development in India.** New Delhi: Himalaya, 2005.
2. IGNOU. **Rural Development: Indian Context.** New Delhi: IGNOU, 2005.
3. Narwani, G. S. **Training for Rural Development.** New Delhi: Rawat Publications, 2002.
4. Rao K. Hanumantha , **Rural Development Statics : 2007-08,** National Institute of Rural Development Ministry of R. D., Govt. of India, Rajendra Nagar, Hyderabad – 30 July, 2008.

Paper - II
Course Code: RD 102
Title: Rural Development Planning and Management

Credit: 4

Unit- I

Planning for Rural Development: Definition. Planning Process, Stage of Planning, Theories of Planning. Characteristics of Strategy in Planning.

Multi-level Planning, District Planning.

Unit- II

Grassroots Level Planning: Approaches, Need of Grassroots Level Planning.
Block Level Planning: Working Groups.
Village Level Planning: Rural Development Programs, Role of Panchayti Raj, Gram Sabha.

Unit- III

Issue in Management of Rural Development Projects, Project Dimension, Identification and Formulation.

Unit- IV

Project Appraisal-I (Technical Feassibility)

Project Appraisal-II (Economic Feassibility)

Project Appraisal-III (Financial Feassibility)

Programme Implementation (Activity Planning and Network Analysis), Monitoring Development Projects, Project Evaluation.

Unit- V

Voluntary Effort in Rural Development, Voluntary Agency Administration, Developing Community Based Programmes and Projects, Social Action, Formation and Strengthening of Voluntary Organisations.

Books Recommended:

1. David I Cleland, **Project Management: Strategic designed implementations** – McGrow Hill : McGrow Hill inc, 1995.
2. Gopalkrishnan P, **Text book of project management**, MacMillan and V. E. Rammurthi Indu. Ltd., 1993.
3. Goudman J., **Integrated project planning and management cycle**, Hawai: Ralph Ngalala Love East West Centre, 2000.

Paper – III
Course Code: RD 103
Title: Rural Development Programme & Evaluation

Credit: 4

Unit-I

Background of Rural development Programmes, Pre-Independence era, Post-Independence era Poverty Alleviation Programmes- A Restrospect, Minimum Needs Programme, Integrated Rural development Programme, TRYSEM and DWCRA, Jawahar Rozgar Yojana(JRY), Employment Assurance Scheme(EAS)

Unit- II

Swarnajayanti Gram Searozgar Yojana (SGSY)-1, Swarnajayanti Gram Searozgar Yojana (SGSY)-2, Sampoorna Grameen Rozgar Yojana (SGRY), National Social Assistance Programme(NSAP), Food Security- TPDS

Unit- III

Prime Minister's Rozgar Yozara(PMRY), Rural Employment Generation Programme (REGP), Rashtriya Mahila Kosh, Programme of Development Finance Corporations.

Unit- IV

Elementary Education and Total Literacy Campaign, Rural Housing, Rural Health Care, Drinking Water and Rural Sanitation, Rural Electrification & Energy, Rural Connectivity.

Unit- V

Desert Development Programme and Desert Development Programme, Integrated Wasteland Development Programme, Science and Technology for Rural Development, Evaluation of Rural Development Programmes through different community, Suggestion & Recommendation.

Books Recommended :

1. प्रा. डॉ. बोबडे, प्रकाश **भारतीय समाज रचना** : पारंपारिक आधुनिक श्री. मंगेश प्रकाशन, श्री शांतीदुर्गा निवास, 23 नवी रामदासपेठ, नागपूर 1998.
2. डॉ. कन्हाडे बी. एम. **ग्रामीण व नागरी समाजशास्त्र** पिंपळापुरे ॲण्ड कं. पब्लिषर्स, नागपूर 2005.
3. डॉ. झामरे जी. एन. **भारतीय अर्थव्यवस्था , विकास व पर्यावरणात्मक अर्थशास्त्र** पिंपळापुरे ॲण्ड कं. पब्लिषर्स, नागपूर 2006.

4. प्रा. निबाळकर, संजिव के. **समाजकल्याण** केषव–कृश्णा प्रकाशन, 14 विदयानगर, चंद्रपूर 2005.
5. यादव, रामजी **भारत में ग्रामीण विकास** अर्जुन पब्लिषिंग हाउस, नई दिल्ली 2008.
6. Desai, Vasant. **Rural Development in India,** Mumbai: Himalaya Publishing House, 2005.
7. Prakash, I. Satya. **Rural Development in India,** New Delhi: Himalaya Publishing House, 2005.

Paper - IV
Course Code: RD 104
Title: Rural Social Problem

Credit : 4

Unit - I

Inequality of Caste : Definition, Characteristics, constructive demerits of caste inequality, Problems of Lower or untouchable caste, changing pattern of Leadership (Caste base)

Unit - II

Tribal Issues and Problems : Meaning, disabilities, problems, constitutional provisions to solve the problems, government measures for development. Problems and Remedies of the Backward classes.

Unit - III

Role and Status of Women : Role of gender inequality, status of women in different ages, nature of women disabilities in Indian society, causes of women decline, women's problem in present age.
Dowry : Meaning, causes, evils, prohibition act, solution
Domestic Violence : Meaning of violence against women, nature of violence, major causes of rape.

Unit – IV

Problems related to Land : Types of techniques of farm production, problems of land owners and Landless Labours and artisans, measure to reduce rural problems, trends of land acquisition by Businessmen, industrialist, politicians and Bureaucrats.

Unit - V

Displacement and Rehabilitation : Meaning of rehabilitation, movement related to displaced folk, causes of displacement, measures of displacement.
Migration : Nature, adverse effect and measures of migration.

Books Recommended :

1. डॉ. कन्हाडे बी. एम. **समाजशास्त्र : प्रश्न व समस्या** पिंपळापुरे ॲण्ड कं. पब्लिशर्स, नागपूर 2009.
2. डॉ. महाजन, संजिव **आधुनिक भारतमें समाजिक परिवर्तन** अर्जुन पब्लिशिंग हाउस, असारी रोड, दरियागंज, नई दिल्ली 2001.
3. Dr. Sundaram, I. Satya. **Rural Development.** Mumbai: Himalaya Publishing House, 2002.
4. Datt and Vasant. **Fundamental of Rural Development,** New Delhi: Rawat publication. 1991.

5. Datt and Rudra. **Growth Poverty and Equality** New Delhi: Deep and Deep Publication. 2008.
6. Khanna. Sulbha. **Rural Development,** New Delhi: Sonali Publication. 2003.
7. Prasad. B.K. **Rural Development,** New Delhi: Surupand Sons, 2003.

Paper - V
Course Code: RD 105
Title: Panchayati Raj and Rural Administration

Credit : 4

Unit - I

Programmes for Rural Development in India since Independence.
Rural Development policies during planning period; Administrative structure.

Unit - II

The focus and thrust of Rural Development programmes: Poverty alleviation, employment generation
Social mobility, mobilization and change; Meaning of empowerment, economic, political, Social and cultural empowerment

Unit - III:

Agricultural Extension Services; Emergence and
Growth of Panchayati Raj Institutions in India; People and Panchayati Raj Financial Organizations in Panchayati Raj Institutions

Unit - IV

Rural Development Administration and Panchayat Raj Institutions : Panchayat Raj System, functions of Panchayat Raj System, Sources of income for Panchayats, merits and demerits of Panchayat system, strengthening of Panchayat Raj System, Rural Development administration.

Unit - V

Agriculture diversification, Population; pressure, small holdings, infrastructure, rural development. Role of Women in Rural Development, Marginalization of Women in Land Reform Agenda.

Books Recommended:

1. Desai, Vasant. **Fundamentals of Rural Development.** New Delhi: Rawat Publications, 1991.
2. Meier, Gerald (ed.). **Leading Issues in Economic Development** New Delhi: Oxford Uni. Press, 1987.
3. Prasad, B.K. **Rural Development: Concept, Approach and Strategy**, New Delhi: Sarup & Sons, 2003.
4. Rau, S.K. **Global Search for Rural Development,** Hyderabad: NIRD, 2001.
5. Satya Sundaram, I.. **Rural Development,** Mumbai: Himalaya, 2002.

Session: 2017-18
Semester-II
Paper - I
Course Code: RD 201
Title: Urban Planning

Credit: 4

Unit - I

Definition, Rationales and Foundations of Planning. Various definitions of town and country planning; Goals and objectives of planning; Components of planning; Benefits of planning;

Unit - II

Theories of Urbanization and Theories of City Development, Theories of urbanization including Concentric Zone Theory; Sector Theory; and the Multiple Nuclei Theory; Land use and Land Value Theory of William Alonso. Scientific Rationalism, Advocacy Planning and Equity Planning Theory.

Unit - III

Compact city approach: concept, advantages and limitations; forms of cities in developing world. Forms of cities in the former and present socialist countries.

Unit - IV

Basics of Planning Techniques. Planning practice in India, an overview. Methods of identifying urban and regional problems, setting of goals, objectives and priorities. Performance standards, spatial standers and standers for utility.

Unit - V

Relevance of rural area for urban development, mutual dependence between urban and rural areas, between industry and agriculture. Characteristics of symbiotic development and the pattern of urban development. Ecological and environmental considerations in rural development and village planning. Rural energy issues, renewable and alternative sources of energy.

Books Recommended:

1.P.Healey. **Planning Theory**. Pergamon Press 1981.

2. Andrews. Richard B. **Urban growth and development: A problem approach**. New York.: Simmons Boardman. 1962.

3. Ferguson. T: Benjamin. B.; Daley. Allen: Glass. D.V.: Mckeown. Thomas; Johnson. Gwendolyn Z: Mackintosh. J.M.. **Public health and urban growth**. London: Center for Urban Studies. 1964

4. Adrian. Charles R. **State and local Governments: A study in the political process**, New York: McGraw-Hill Book 1960

7. Humes. Samuel. **Structure of local governments throughout the world**, Hague: Martinus Nijhoff 1976.

8. New Delhi. IIPA: **Urbanization and urban development**; New Delhi. IIPA 1968

9. India. Ministry of Welfare & Housing. **TCPO. Project Planning Division: Report on norms and space standards for planning of public sector project towns**. Delhi: Govt of India Press.

Paper - II
Course Code: RD 202
Title: Rural Economy & Industrialization

Credit: 4

Unit - I
Concept and Nature of Rural Economy, characteristic of rural Economy, Factors affecting rural Economy Rural Industrialization Need, rural Infrastructure and industrialization, progress and problem of rural industrialization in Indian Rural Approach.

Unit - II

Basic Needs of Rural Economy; Housing; Health, education, Training, drinking water supply; Electricity, sanitation, rural Roads, transport, Potential areas for rural self-employment with special reference to agro industries. The role of co-operation in Rural Industrialization

Unit - III
The policies & programmes for rural industrial development during planning era..
Important progrmmes for Industrial development of rural areas, micro, small and medium industries. Globalization of Rural economy.

Unit - IV
Need of rural employment, characteristics of rural employment
Incidence and type of Unemployment in rural area. Rural employment programmes and its impacts & evaluation.

Unit - V
Nature of Rural poverty causes, measurement of poverty. Poverty eradication programmes and its outcomes Need based education and training for rural youth Development of Interpreneriship abilities among rural students. Poverty eradication programmes and its impacts

Books Recommended:

1. Satya, Sundaram. **Rural Development** Mumbai: Himalaya, 2002.
2. Datt, Rudra & Sundharam **Indian Economy** New Delhi: S. Chand, 2008.

Paper - III
Course Code: RD 203
Title: Rural Health Care

Credit: 4

Unit- I

Health : Concepts and Concepts and Components. Health and Development. Development of Health Care Services in Rural India : A Review.

Unit- II

Health and Nutrition Status in Rural India. Different Models of Health Care Delivery: An Outline

Unit- III

Communicable Diseases in India – An Overview. Prevention and Control of Communicable Diseases in Rural India.

Unit- IV

Reproductive and Child Health Programme (RCH). MCH

Unit- V

Planning Rural Helth Care Services. Management of Rural Health Care Services. Communication and Health Education : An Outline NGO Experience in Health Care.

Books Recommended:

1. **Urban–Rural Health Comparisons: Key results of the 2002/03**. New Zealand: Health Survey. Wellington: Ministry of Health.
2. Satya, Sundaram. **Rural Development** Mumbai: Himalaya, 2002.

Paper - IV
Course Code: RD 204
Title: Scientific Research Methodology in Rural Development

Credit: 4

Unit - I

Introduction to Scientific Research : Purpose, Nature and Scope, Research in Rural Development Retrospect : National and International Perspectives.

Unit - II

Research Process I : Formulation of Research of Research Problem

Process II : Preparing a Research Proposal

Unit - III

Scientific Methods of Social Research, Descriptive and Experimental Reseachm Evaluation and Action Research, Naturalistic Inquiry and Case Study.

Unit - IV

Methods of Sampling, Tools of Data Collection, Interview, Observation, Documents as Tools, Data Collection.

Unit - V

Writing a research proposal, Research Report Writing : Structure, clarity and consistency; chapter-scheme, preparation of bibliography and reference, Methods of presentation, appendices, review of literature, computer-application in research. Qualitative Data Processing and Analysis, Advance Techniques : Aerial photography- Basic principal and techniques of photogrammetric, Remote sensing technique.

Books Recommended:

1. Crabtres & Miller (ed.). **Doing Qualitative Research.** New Delhi: Sage Publications, 2000.
2. Denzin & Lincoln (eds.). **Handbook of Qualitative Research.** New Delhi: Sage Publications, 2000.
3. Herekar, P.M. **Research Methodology and Project Work .** Kolhapur: Phadke Prakashan, 2004.
4. Kumar, P.S.G. **Research Methods and Statistical Techniques**. Delhi: B.R. Publishing Co., 2004.
5. Marshall & Rošaman, **Designing Qualitative Research.** New Delhi: Sage Publications, 1999.

Paper – V
Course Code: RD 205
Title: Tribal Development (With special reference to Chhattisgarh)

Credit: 4

Unit - I

Definition of Tribe, Characteristics, Classification – Geographical, Linguistics, Economic and Racial, Difference between Schedule Caste and Scheduled Tribe Constitutional Safeguards for Scheduled Tribes.

Unit - II

Tribal Development : Concept and Objectives, Tribal Development Plans, Programmes and their Implementation, Tribal Sub-Plan, Scheduled and Tribal Area, Role of Non-Governmental Organization (NGO) in Tribal Developments.

Unit - III

Major Tribes of Chhattisgarh : Gond (Muria, Maria), Oraon, Kawar, Halba, Binjhwar.Primitive Tribes of Chhattisgah: Abujhmaria, Pahari Korwa, Kamar, Baiga, Birhor.Their Social Organization : Family, Marriage, Economic, Religious, Political, Youth Dormitories etc.

Unit - IV

Forest and Tribal's, Critical review of Forest policies, Deforestation and Tribals, Forest Management and Tribal Welfare, History of Tribal Movements in India with special reference to Chhattisgarh.

Unit - V

Tribal Problems: Different approaches to Tribal problems, Major Tribal Problems: Land alienation, Displacement and Rehabilitation, Industrialization and Urbanization Naxal Problem in Tribal Area.

Books Recommended:

1. Verrier Elwin, **Muria and Their Ghotul: Kingdom of the young** (abridged edition), New Delhi: Vanya Prakashan, 1991.
2. Verrier Elwin, **The Baiga,** New Delhi: Gyan Publishing House, 2002.
3. Verrier Elwin, **Maria, Murder and Suicide.** New Delhi: Vanya Prakashan, 1991

4. Vidhyarthi & Rai. **The Tribal Culture of India.** New Delhi: Concept Publishing Company. 1985.

5. Nadeem Husnain. **Tribal India,** Delhi: Palka Prakashan. 2006.

6. Sir Wilfrid Grigson . **The Maria Gonds of Bastar,** New Delhi: Vanya Prakashan. 1991.

7. R.C. Verma. **Indian Tribes Through the Ages,**. New Delhi: Publication. Division. Govt. of India. 1995.

8. Majumdar. D.N..**Reces and Cultures of India**. New Delhi: Kalyani Publishers. 1990.

9. उपाध्याय एवं शर्मा, भारत की जनजातीय संस्कृति, भोपाल: म.प्र. हिन्दी ग्रंथ अकादमी, 2004.

10. पी.आर. नायडूए भारत के आदिवासी विकास की समस्याएँ नई दिल्ली: राधा पब्लिकेशन, 2002.

Semester – III
Session: 2018-19
Course Code: RD 301
Title: Communication and Extension in Rural Development

Credit: 4

Unit - I

Meaning, Concept and Functions of Communication, Communication Channels and their Use in Rural Development.

Unit - II

Communication-Media Mix for Rural Development, Role of mass communication in social change. Traditional and modern means of mass communication.

Unit - III

Concepts, Philosophy and Principles of Extensoin, Historical Development of Rural Extension in India Types of Rural Extension, Extension Methods

Unit - IV

Forms of communication: Verbal, non-verbal and written, Development Communication, Communication in Social Work Profession

Unit - V

Communication Support, Extension Management, Organistional Communication, Communication Strategies for Rural Development – Media Mix

Books Recommended:

1. Gamble, T.K. & Gamble, M . **Communication Works,** McGraw Hill. 2002.
2. Knapp, M.L. & Miller, G.R. **Handbook of Interpersonal Communication,** Sage
3. Publications. 1985.
4. Melkote, Srinivas, **Communication for Development in the Third World**, Theory and Practice . Sage Publications. 1991.
5. Owen, Hargie, **The Handbook of Communication Skills,** Routledge. 2006.
6. Treholm, Sarah, **Thinking through Communication: AN Introduction to the Study of Human Communication**. Allyn & Bacon.1993.
7. Thompson, Neil, **Communication and Language: A Handbook of Theory and Practice' Palgrave.** Macmillan, 2003.
8. Morreale, Spitzberg & Barge, **Human Communication: Motivation, Knowledge and Skills,** Wadsworth: Thomson Learning, 2001.

Paper – II
Course Code: RD 302
Title: Rural Social Development

Credit: 4

Unit - I

Rural Women : Status and Development Strategies, Education and Training fo Rural Women, Health and Nutrition of Rural Women.

Unit - II

Empowerment of Rural Women (Gender Frame Work Approach), Empowerment of Rural Women- Policies and Programmes.

Unit - III

Situation of Rural Children, Health and Nutrition of Rural Children, Education of Rural Children, Integrated Child Development Services Programme.

Unit - IV

Development of Scheduled Castes, Development of Scheduled Tries, Bonded Labour . Development of Artisans and Landless Laboures.

Unit - V

Social Legislations on Children, Social Legislations on Women, Social Legislations on Scheduled Castes and Schedule Tribes, Other Social Legislations.

Books Recommended:

1. Dr. Sundaram, I. Satya. **Rural Development.** Mumbai: Himalaya Publishing House, 2002.
2. Datt and Vasant. **Fundamental of Rural Development.** New Delhi: Rawat publication, 1991.
3. Datt and Rudra. **Growth Poverty and Equality.** New Delhi: Deep and Deep Publication, 2008.
4. Khanna, Sulbha. **Rural Development.** New Delhi: Sonali Publication, 2003.

Paper – III
Course Code: RD 303
Title: Voluntary Action in Rural Development
(With special reference to Chhattisgarh)

Credit: 4

Unit - I

Voluntarism – Theoretical Issues. Voluntay Associations in a Democratic Society. VOS. the State and Development – Delicate Relationship. Philosophy and Nature of Non-Profit Organisations

Unit - II

Organistatioon and Structure of VOs, Voluntary Agency Administration and Management. Vos : Issues and Agenda for Social Transformation. Vos – Finace and Resource Mobilisation

Unit - III

Voluntary Effort in Rural Development – A Critical Appraisal. Nature and Types of Vos in Rural India. Problems faced by Vos in Rural Areas. Vos and Rural Development at Cross-Roads

Unit - IV

State Sponsored Vos and Rural Development. Community Based Vos and Rural Development.

Unit - V

Some Successful Experiences. Global Voluntary Effort in Rural Development.

Books Recommended:

1. **The Hindu survey of Envioronment** 1993, 1994,1995,1996,1997,1998.
2. **The Hindu survey of Agriculture** 1993, 1994,1995.1996,1997,1998.
3. Mark A Robinson, **Evaluating the impact of NGOs in Rural Poverty Alleviation : Indian country study,** London: Development Institute, 2002.

Paper – IV
Course Code: RD 304
Title: Land Reforms and Rural Development

Credit: 4

Unit - I

Significance of Land Reforms in Rural Development. Origin and Development of Land Tenure Systems in India. Land Tenure Systems and Agratian Structure – I

Land Tenure Systems and Agrarian Structure – II. Agratian Structure and Agratian Movements

Unit - II

Freedom Movemen and Quest for Land Reforms. Concepts and Strategies. Land Reform : Constitutional Status and State Legislations – I.

Unit - III

Land Reform : Constitutional Status and State Legislations – II. Land Reforms – Non Governmental Initiatives.

Unit - IV

Land Revenue Administration –I. Land Revenue Administration –II. Impact of Land Reforms on Rural Economy and Society.

Unit - V

Land Reforms : Social, Economic and Political Limitations. Panchayati Raj and Land Reforms. Land Reforms : Indian Experiences.

Books Recommended:

1. Mamoria & Tripathi. **Agricultural Problems of India** . New Delhi: Kitab Mahal., 2003.
2. Purushottam, P. (ed.). **Rural Technology for Poverty Alleviation**, Hyderabad: NIRD. 2004
3. Thaplial (ed.). **Challenges of Liberalisation to Indian Agriculture**. Hyderabad: NIRD, 2002.

Paper – V
Course Code: RD 305
Title: Project Report based on Field Work

Credit: 4

Dissertation/ Field work report is to provide an opportunity to the students to conduct an original study and develop a subject of their choice in coordination with Heal or Supervisor with adds significantly to the knowledge of urban and regional planning. this attempt would also give a chance to the students to demonstrate their abilities to use and apply planning theories and techniques they have learnt in theory subjects and to arrive at independent conclusions. Depending upon the theme of the thesis, investigations may involve original field work (collection of Primary data), compilation an analysis of data already available an critical analysis before its synthesis in the form of conclusion and policy recommendations..

The development project guidance on research methods, presentation techniques, and report writing and each student is compulsorily required to attend these courses.

Session: 2018-19
Semester – IV
Paper – I
Course Code: RD 401
Title: Entrepreneurship and Rural Development

Credit: 4

Unit- I

Entrepreneurship – Concepts and Theories. Evolution fo Entrepreneurship in India.

Unit- II

Democratic State. Development and Entrepreneurship. Market-Economy and Entrepreneurship Unleashing Rural Entrepreneurship

Unit- III

Entrepreneurship – Policies and Strategies . Types of Rural Entrepreneurship.

Unit- IV

Rural Entrepreneurship – Successful Experiences. Rural Entrepreneurship – International Experiences. Domains of Rural Entrepreneurship

Unit- V

Planning a Rural Enterprise. Human Rsources and Infrastructure. Arranging of Finance. Managing a Rural Enterprise. Marketing Rural Products and Servies.

Books Recommended:

1. Battacharya. S.N.. **Rural Industrialization in India,** Delhi: Vikas Press. 2002.
2. Desai. Vasant. **Rural Development in India.** New Delhi: Himalaya. 2005.
3. IGNOU. **Rural Development: Indian Context.** New Delhi: IGNOU. 2005.
4. Narwani. G. S. **Training for Rural Development**. New Delhi: Rawat Publications. 2002.

Paper – II
Course Code: RD 402
Title: Natural Resources and Sustainable Development.

Credit: 4

Unit-I

Natural Resources: Meaning and Type. Importance of Natural Resource. Concept of ESP: Equality, Sustainability and Peace. Natural Resources in Chhattisgarh: Land, Forest and Minerals.

Unit-II

Sustainable Development: Meaning and Concept. Development and Sustainable Development. Role and need of sustainable Development in Natural and Social surrounding. Role of tradition knowledge for sustainable development.

Unit-III

Energy and Sustainability. New-renewable Energy Sources. Global Climate Change.

Energy from Coal, Petroleum, Gas, Wind and Solar Power, Bio-Gas.

Unit-IV

Forest resources and distribution. Major forest types. Use and over-exploitation of Forest. Deforestation and their effects on forest and tribal life.
Forest Policy, Joint Forest Management, Eco-development Plan.

Unit-V

Water Resources and its traditional management with special reference to Chhattisgarh.
Global Warming and Sustainable use of Natural Resources.
Pollution: Meaning and Type. Water Pollution, Air Pollution, Noise Pollution.

Book Recommended:

1. Agyeman, Juliann, Robert D. Bullard and Bob Evans (Eds.), **Just Sustainability: Development in Unequal World**, London: Earth scan. (Introduction and Conclusion.2004.
2. Brulle, R. J., Carmichael, J., & Jenkins, J. C., **Shifting public opinion on climate change: an empirical assessment of factors influencing concern over climate change in the US, 2002-2010**. US: US press, 2012.

Paper – II
Course Code: RD 403
Title: Internship

Credit: 4

Through internship students will –

1. Get experience in actual work situation
2. Practice skills of guidance and counseling already learned during the course
3. Develop an insight into the causal relationships in the problems of students regarding school environment.
4. Develop the ability to co-ordinate among teachers, parents and management.

Duration of Internship will be 2-3 months.

During the internship period students will identify the problems, identify strengths and weaknesses, develop and execute programme for enhancing the abilities motivation etc. They will also handle the problem cases of varied types as referred to them. The students will maintain the record of their work during internship; get it signed by their supervisor from time to time. In the end, they will have to produce a certificate of successful completion of internship signed by the Head of the Institution/ Principal and the authorities where internship has been done and also by the Head of the department.

RD 404: Presentation based on Internship **Credit: 4**

RD 405: Viva based on Internship **Credit: 4**

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)

Choice Based Credit Program for students of Regional Studies

Session: 2017-18
Course Code: CBCP 101
Title: Regional Demography and Development

Credit: 03

Unit -I: Regional Composition of Population :

Age Composition- Sex Composition- Ethnic Composition- Educational Composition- Religious Composition- Economic Composition etc.

Regional Birth Rate and Death Rate:

Conception- early childhood- toilet teaching- late childhood (all sub- topics with reference to urban and rural and tribal and non-tribal).

Unit-II: Regional Migration :

Immigration and Emigration - push and pull factors-economic, religious, social etc.

Unit-III: Regional Development :

Concept: Natural and Human Resource – Sustainable development and Inclusive growth. Pogramme for and Evaluation on urban, rural and tribal development

Books Recommended:

1.Baudisch, Annette, **Inevitable Ageing: Contributions to Evolutionary- Demographic Theory, Demographic Research Monograph**, Max Plank: Institute for Demographic Research, 2008.

2. Becker , **An Economic Analysis in Fertility in Demographic and Economic Change in Developed Countries, NBER Committee for Economic Research**, Princeton: Princeton University Press, 1960.

3. Benefo,Kofi and Schultz, T.Paul ().Fertilityand **Child Mortality in Cote d'Ivoire and Ghana**, World Bank Economic Review, Vol.10, No.1, PP.123-158, 1996.

4. Chanana and P.P.Talwar , **Aging in India: its socio-economic and health implications**, Asia-Pacific Population Journal, Vol.2, no.3 pp.23-35,1987.

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)

Choice Based Credit Program for students of other department

Course Code: CBCP 102
Title: Rapid Assessment

Credit: 03

The course is meant for six weeks. The first four weeks will be engaged for classes, where the contents of section I will be taught by the faculty members.

During the next two weeks, first ten days will be engaged for field work, and next five days for preparation of report and viva-voce examination.

Section-I

Unit-I : Role of Anthropology/ Social Scientist in Rural development- Chief Characteristic of anthropology (participate observation, field work, cultural relativism) and holistic study.

Unit-II : Basic techniques of data collection: observation, interview, questionnaire, schedule and genealogical table method.

Unit- III: RRA (Rapid Rural Appraisal) and PRA (Participatory Rural Appraisal) Report Writing.

Section II

The candidates are required to conduct field work in any tribal or rural or urban area of the state under the supervision of a professor-in-charge. After the completion of the field work they have to prepare a report, which will be examined by an external examiner, who will also conduct the viva-voce examination.

Books Recommended:

1. Crabtres & Miller (ed.). **Doing Qualitative Research.** New Delhi: Sage Publications, 2000.
2. Denzin & Lincoln (eds.). **Handbook of Qualitative Research.** New Delhi: Sage Publications, 2000.
3. Herekar, P.M. **Research Methodology and Project Work .** Kolhapur: Phadke Prakashan,2004.
4. Kumar, P.S.G. **Research Methods and Statistical Techniques.** Delhi: B.R. Publishing Co., 2004.
5. Marshall & Rosaman, **Designing Qualitative Research.** New Delhi: Sage Publications, 1999.

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)

Choice Based Credit Program for students of other department

Session: 2018-19
Course Code: CBCP 103
Title: Applied Research Methodology

The course will helpful to provide field training

Credit: 03

Unit-I : Role of Anthropology in Rural development- Chief Characteristic of anthropology (participate observation, field work, cultural relativism) and holistic study.

Unit-II : Basic techniques of data collection : observation, interview, questionnaire, schedule and genealogical table method.

Unit-III : Qualitative and Quantitative research
Research Design and its type. Preparation of a research design.
Sampling method and its types. Report Writing.

Books Recommended:

1. Crabtres & Miller (ed.). **Doing Qualitative Research.** New Delhi: Sage Publications, 2000.
2. Denzin & Lincoln (eds.). **Handbook of Qualitative Research.** New Delhi: Sage Publications, 2000.
3. Herekar, P.M. **Research Methodology and Project Work .** Kolhapur: Phadke Prakashan, 2004.
4. Kumar, P.S.G. **Research Methods and Statistical Techniques**. Delhi: B.R. Publishing Co., 2004.
5. Marshall & Rosaman, **Designing Qualitative Research.** New Delhi: Sage Publications,1999.

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)

Choice Based Credit Program for students of other department

Course Code: CBCP 104

Title: Corporate Social Responsibility

Credit: 03

Indian entrepreneurs and business enterprises have a long tradition of working within the values that have defined our nation's character for millennia. India's ancient wisdom, which is still relevant today, inspires people to work for the larger objective of the well-being of all stakeholders. These sound and all-encompassing values are even more relevant in current times, as organizations grapple with them challenges of modern-day enterprise, the aspirations of stakeholders.

The proposed course will help the student's better understanding.

Unit-I: Meaning and Definition of Corporate Social Responsibility (CSR), CSR and Strategic Branding in Rural India, CSR Practices in India.

Unit-II: Corporate and Rural Development, Public Private Partnerships, Stakeholder Engagement, Cause and Social Marketing, Environmental responsibility, socially Responsible investing

Unit-III: Corporate Social Responsibility in view of Ministry of Corporate Affairs, India, Companies ACT, 2013, Section 135, 149, 182, 198, 380, 381, 08.

Books Recommended:

1. Waddock, S., **Making a difference? Corporate responsibility as a social movement.** ***Journal of Corporate Citizenship***, 33, 35-46, 2009.
2. Mishra and Puri, **Growth and Development**, Himalya publishing house, 2004.

School of Regional Studies and Research

Syllabus

Post Graduate Diploma in Regional Planning and Development
Session: 2017-2018

Pt. Ravishankar Shukla University, Raipur -492010
Chhattisgarh, India

5/14/16

(Dr. Mitashree Mitra)
Professor & Head
School of Regional Studies and
Pt. Ravishankar Shukla University
RAIPUR (C.G.)

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)
Post Graduate Diploma in Regional Planning and Development
Syllabus
2017-2018
Scheme of Examination

Semester	Course code	Paper No.	Name of the Paper	External marks	Internal Marks	Total Marks	Credit	Passing Marks
First	PGDRPD 101	I	Regional Planning and Development	80	20	100	4	40
	PGDRPD 102	II	Research method and Computer Applications	80	20	100	4	40
	PGDRPD 103	III	Tribal Development	80	20	100	4	40
	PGDRPD 104	IV	Field based Minor project on Urban Planning	80	20	100	8	40
			Sub-Total	**320**	**80**	**400**	**20**	**160**
Second	PGDRPD 201	I	Research and Development Based Regional Needs	80	20	100	4	40
	PGDRPD 202	II	Rural Marketing & Finance	80	20	100	4	40
	PGDRPD 203	III	Dissertation / Field Report	80	20	100	8	40
	PGDRPD 204	IV	Viva	80	20	100	4	40
			Sub-Total	**320**	**80**	**400**	**20**	**160**
			Grand Total	**640**	**160**	**800**	**40**	**320**

Post Graduate Diploma in Regional Planning and Development

Session: 2017-18

Semester- I

Paper-I

Course Code: PGDRPD 101

Title: Regional Planning and Development

Credit: 4

Unit - I

Regional Planning: Concept, Scope and Objectives, Types of Regional Planning, Failure of Regional Planning, Concept of Sustainable Development. Regional Planning in India, Regional imbalances and Inequalities, Indicators of Regional Development and Regional Imbalance

Unit - II

Theories of Regional Planning, Development Models, Environmental Pollution : Concept, Types and Strategies of prevention, Environmental laws and their implementation, Policy instruments for controlling water and air pollution, The environment protection Act, Social forestry in India: rationale and benefits.

Unit – III

Approaches and Strategies of Regional Development: Growth Model - Meaning and Objectives, Types of Model, Rural Development Planning, Metropolitan planning (With reference to India) Balance and unbalanced Growth.

Unit – IV

Regional Policies in Five Year Plans. Introduction to 12th Five Year Plan. Globalization and its impact on India. Role of Regional Planning in National Development. Regional Planning in different fields: Irrigation and Regional Planning, Energy resources and Regional Planning

5/12/16

Books Recommended:

1. Desai, Vasant. **Rural Development in India.** New Delhi: Himalaya. 2005.
2. IGNOU. **Rural Development: Indian Context.** New Delhi: IGNOU, 2005.
3. Narwani, G. S. **Training for Rural Development.** New Delhi: Rawat Publications. 2002.
4. Rao K. Hanumantha , **Rural Development Statics : 2007-08,** National Institute of Rural Development Ministry of R. D., Govt. of India, Rajendra Nagar, Hyderabad – 30 July, 2008.

Paper-II
Course Code: PGDRPD 102
Title: Research methods and Computer Application

Credit: 4

Unit - I

Social Research: Concept, Objectives, Types, Importance, Scope, Selection of Research problem, Hypothesis. Social Survey Method

Unit - II

Tools and Techniques of data Collection-Observation, Interview, Questionnaire and Schedule, and Content Analysis, Sample and Sampling techniques. Measures of Central Tendency

Unit - III

Introduction to Computers: Types of Computers, Computer hardware and software.

DOS, Windows: Features, Desktop, Taskbar, Start Menu, My Computer, Recycle bin.

Unit – IV

MS Office: MS Word, MS Excel, Power Point, Outlook Express. SPSS (Evolution version).

Books Recommended:

1. Crabtres & Miller (ed.). **Doing Qualitative Research.** New Delhi: Sage Publications, 2000.
2. Denzin & Lincoln (eds.). **Handbook of Qualitative Research.** New Delhi: Sage Publications, 2000.
3. Herekar, P.M. **Research Methodology and Project Work .** Kolhapur: Phadke Prakashan, 2004.
4. Kumar, P.S.G. **Research Methods and Statistical Techniques**. Delhi: B.R. Publishing Co., 2004.
5. Marshall & Rosaman. **Designing Qualitative Research.** New Delhi: Sage Publications, 1999.

5/12/16

Paper-III
Course Code: PGDRPD 102
Title: Tribal Development (with special reference to Chhattisgarh)

Credit: 4

Unit - I

Definition of Tribe, Characteristics, Classification – Geographical, Linguistics, Economic and Racial, Difference between Tribe and Scheduled Tribe,Constitutional Safeguards for Scheduled Tribes.

Unit - II

Tribal Development : Concept and Objectives, Tribal Development Plans, Programmes and their Implementation, Tribal Sub-Plan, Scheduled and Tribal Area, Role of Non-Governmental Organization (NGO) in Tribal Developments.

Unit - III

Major Tribes of Chhattisgarh : Gond (Muria, Maria), Oraon, Kawar, Halba, Binjhwar.

Primitive Tribes of Chhattisgah : Abujhmaria, Pahari Korwa, Kamar, Baiga, Birhor.

Their Social Organization: Family, Marriage, Economic, Religious, Political, Youth Dormitories etc.

Unit - IV

Forest and Tribals,Critical review of Forest policies. Deforestation and Tribals.Forest Forest Management. Tribal Problems: Different approaches to Tribal problems, Major Tribal Problems: Land alienation, Displacement and Rehabilitation. Industrialization and Urbanization, Naxal Problem in Tribal Area.

Books Recommended:

1. Verrier Elwin. **Muria and Their Ghotul: Kingdom of the young** (abridged edition). New Delhi: Vanya Prakashan, 1991.
2. Verrier Elwin. **The Baiga.** New Delhi: Gyan Publishing House, 2002.
3. Verrier Elwin. **Maria, Murder and Suicide**. New Delhi: Vanya Prakashan, 1991

5/12/11

4. Vidhyarthi & Rai. **The Tribal Culture of India.** New Delhi: Concept Publishing Company, 1985.

5. Nadeem Husnain, **Tribal India,** Delhi: Palka Prakashan, 2006,

6. Sir Wilfrid Grigson , **The Maria Gonds of Bastar,** New Delhi: Vanya Prakashan, 1991.

7. R.C. Verma. **Indian Tribes Through the Ages,**. New Delhi: Publication. Division, Govt. of India. 1995.

8. Majumdar. D.N.,**Reces and Cultures of India,** New Delhi: Kalyani Publishers. 1990.

9. उपाध्याय एवं शर्मा**ए भारत की जनजातीय संस्कृति**, भोपाल: म.प्र. हिन्दी ग्रंथ अकादमी, 2004.

10. पी.आर. नायडू, **भारत के आदिवासी विकास की समस्याएँ**, नई दिल्ली: राधा पब्लिकेषन, 2002.

5/12/16

Paper-IV
Course Code: PGDRPD 104
Title: Field based Minor project on Urban Planning

Credit: 8

The course is designed to make the student carry out field work in the Urban Planning of project proposal, data collection, data analysis and report writing under the guidance of teacher assigned by the Head of the department using conventional and scientific methods at various stages of the field dissertation. The course aims at capacity building of the student in taking up independent research programmes. The students are required to work with the community for a period of 7-10 days . Two typed copies of analyzed data is to be submitted in the department in the form of a Field work Report.

5/12/16

Post Graduate Diploma in Regional Planning and Development

Session: 2017-18

Semester- II

Paper-I

Course Code: PGDRPD 201

Title: Research and Development based Regional Needs

Credit: 4

Unit I

Human Resources: Meaning, Importance in Regional Development.
Health in Rural Area: Problems and Solution. Role of Research in Health Problem.

Unit II

Applied and Action Research: Meaning, Differences between Applied and Action Research.
Use of Applied and Action Research in Regional Development.

Unit III

Data Analysis: Definition of Data, Types of Data.
Tabulation and Graphical Presentation of Data.
Report Writing.

Unit IV

Role and Importance of Statics in Research.
Measures of Central Tendency: Mean, Mode, Median.

Books Recommended:

1. Crabtres & Miller (ed.). **Doing Qualitative Research.** New Delhi: Sage Publications, 2000.
2. Denzin & Lincoln (eds.). **Handbook of Qualitative Research.** New Delhi: Sage Publications, 2000.
3. Herekar, P.M. **Research Methodology and Project Work .** Kolhapur: Phadke Prakashan, 2004.
4. Kumar, P.S.G. **Research Methods and Statistical Techniques**. Delhi: B.R. Publishing Co., 2004.
5. Marshall & Rosaman. **Designing Qualitative Research.** New Delhi: Sage Publications, 1999.

Paper-II
Course Code: PGDRPD 202
Title: Rural Marketing & Finance

Unit-I **Credit: 4**

Rural Marketing

- Concept-characteristics & scope of Rural Marketing.
- Factors of Rural Markets.
- Problem of Rural Marketing and Remedies.

Unit-II

Agriculture Marketing

- Concept, Nature & types of Agricultural Marketing
- Factors of Agricultural Marketing
- Significance & Problems of Agricultural Marketing

Unit-III

Agencies in Agriculture Marketing

- Marketing Inter -mediators
- Commission on Agriculture costs & prices (CACP)
- Agricultural Agencies 1. FCI (Food Corporation of India) 2. APMC (Agriculture Price & Marketing Council) 3. NAFED (National Federation)

Unit-IV

Concept of Basic Finance

- Introduction and Basic Concepts. Basic Economic Problem Choice and Scarcity.
- Deductive and Inductive Positive and Normative Economics Static and Dynamic Equilibrium
- Concept of Equilibrium: General Equilibrium v/s Partial Equilibrium Walrasian theory of General Equilibrium
- NABARD

5/12/16

Books Recommended:

1. Badi, V. Narayan, Badi, V. Narayan, **Rural Marketing**, Himalaya Publishing, 2014.
2. Bhowmik K.L., **Tribal India , A Profile in India Anthology**, Calcutta: World Press. 1971.
3. Hasnain, Nadeem ,**Janjatiya Bharat (in hindi)**, Jawahar publishers and Distribution,New Delhi, 2005
4. Kashyap. P., **Rural Marketing**, Pearson Publication. 2016.
5. Rabi N. Misra, **Marketing of Tribal Products**, Discover Publishng pvt. Ltd. 2002.
6. T.P. Gopalaswamy, **Rural Marketing: Environment, Problems and Strategies**. Vikas Publication. 2014.

5/12/16

Paper-III
Course Code: PGDRPD 203
Title: Dissertation /Field Report

Credit: 8

The course is designed to make the student carry out field work and research in the planning of the projects proposal, data collection, data analysis and report writing under the guidance of teacher assigned by the Head of the department in the area of Regional Planning and Development. The course aims at capacity building of the student in taking up independent research programmes to create a pool of professionals who could provide services to the local governments and NGOs working in the rural and urban areas for development of the region. Presentation and Viva of the Dissertation in the presence of External examiner and Head of the department consists of 40 marks (20+20).

Paper – IV
Course Code: (PGDRPD 204)
Title: Seminar & Viva

Credit: 4

5/12/16

School of Regional Studies and Research

Syllabus

Ph. D. Course Work 2017

Pt. Ravishankar Shukla University, Raipur -492010
Chhattisgarh, India

(Dr. Mitashree Mitra)
Professor & Head
School of Regional Studies and Research
Pt. Ravishankar Shukla University

5/12/2016

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)
Ph.D. Course Work Syllabus

Ph. D. Course Work 2017

DURATION: SIX MONTHS **M.M. 200**

	COURSE	MARKS
COURSE I	Research Methodology & Fundamental of Computer	100
COURSE II	Project Based on Review of Research work	50
	Seminar	50
	TOTAL	**200**

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)
Ph.D. Course Work Syllabus
Course-I Research Methodology & Fundamental of Computer

Max Mark-100

UNIT-I

Social Research: Concept & Objectives, Types of Research, Interdisciplinary Research Approach, Social Survey and Field Work (Tribal, Rural & Urban Area) Selection of Research problem & formulation of Hypothesis, Research Design

UNIT-II

Nature & Types of Data- Primary & Secondary data, Quantitative & Qualitative data. Use of Secondary Sources: Census, Survey Report of different Govt. Dept/Agency and Non-Govt. Organization,(NGO) Documents & Records, Sampling techniques: Meaning & significance of sampling, Types of Sampling, Merits & demerits of different sampling methods.

UNIT-III

Tools & Techniques of Data Collection observation, Interview, Questionnaire & Schedule, Case study.

UNIT- IV

Qualitative data analysis methods: Content analysis, Tabulation & Interpretation of Data, Report writing, Basic Knowledge of computer Application,

UNIT-V

Elementary Statistics

Measures of central tendency: Mean, Mode, Median
Measures of Variability: Range, Average deviation, standard deviation
Test of Significance: t-test, Chi-square Test.
Karl Pearson's Correlation Coefficient

Recommended Readings :

1. Goode & Hall (1983). Methods in Social Research, Mcgrew Hill, International Japan.
2. Young, P.V.(1984) Scientific Social Survey and Research Prentice Hall of Indian, New Delhi
3. MacConuik,L., Elementray Social Statistics
4. Raja Raman,V. (1996) Fundamental of Coputer Prentice Hall of India, New Delhi
5. Kenneth D. Bailey, 1982, Methods of Social Research, The free Press, London
6. Piergiorgio carbetta – 2003, Social Research: Theory, Methods & Techniques sage Publication, New Delhi.

COURSE – II **M.M. 100**

1. PROJECT BASED ON REVIEW OF RESEARCH WORK: Use of Literature, Knowledge of National and International Journals, Impact Factor, Citation Index, SCI Journals. (To be Supervised and evaluated by Guide Concerned).
   Literature search by SCOPUS, Google Scholar and Web of Science.

2. SEMINARS: Open Seminar, evaluation will be done by member of DRC.

5/12/2016

COURSE OF STUDIES FOR M.A. EXAMINATION IN SOCIOLOGY (UNDER SEMESTER SYSTEM IN UNIVERSITY TEACHING DEPARTMENT AND AFFILETED COLLEGES OF PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR (C.G.)

ACADEMIC SESSION (2017- 18)

M.A. Examination in Sociology shall be conducted in four semesters, each having 500 hundred marks, totaling to 2000 marks. The detailed Course Structure Semester wise is mentioned below.

Sl. No.	**Paper No.**	**Title**	**Marks**			
A. FIRST SEMESTER:(Effective from July 2017)						
S. No.	Paper	Subject	I	T	Total	CC
1	Paper-I/CC1	Classical Sociological Tradition	20	80	100	
2	Paper-II/CC2	Philosophical and Conceptual Foundation of Research Methodology	20	80	100	
3	Paper-III/CC3	Social Change in India	20	80	100	
4	Paper-IV/CC4	Rural Sociology	20	80	100	
5	Paper-V/P 1	Practical-I			100	
B. SECOND SEMESTER(Effective from Jan 2018)						
6.	Paper-VI/CC5	Classical Sociological Thinkers	20	80	100	04
7.	Paper-VII/CC6	Quantitative Research Techniques in Sociology	20	80	100	04
8.	Paper-VIII/CC7	Sociology of Development	20	80	100	04
9.	Paper-IX/CC8	Indian Rural Society	20	80	100	04
10.	Paper-X/P2	Practical-II			100	04
C. THIRD SEMESTER(Effective from July 2018)						
11.	Paper-XI/CC9	Classical Sociological Theories	20	80	100	04
12.	Paper-XII/CC10	Social Movements in India	20	80	100	04
13.	Paper-XIII/CC11	Perspectives of Study to Indian Society	20	80	100	04
14.	Paper-XIV/CC12	Industry and Society in India	20	80	100	04
15	Paper-XV/CC13	Criminology	20	80	100	04
D. FOURTH SEMESTER Effective from Jan 2019)						
16	Paper-XVI/CC14	Modern Sociological Theories	20	80	100	04
17	Paper-XVII/CC15	Comparative Sociology	20	80	100	04
18	Paper-XVIII/CC16	Contemporary Issues in Industry	20	80	100	04
19	Paper-XIX/CC17	Criminology: Correctional administration	20	80	100	04
20	Paper-XX/P3	Project Report	-	-	100	04

FIRST SEMESTER

Paper No. I/CC1 **Marks-80**

CLASSICAL SOCIOLOGICAL TRADITION

Unit-I: Historical Background of The Emergence of Sociology

a. Traditional Feudal Economy and Social Structure
b. Impact of Industrial Revolution and New Mode of Production on Society and Economy.
c. Emergence of Capitalist Mode of Production- Nature and Feature of Capitalism
d. Enlightenment and It's Impact on Thinking and Reasoning

Unit-II: Auguste Comte

a. Social Statics and Dynamics
b. Law of Three Stages
c. Hierarchy of Sciences
d. Positivism

Unit-III: Emile Durkheim

a. Social Facts
b. Division of Labour, Mechanical and Organic Solidarity
c. Religion
d. Theory of Suicide

Unit-IV: Vilfredo Pareto

a. Logical and Non- Logical Action
b. Residues and Derivations
c. Theory of Social Change
d. Contributions to Methodology

Unit-V:Herbert Spencer

a. Social Darwinism
b. Evolution
c. Organic Analogy
d. Militant and Industrial Societies

References:

1. Abraham, F and Morgan, J.H. 1985 — Sociological Thought from Comte to Sorokin Macmillan, New Delhi.
2. Adams, B.N. and Sydie, R.A. 2002 — Sociological Theory Vistaar Publications, New Delhi
3. Aron, R. 1965 — Main Currents in Sociological Thought Vol. I and Vol.II Penguin, New Delhi.
4. Coser, L.A. 2001 — Masters of Sociological Thought Rawat Publishers, Jaipur
5. Rex, John 1973 — Discovering Sociology Routledge and Kegan Paul, London
6. Turner, J.H. 2001 — The Structure of Sociological Theory Rawat Publishers, Jaipur.

7. Zeitlin, I.M. 1981 — Ideology and the Development of Sociological Theory, Prentice Hall, London.
8. _____ 1998 — Rethinking Sociology: A Critique of Contemporary Theory. Rawat Publishers, Jaipur.

Paper-II /CC2 **Marks-80**

PHILOSOPHICAL AND CONCEPTUAL FOUNDATION OF RESEARCH METHODOLOGY

Unit-I: Philosophical Roots of Social Research

a. Issues in the Theory of Epistemology: Forms and Types of knowledge, Validation of knowledge
b. Positivism and It's Critique: Contributions of Comte, Durkheim and Popper.
c. Methodological perspectives in Sociology.

Unit-II:Social Research and Scientific Method

a. Concept and Importance of Social Research.
b. Types of Social Research
c. Concept and Characteristics of Scientific method.
d. Social Phenomeno of Scientific method

Unit-III: Nature of Social Reality and Approaches to It

a. Research Design: Steps and Processes of It's Formulation
b. Type of Research Design: Exploratory, Descriptive, Explanatory, Diagnostic and Experimental
c. Role of concepts and Hypotheses
d. Problems of Objectivity

Unit-IV: Qualitative Methods in Social Research

a. Techniques and methods of Qualitative Research: Observation and Interview Guide
b. Case study, Content Analysis
c. Participatory Rural Appraisal (PRA)
d. Encounters and Experiences in Field work

Unit-V: Issues in Social Research

a. Inter disciplinary Research
b. Issues in Qualitative Research
c. Theoretical Vs. Applied Research
d. Processing of Data: Classification, Tabulation and Interpretation.

References:

1. Bailey, K.D. 1979 — Methodology of Social Research Macmillan, Free Press- London
2. Barnes, J.A. 1979 — Who should known what? Social Science, Privacy and Ethics, Penguin, London.
3. Beteille, A Madan, T.N. 1975 — Encounter and Experience: Personal Accounts of field work, Vikas, new Delhi

4.	Bose, P.K. 1995	Research methodology, ICSSR, New Delhi.
5.	Bryman, A 1988	Quality and Quantity in Social Research Unwin Hyman, London.
6.	Madge, J 1970	The Origins of Scientific sociology Tavistock, London
7.	Mukherjee, P.N. 2000	Methodology in Social Research: Dilemmas and perspectives Essays in Honour of Ramakrishna Mukherjee Sage, New Delhi.
8.	Mukherjee, R.K. 1979	What will it be? Explorations in Inductive Sociology Allied, Bombay.
9.	_____ 1993	Systemic Sociology Sage, New Delhi.
10.	Popper, K 1999	The Logic of Scientific Discovery Routledge and Kegan Paul London
11.	Punch, K 1986	Introduction to Social Research Sage, New Delhi
12.	Sjoberg, G and Roger, N., 1997	Methodology of Social research Rawat, Jaipur
13.	Srinivas, M.N. and Shah, A.M., 1979	Field worker and the Field Oxford, New Delhi.
14.	Weber, M 1974	The Methodology of Social Sciences Free Press, Chicago
15.	Young, P.V. 1977	Scientific Social Surveys and Research Prentice Hall, New Delhi.

Paper No. III/CC3 **Marks-80**

SOCIAL CHANGE IN INDIA

Unit-I: Conceptual and Theoretical Frame work

a. Concept, Meaning, Definition, Characteristic of social Change.
b. Forms of Social change- Evolution, Progress, Development, Transformation, Revolution
c. Linear Theory of Social Change- August Comte, Herbert Spencer, Morgan
d. Cyclic Theory of Social Change- Vilifred Pareto, P. Sorokin

Unit-II: Factors of Social change

a. Techno- Economic
b. Socio- Psychological
c. Cultural and Religious
d. Media

Unit-III: Trends and Processes of Change in Modern India

a. Sanskritization- Concept, Characteristics and means of Social Change.

b. Secularization –Concept, Characteristics and importance
c. Gandhian- Swalamban, Sarvodaya, Trustiship and importance
d. Globalization- Concept, Characteristic and a process of Social change

Unit- IV: Changes in Tribal and Rural India

a. Tribal Economy- Concept, Characteristics of Tribal Economy, base of Tribal Economy and recent changes in Tribal Economy
b. Rural Economy- Concept, Characteristics of Rural Community, base of Rural Economy and recent changes in Rural Economy
c. Changes in Socio Cultural Spheres
d. Land Alienation- Concept and Cause of Land Alienation, Land Alienation in Rural and Tribal Area.

Unit-V:-Changes in Urban and Industrial India

a. Migration - Concept, Characteristics and types of Migration, In Migration and Growth of informal sector.

b. Slums - Concept, Characteristics of Slums , causes of development of Slums in Urban and Industrial India.

c. Crime - Concept, Characteristics of Crime and causes of development of criminal Activities in Urban and Industrial India.

d. Welfare- Concept, Characteristics of Welfare Programme,Welfare measures and Consequent Changes.

References:

1. Beteille, A. 2003 — The Idea of natural inequality and other essays. Oxford, New Delhi.
2. Desai, AR 2001 — Rural Sociology in India. Popular, Bombay
3. Jhingan, M.L. 2003 — The economics of Development and Planning. Vrinda Publications, New Delhi
4. Kanungo, S. 2002 — Making Information Technology Work, Sage, new Delhi
5. Mathur, H.M. (ed) 1994 — Development, Displacement and Resettlement: focus on Asian experiences Vikas, New Delhi.
6. Preston, P. 2001 — Reshaping communications, Technology Information and Social Change. Sage, New Delhi.
7. Ramachandran, P.S. et al (ed) 2002 — Traditional Ecological Knowledge for managing Bio-sphere reserves in south and central Asia. Oxford, New Delhi.
8. Reid, Suctitus 1976 — Crime and Criminology, Illiois: Deyen Press
9. Schuurman, F.J. 1999 — Globalization and Development, Vistaar, new Delhi.
10. Parekh, B 1999 — Colonialism, Tradition and Reform: An analysis of Gandhi's Political Discourse Sage, New Delhi.
11. Sharma, K.L. 1997 — Social Stratification in India: Issues and Themes. Sage, New Delhi.
12. Shiva, V. and Bedi, — Sustainable Agriculture and food scarcity Sage,

G. 2002 New Delhi.
13. Singh, Y. 1999 Modernization of Indian tradition Rawat, jaipur.
14. _____ 2003 Culture Change in India Rawat, Jaipur
15. Singharoy, D.K. et al (ed) 2000 Social Development and Empowerment of Marginalised groups, Sage, New Delhi.
16. Srinivas, M.N. 1998 Social Change in Modern India. Orient and Longman, New Delhi.
17. Vidyarthi, L.P. and Rai, B.K., 1977 Tribal culture in India Concept Publication Company New Delhi.

Paper No. IV/CC 4 **Marks-80**

RURAL SOCIOLOGY

Unit-I: Characteristics and Approaches

a. Concept andCharacteristics of Peasant Society
b. Concept andCharacteristics of Agrarian Society
c. Caste and Jamani Approach
d. Sub- Altern Approach

Unit-II: Agrarian Institutions

a. Land Ownership and Its Types:After Independence
b. Agrarian Relations and Modes of Production
c. Agrarian Social Structure

Unit- III: Planned Change

a. Rural leadership
b. Factionalism
c. Panchayati Raj before and after 73rd Amendment
d. Five Year's Plans in India

Unit-IV: Rural Development and Change

a. Green Revolution
b. Land Reform
c. Globalization and its Impact on Agriculture

Unit-V:Welfare measures and consequent Changes

a. Self-help Group(SHG)
b. MNREGA
c. SSA

References:

1. Basu, K. (ed) 2000 Agrarian Questions Oxford, New Delhi.
2. Berberglu, B. (ed) 1992 Class, State and Development in India sage, New Delhi.
3. Beteille, A. Six essays in comparative sociology oxford, New

	1974	Delhi.
4.	_____ 1974	Studies in Agrarian social structure oxford, New Delhi.
5.	Breman, J. 1974	Patronage and Exploitation oxford, New Delhi.
6.	Desai, A.R. (ed) 1977	Rural sociology in India popular, Mumbai.
7.	_____, (ed) 1977	Rural society in transition Popular, Mumbai.
8.	Gough, K and Sharma, H.P.(Ed) 1973	Imperialism and Revolution in South Asia, Monthly Reviewed Press, New York.
9.	Guha, r (ed) 1999	Subaltern Studies Oxford, New Delhi.
10.	Joshi, P.C. (ed) 1976	Land Reforms in India Allied, New Delhi.
11.	Long, N. 1982	An Introduction to the sociology of Rural development, Tavistock, London.
12.	Mencher, J.P. (ed) 1983	Social Anthropology of peasantry Somaiya Publications New Delhi
13.	Patnaik, U. 1990	Agrarian Relations and Accumulation: the Mode of production debate in India.
14.	Shanin, T. (ed) 1971	Peasants and Peasant Societies, Penguin, London.
15.	Thorner, D. 1956	The Agrarian prospects in India University press, New Delhi.
16.	_____ 1962	Land and labour in India, Asia publications, Mumbai.

Paper No. V/P1 **Marks-100**

PRACTICAL-I

Practical based on Field Work & Preparation of tools
Interview Guide and case study

Scheme of Evaluation- 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

SECOND SEMESTER

Paper No. –VI/CC 5 **Marks-80**

CLASSICAL SOCIOLOGICAL THINKERS

Unit-I: Karl Marx

a. Materialistic Interpretation of History
b. Class and Class Struggle
c. Alienation.

d. Surplus Value and Exploitation.

Unit-II:Thurstein Veblen

a. Theory of Leisure class
b. Concepts of Social Change
c. Comparison of Marx and Veblen's theories.

Unit-III: Max Weber

a. Theory of Social Action
b. Concepts of Status, Class and power
c. Sociology of Religion and Economic Development
d. Ideal Type

Unit-IV Talcott Parsons

a. Social Action
b. Pattern variables
c. Social System
d. Mechanisms of social Control.

Unit-V: Robert K. Merton

a. Reference Group
b. Social structure and Anomie
c. Paradigms of Functionalism
d. . Bureaucracy

References:

1. Abraham, F and Morgan, J.H. 1985 — Sociological Thought from Comte to Sorokin Macmillan, New Delhi.
2. Aron, R. 1965 — Main Currents in Sociological Thought Vol. I and II Penguin, London.
3. Adams, B.N. and Sydie, R.A. 2001 — Sociological theory Vistaar, New Delhi.
4. Collins, R. 1997 — Theoretical Sociology Rawat, Jaipur
5. Coser, L.A. 2001 — Masters of Sociological Thought Rawat, Jaipur
6. Giddens, A. 1977 — Capitalism and Modern Social Theory: An Analysis of Writings of Marx., Durkeheim and Weber Cambridge University press. London.
7. Rex, J. 1973 — Discovering Sociology Routledge and Kegan Paul London.
8. Simmel George and Kurt H.Wdff,1950 — The Sociology of George Simmel, Glancoe, IIIFree Press
9. Simmel George and Kurt H.Wdff,1922 — Conflict and the web of Group Glancoe, IL,Freepress.
10. ----------1972 — On Individuality and Social Forms, Chicago, University of Chicago Press.
11. Turner, J.H. 2001 — The Structure of Sociological Theory Rawat, jaipur

12. Zeitlin, I.M. 1981 Ideology and the Development of Sociology Prentice Hall, London.
13. _____ 1996 Rethinking Sociology Rawat, Jaipur.

Paper No.-VII/CC6 **Marks-80**

QUANTITATIVE RESEARCH TECHNIQUES IN SOCIOLOGY

Unit-I: Sampling

a. Rational
b. Types
c. Sampling error
d. Survey Vs. Sampling based study in sociology

Unit-II: Quantitative method and survey Research

a. Techniques of Survey Research: Interview
b. Tools of Research; Preparation of Questionnaire and Interview Schedule
c. Processing of Data:Editing ,Classification,Tabulation and Interpretation
d. Use of Computer in Data Processing

Unit-III: Measurement and Scaling Techniques

a. Levels of Measurements: Types of Scales- Nominal and Ordinal
b. Reliability and Validity of Scaling
c. Measures of Social Distance: Thurstein, Lickert and Bogardus Scale
d. Sociometry

Unit-IV: Statistics in Social Research

a. Measures of Central Tendency: Mean, Median and Mode
b. Measures of Dispersion- Standard Deviation
c. Correlation Analysis- Chi Square Test
d. Quantitative Vs. Qualitative research in sociology

Unit-V:Qualitative and Quantitative research method

a. Triangulation;mixing Qualitative and Quantitative methodologies
b. Social Research, Action research and Participatory research
c. Application of computers in Social research; MS office.
d. Ethical issues in social research.

References:

1. Bailey, K.D. 1979 Methodology of social Research Macmillan, Free Press.
2. Bryman, Allan1988 Quality and Quantity in Social ResearchUnwin, Hyman, London.
3. Ethance, D.M. Fundamental of Statistics
4. Irvine, J. M et al (ed) 1979 Demystifying social statistic, Pluto Press, London.
5. Lutz, G, M 1983 Understanding Social Statistics, Macmillan Publishing co., Inc., New York.

6. Mukharjee, R, 1979 — What will it be? Explorations in inductive sociology, Allied Publishers, Bombay.
7. Mukherjee, P.N, 2000 — Methodology in Social Research Dilemamas and Perspectives, Essays in honour of Ramakrishna Mukharjee, Sage Publication, New Delhi.
8. Wilkinson, T.S. and Bhandarkar, P.L. — Methodology and Techniques of Social Research: Himalaya Publication House, Bombay,
9. Young, P.V. 1977 — Scientific Social Surveys and Research. Prentice Hall of India, New Delhi.

Paper No. –VIII/CC7 **Marks-80**

SOCIOLOGY OF DEVELOPMENT

Unit-I: Perspectives on Development

a. Concept and Defining development
b. Element of Development
c. Path and Agency of Development: Capitalist, Mixed Economy, Gandhian
d. Theories; Modernization , Marxist, Dependency.

Unit-II: Changing Concept of Human Development

a. Mainstream vs. Indigenous Model of Development
b. Human Indicator Index
c. Sustainable Development: Socio- Cultural, environmental and economic.
d. Impact of Bio-Technology and Information Technology on Development.

Unit-III: Indian Experience of Development

a. Sociological Appraisal of Five Year Plans
b. Social Consequences of Economic Reforms
c. Socio- Cultural Impact of Globalization
d. Social Implication of InfoTech and Bio-Tech Revolution

Unit-IV: Consequences of Development

a. Development and Displacement- concept, causes and consequences of Displacement
b. Development and Socio- Economic Disparities: health, Education , Per capita Income
c. Ecological Degradation: concept, causes and consequences of Degradation
d. Development and Migration: concept, causes and consequences of Migration.

Unit-V:Issues in development in Contemporary India.

a. Social Exclusion
b.Gender Discrimination
c. Privatization and un favourable Service condition.
d. Sustainability and development

References:

1. Alavi, H. and Shanin, T., 1982 — Introduction to the study of Developing societies Macmillan, London
2. Amin, Samir-1979 — Unequal Development, New Delhi
3. Apter, D.C. 1987 — Rethinking development Sage, New Delhi
4. Appadurai, A. 1997 — Modernity at Large: Cultural Dimensions of Globalisation, Oxford, New Delhi
5. Berberglu, B. (ed) 1992 — Class, State and Development in India, Sage, New Delhi
6. Bhatnagar, S., 2000 — Information and Communication: Technology in Development, Sage, New Delhi.
7. Carmen, R 1996 — Autonomous Development Vistaar, New Delhi
8. Desai, A.R 1985 — India's path of development: A Marxist Approach, Bombay, popular Prakashan.
9. Dreze, J and Sen, A. 1996 — India: Economic Development and social Opportunity Oxford, New Delhi
10. Encyclopaedia of Social Sciences (Relevant Portions), Macmillan
11. Frank, A 2002 — Reorient Vistaar, New Delhi
12. Haq, M.V. 1991 — Reflections on Human Development Oxford, New Delhi
13. Melkote, S.R. 1991 — Communications for Development in Third WorldSage, New Delhi
15. Naidu, R. 1971 — Values in Models of Modernisation Vikas, New Delhi
16. Pieterse, N.J. 2001 — Development Theory: Deconstruction/ Reconstruction , Sage, New Delhi
17. Preston,P.W,1996 — Development Theory- An Introduction Oxford Blackwell.
18. Rege, S. (ed) 2003 — Sociology of Gender Sage, New Delhi
19. Sachs, I 2000 — Understanding Development Oxford, New Delhi
20. Saha, G et al (ed) 2002 — Development and Deprivation in Gujarat Sage, New Delhi
21. Schuurman, F.J. 2003 — Globalisation and Development Vistaar, New Delhi
22. Singharoy, D (ed) 2001 — Social Development and Empowerment of Marginalised Groups Sage, New Delhi.
23. Sings, C.C. And Denemark, R.A. — The Underdevelopment of Development Sage, New Delhi.

24. Sharma ,S.L1986 Development: socio-Cultural Dimensions, Jaipur,Rawat Publications.
25 ----------1994 Perspective on Sustainable Development in South Asia, KualaLumpur, ADIPA

Paper No. IX/CC8 **Marks-80**

INDIAN RURAL SOCIETY

Unit-I: Tribal Society as Agrarian Society

a. Tribe Concept and Characteristic
b. Tribe class
c. Changing problems of Tribal Land

Unit-II: Social Issues

a. Migration
b. Land Alienation
c. Loss of Livelihood

Unit-III: Contemporary Issues

a. Health
b. Education
c. Changing status of Rural Women
d. Inequality

Unit-IV: Peasant Movement

a. Causes
b. Types
c. Tebhaga
d. Telengana

Unit-V: Naxlite movement in Contemporary India.

a. Origin and affected area
b. Causes
c. Present status; Governments measures and peoples response.

References:

1. Beteille, A. 1986 Inequality and Social Change Oxford, New Delhi.
2. Bardhan, p. Poverty, Agrarian Structure and Political Economy in India.
3. Desai, A.R. 1979 Rural Society in Transition Popular, Mumbai
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5. _____ (ed) 2003 Rural Sociology in India Popular, Mumbai
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12 Prakash Singh 2007 — The Naxalite Movement in India, Rupa Publication
13. Rao, M.S.A. (ed) 1978 — Social Movements In India, Manohar, New Delhi.
14. Schuurman, F.J. 2003 — Globalization and Development Vistaar, New Delhi.
15. Singhroy, D et al 2001 — Social development and the empowerment of mariginalised groups, Sage New Delhi.
16. Thorner, A. 2002 — Daniel Thorner, Memorial Lecturers, Manohar, New Delhi.
17. Vidyarthi, L.P. and Rai, B.K. 1977 — Tribal Culture in India, Concept Publishing Company, New Delhi.

Paper No. X/P2 **Marks-100**

PRACTICAL-II

Practical based on Field Work & Preparation of tools

Questionnaire, Interview Schedule Preparation and Tabulation.

Scheme of Evaluation- 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

THIRD SEMESTER

Paper No. XI/CC9 **Marks-80**

CLASSICAL SOCIOLOGICAL THEORIES

Unit-I: Positivism

a. Concept and Characteristics of positivism

b. Contributions of Comte
c. Contributions of Durkheim
d. Criticism

Unit-II: Functionalism

a. Concept and Characteristics of functionalism
b. Contributions of Parsons
c. Contribution of Merton
d. Criticism

Unit-III: Conflict theory

a. Concept and Characteristics of Conflict theory
B Contributions of Karl Marx
c Contribution of Dahrendorf
d Randell Collins

Unit-IV: Structuralism

a. Concept and Characteristics of Structuralism
b Contribution of Red Cliff Brown
c Contribution of Levistrauss
d Criticism

Unit-V:Exchange Theory

a. Concept and Characteristics of Exchange Theory
b. Contribution of Peter Blau
c. Contribution of George Homans.
d. Criticism

References:

1. Abraham, M.F. 2001 — Modern Sociological Theory: An Introduction Oxford, New Delhi.
2. Alexander, J.C. 1987 — Twenty Lectures; Sociological theories since World War- II Columbia University press- New York.
3. Coser, L.A. 2001 — Masters of Sociological thoughts Rawat, Jaipur
4. Collins, R. 1997 — Sociological theory Rawat, jaipur
5. Craib, I 1992 — Modern Social Theory: From parsons to Habermas, Harvester, London.
6. Giddens, A. 1983 — Central Problems in Social theory, Action, Structure and contradiction in social analysis. Mac Millan, London.
7. _____, 1996 — Capitalisation and modern social theory Cambridge University Press. London.
8. Godelier, M. — Structural Anthropology Tavistock, London.
9. Sturrock, J (ed) 1979 — Structuralism and since: from Levistrancess to Derrida Oxford, London.

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11. Turner, J.H. 2001 The structure of sociological theory Rawat, Jaipur
12. Zeitlin, I.M. 1998 Rethinking sociology: A critique of contemporary Theory Rawat, Jaipur.

Paper No.XII/CC10 **Marks-80**

SOCIAL MOVEMENTS IN INDIA

Unit-I: Nature and Types

a. Characteristics
b. Types
c. Reasons
d. Power Structure and Social Movements

Unit –II:Basis of Social Movement

a.Class, Caste, Ethnicity and Gender
b.Types of leadership and relationship between leaders and masses
c. Political institution and social movement.
d. Role of media in social movement.

Unit-III: Theoretical Perspectives

a. Marxian and Post-Marxian
b. Structural-Functional
c. Postmodernist
d.Post-Structuralist

Unit-IV: Traditional Social Movements

a. Labour and Trade Union
b. Tribal
c. Peasant
d. Nationalist

Unit-V: New Social Movements

a. Dalit
b. Women
c. Ethnic
d. Environmental
e. student movements.

References:

1. Banks, J.A., 1972; The Sociology of Social Movements (London : Macmillan)
2. Desai, A.R., Ed., 1979; Peasant Struggles in India (Bombay : Oxford University Press)

3. Danagare, D.N., 1983; Peasant Movements in Indian 1920-1950 (Delhi : Oxford University Press.
4. Gore, M.S., 1993; The Social Context of an Ideology : Ambedkar's Political and Social Thoughts (New Delhi : Sage)
5. Oomen, T.K., 1990 : Protest and Change : Studies in Social Movements (Delhi : Sage).

Paper No.XIII/CC11 **Marks-80**

PERSPECTIVES OF STUDY TO INDIAN SOCIETY

Unit-I: Indological / Textual

a. G.S. Ghurye;- Origin, Theory and Characteristics of caste , caste and Race.
b. Louis Dumont:- Homohierarchius in caste system in India
c. Criticism of Ghurye and Dumont.

Unit-II: Structural Functionlism

a. M.N.Srinivas:- Dominant Caste, Sanskritization , Secularization and Social Change.
b. S.C.Dube:-Social Change and Modernization
c. Criticism of M.N. Srinivas and S.C.Dube

Unit-III: Marxism

aD.P.Mukharjee:- Approach to study Indian Economy and Society
b.A.R. Desai:- Approach to study rural society and Economy in India.
cCriticism of D.P.Mukherjee and A.R.Desai

Unit-IV: Subaltern Perspective

a. B.R. Ambedkar :- Characteristics of Caste, Demerits of Caste, Annihilation of Caste
b. David Hardiman:- Characteristics of Indian Society, Subaltern Approach to study Indian Society.
c. Comparision between Ambedkar and Hardiman's Subaltern Approach

Unit-V: Civilizational Approach

a. N.K.Bose
b. Surjeet Sinha
c. Criticism of N.K. Bose and Surjeet Sinha

References:

1. Das, V. 1982 Structure and Cognition aspects of Hindu caste and rituals Oxford, New Delhi.
2. Desouza, P.R. (ed) 2000 Contemporary India Transitions. Sage, New Delhi.
3. Dhanagare, D.N. 1993 Themes and Perspectives in Indian Sociology Rawat, Jaipur
4. Dube, S.C. 1967 The Indian village Routledge, London

5. _____ 1973 Social Sciences in a chanign society. Lucknow university press, Lucknow
6. Dumont, L. 1970 Homo Hierarchicus: the caste system and its implications Vikas, New Delhi.
7. Hardiman, D 1987 The coming of the Devi: Adivasi Assertion in western India Oxford, New Delhi
8. _____ 1996 Feeding the Bania: Peasants and usurers in western India. Oxford, New Delhi.
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10. Mukharjee, D.P. 1958 Diversities PPH, New Delhi
11. Oommen, T.K. and Mukharjee, P.N. 1986 Indian Sociology: Reflection and Introspection popular, Mumbai.
12. Singh, y. 1986 Indian Sociology: Social conditioning and Emerging concerns, Vistaar, New Delhi.
13. Srinivas, M.N. 1960 India's Villages Asia publishing House, Bombay.

Paper No.XIV/CC12 **Marks-80**

INDUSTRY AND SOCIETY IN INDIA

Unit-I: Industrial Sociology and Classical Sociological Tradition

a. Scientific Management
b. Division of Labour
c. Bureaucracy and Rationality
d. Production Relations and Alienation

Unit-II: Industrial Organizations

a. Formal and Informal Organizations: Structure and Functions
b. Line and Staff Organization
c. Contemporary Organization Realities

Unit-III: Impact of Industrialization on:

a. Family
b. Stratification
c. Habitat and Settlement
d. Environmental

Unit-IV: Subjective Experience of Work

a. Work Ethics, Work Value, Work Attitude and Work Process
b. Motivation to Work,
c. Work Satisfaction, Incentives and Its Effects

Unit-V: Technological Change and Automation

a. Technology and Social Structure in Industry
b. Organizational Choice and Technological Change
c. Resistance to Automation and Change

References:

1.	Agrawal R.D. 1972	Dynamics of Indian labour relations in India (A Book regarding Mc-Graw Hill, Bombay)
2.	Aziz Abdul 1984	Labour problems of developing economy Ashis Publishing house, New Delhi
3.	Gilbert S.J. 1985	Fundamentals of Industrial Sociology Tata Mc-Graw hill Bombay
4.	Karnik V.B. 1990	Indian trade Union A survey, Popular Prakashan-Bombay
5.	Laxmana, C et al 1990	Workers Participation and industrial democracy: Global perspectives: Ajanta publication, New Delhi.
6.	Memoria, C.B. and Memoria 1992	Dynamics of Indian Relations in India Himalaya publishing house: Mumbai
7.	Miller, D.c. and Farm W.M. 1964	The Sociology of Industry George Allen and Onwin, London
8.	Philip H and Mellissa T 2001	Work Post Modernism and organization Sage, New Delhi
9.	Ramaswamy E.A. 1977	The worker and His union, Allied New Delhi
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11.	Thiwait, P.K. 1987	Social Structure of a Planned Town, Institute of Social Research and Applied Anthropology, Calcutta.
12.	Watson K. Tony 1995	Sociology, work and industry Routlodge and Kagan Paul, London.

Paper No.XV/CC13 **Marks-80**

CRIMINOLOGY

Unit-I: Conceptual and Theoretical Approaches

a. Legal, and Sociological concept of Crime
b. Crime Causes prevention and Control
c. Theories on Crime Causation; Sociological and Geographical

Unit-II:Type of Criminals and Crime

a. Juvenile delinquency
b. Women and Crime
c. White collar crime

Unit-III: Changing Profile of Crime and Criminals;

a. Corruption: Types, Causes, and Consequences.
b Cyber Crime: Causes, Prevention and Control
c Crime Against Women: Causes, Prevention and Control

Unit-IV: Theories of Punishment

a. Retributive, Deterrent: Theories and Criticism
b. Reformative Theory: Probation and Parole
c. Open Prison- Its Success and Failure

Unit-V: Terrorism

a. Concept of Terrorism and Its Characteristics
b. Terrorism in India
c. Social and Legal Measures for Its Prevention and Control

References:

1. Ahuja, R. 1969 — Female offenders in India Meenakshi Prakashan, Meerut
2. Madan, G.R. 1985 — Indian social problems-I Allied Publishers, New Delhi
3. Mahapatra, S. 2002 — Rays of Hope: Forum for fact finding documentation and Advocacy Raipur.
4. Mishra, R and Mohanty, S. 1992 — Police and Social change in India Ashish publishing House, New Delhi.
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FOURTH SEMESTER

Paper No. XVI/CC14 **Marks-80**

MODERN SOCIOLOGICAL THEORIES

Unit-I: Symbolic Interactionism

a. Concept and Characteristics of Symbolic Interectionism
b. Contributions of G.H. Mead
c. Contribution of H.Blumer
d. Criticism

Unit-II: Phenomenology

a.Concept and Characteristics of Phenomenology

bContributions of Alfred Schutz
cContributions of Peter Berger
dCriticism

Unit- III:Ethnomethodology

a Concept and Characteristics of **Ethnomethodology**
b.Contribution of Harold Garfinkel
c Contribution of Irving Goffman
dCriticism

Unit-IV: Critical Theory

a. Concept and Characteristics of **Critical Theory**
b. Contributions of Adorno
c. Contributions of Habermas
d. Criticism

Unit-V: Post Modernism

a. Concept and Characteristics of Post Modernism
b. Contributions of Michel Foucault
c. Contributions of Jacques Derrida
d. Criticism

References:

1. Abraham, M.F. 2001 — Modern Sociological Theory: An introduction Oxford, New Delhi
2. Adams, B.N. and Sydie, R.A. 2001 — Sociological Theory, Vistaar, New Delhi
3. Alexander, J.C. 1987 — Twenty lecturers: Sociological theories since world war-II Columbia Univ. Press New York
4. Apadurai, A. 1996 — Modernity at large: Cultural Dimensions of Globalisation University of Minnesota Press, Minneapolis
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8. Collins, R. 1997 — Sociological Theory Rawat, Jaipur
9. Craib, I 1992 — Modern Social Theory; From parsons to habermas Harvester, London.
10. Giddens, A. 1983 — Central Problems in social theory, action, structure and contradictions in social analysis Macmillan, London.
11. _____ 1996 — Capitalism and Modern Social Theory, Cambridge University Press, Cambridge.

12. Kumar, K. 1997 — From Post-Industrial to post- modern Society, Black Well Publishers, Oxford, UK.
13. Lash, S. 1996 — Sociology of Post Modernism Routledge and Kegan Paul, London.
14. Podogorecki, A and Los, M. 1979 — Multi Dimensional Sociology Routledge and Kegan Paul, London.
15. Sturrock, J (ed) 1984 — Structuralism and since from Levistrauss to Derrida Oxford, New York
16. Turner, B.S. 1999 — Classical Sociology Sage, New Delhi.
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Paper No. XVII/CC15 **Marks-80**

COMPARATIVE SOCIOLOGY

Unit-I: Historical and Social Context of Emergence of Sociology in the West

a. Emergence of Sociology in West
b. Eurocentric base of western Sociological Tradition
c. Americanization of Sociology
d. National Tradition in Sociology

Unit-II: Central Themes in Comparative sociology

a. Modernity and Development:- Concept, Characteristics and issues
b .Diversity and multi Culturalism:- Concept, Characteristics and issues
c. Enviornment:- Concept, Characteristics and issues
d. Globalization; Concept, Characteristics and issues

Unit-III: Theoretical Concern,s in Comparative sociology

a. Problems of theoring in sociology
b. Theoretical and Methodological approaches in sociology
c. Policy issues: Formulation and Evalution

Unit IV: Current Debates

a. Contextitualization- Iravati Karve
b. Indianization- G.S.Ghurye, K.M.Kapadia
c. Use of Native Categories- M.N.Srinivas , A.Beteille
d. Criticism and present status

Unit-V: Debate on "For Sociology of India"

a. Sociology of India- D.P.Mukherjee,R.K.Mukherjee
b .Sociology in India-School of Sociology in Bombay, Lucknow and Delhi
c. Sociology For India- Louis Dumont,Pocock,Yogendra Singh and Indra Deva
d. Criticism and present status

References:

1	Anderski, S 1961:	Elements of Comparative Sociology(London , Widenfeld and Nicolson)
2	Beteille, Andre 1987:	Essays in Comparative Sociology(New Delhi: Oxford University Press)
3	Beteille, Andre 1992:	Society and Policies in India: Essays in Comparative Sociology(New Delhi: Oxford University Press)
4	Berremen, G.D 1981:	The Politocs of Truth : essays in Critical Anthopology, New Delhi: South Asian Publishers)
5	Dube, S. C. 1973:	Modernization and Development: The search for alternative paradigm (New Delhi: Vistar)
6	----------1973:	Social Sciences in a chanign society. Lucknow university press, Lucknow
7	Ferreira, J.V. and A.R.Momineds: 1983:	Nemesis–CulturalPerspectives on modernization (Bombay, Ramkrishna Publication)
8.	Genov, Nikolai, 1989:	National Traditions in Sociology (Delhi: Sage)
9	Kiely R and Phil Marfleet, eds. 1998:	Globalization and the third world (London: Routledge)
10	Kothari,Rajan1988 :	Rethinking Development: In search of Human Alternatives Delhi: Ajanta.
11	Kuper A 1996 :	Social Science Encyclopaedia, (London: Routledge)
12	MohanR.P and A.S.Wilke, eds.1994:	International Hand book of Contemporary Developments of Sociology (London : Mansell)
13	Oommen,T.K.& P.N. Mukherjee eds. 1986:	Indian Sociology: Reflection and Introspection popular, Mumbai.
14	Parekh, Bhikhu 2000	Rethinking Multiculturalism: Cultural Diversity and Political Theory(London: Macmillian)
15	Saraswati B.N.1994:	Interface of Cultural Identity and Development (New Delhi: Indira Gandhi National Centre of the Arts)
16	World Commission on environment and Development, 1987:	(New Delhi: Oxford University Press)
17	Wallerstein, Immanuel 1974:	Modern World System (New York: Oxford University Press)

Paper No.XVIII/CC16 **Marks-80**

CONTEMPORARY ISSUES IN INDUSTRY

Unit-I: Industrial Relation

a. Importance of Human Relations at work
b. Conflict: Causes and Types, Resolution of Conflict
c. Conciliation and Collective Bargaining
d. Worker's Participation in Management

Unit-II: Trade Union and Industrialization

a. History of Trade Unionism in India
b. Objectives and Functions
c. ILO and Trade Unions in India
d. Trade Unionism in Globalization

Unit-III: Industry and Society

a. Impact of Industry on Family
b. Impact of Industry on Stratification
c. Industrialization and Migration
d. Industrialization and Religion

Unit-IV: **Industrilization in Third world Countries in the Era of Globlization**

a. FDI and Third World
b. International Agencies: World Bank and Third world countries
c. Status of Industries in Third World Countries

Unit-V: Contemporary Issues

a. Industrialization and Women Labour
b. Industrialization and Child Labour
c. Industrialization and Environment
d. Problem of Industrialization in Developing Countries

References:

1. Agrawal R.D. 1972 — Dynamics of Indian labour relations in India (A Book regarding Mc-Graw Hill, Bombay)
2. Aziz Abdul 1984 — Labour problems of developing economy Ashis Publishing house, Hew Delhi
3. Gilbert S.J. 1985 — Fundamentals of Industrial Sociology Tata Mc-Graw hill Bombay
4. Karnik V.B. 1990 — Indian trade Union A survey, Popular Prakashan-Bombay
5. Laxmana, C et al 1990 — Workers Participation and industrial democracy: Global perspectives: Ajanta publication, New Delhi.
6. Memoria, C.B. and Memoria 1992 — Dynamics of Indian Relations in India Himalaya publishing house: Mumbai
7. Miller, D.c. and Farm W.M. 1964 — The Sociology of Industry George Allen and Onwin, London
8. Philip H and Mellissa T — Work Post Modernism and organization Sage, New Delhi

2001
9. Ramaswamy E.A. 1977 The worker and His union, Allied New Delhi
10. _____, 1978 Industrial Relations in India OUP, new Delhi
11. Thiwait, P.K. 1987 Social Structure of a Planned Town, Institute of Social Research and Applied Anthropology, Calcutta.
12. Watson K. Tony 1995 Sociology, work and industry Routlodge and Kagan Paul, London.

Paper No.-XIX/CC17 **Marks-80**

CRIMINOLOGY: CORRECTIONAL AND ADMINISTRATION

Unit-I:Roots of Correction to prevent Crime

a. **Socialization**
b. Family values: Truth,Obedience, honesty,integrity,morality,ethics.
c. Role of education

Unit-II: Correction and It's Forms

a. Meaning and Significance of Correction; Prison Based and Community Based
b. Correctional Programmes in Prison; History of Prison Reforms in India
c. After Care and Rehabilitation Programme.

Unit-III: Problem of Correctional Administration

a. Overcrowding; Lack of Inter Agency Co-Ordination among Police Prosecution, Judiciary and Prison
b. Prison Offences
c. Problem of Criminal Justice Administration

Unit-IV: Victimological Perspective

a. Victrim's Responsibility in Crime
b. Violation of Prisoner's Human Rights
c. Problems of Women Offenders.

Unit-V: Community Policing

a. Concept andObjectives
b. Types
c. Significance

References:

1. Ahuja, R. 1981 The Prison System Sahitya Bhawan, Agra
2. _____, 1997 Contemporary Social problems in India Rawat, Jaipur.
3. Advani, NH, 1978 Perspectives on Adult Crime and correction. Abhinav Publication, New Delhi.
4. Bedi, K. 1998 It is always possible sterling, New Delhi.
5. Devasia, L and Female criminals and Female Victims: An Indian

	Devasia, V.V. (ed) 1989	Perspective Dattsons, Nagpur.
6.	Gosmami, B.K. 1983	Criminology and Penology Allahabad
7.	Mohanty, S 1990	Crime and Criminals in India Ashish Pub. House New Delhi.
8.	Reid, S. 1976	Crime and Criminology Deydan press, Illinayse
9.	Shankardas, R.D. 2000	Punishment and the Prison: India and International perspective, Sage, New Delhi.
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11.	William, H.E. 1990	The correction Profession Sage, New Delhi.

Paper No.-XX/P3 **Marks-100**

PROJECT REPORT

On Rural and Urban Problems

Scheme of Evaluation- 50% by Internal Examiner and rest 50% by Viva-Voce Examination evaluated both by the Internal and External Examiner.

Examination Scheme for Master of Social work

ACADEMIC SESSION (2017- 18)

MSW (MASTER of SOCIAL WORK) Ist SEMESTER(Effective fromJuly2017)

Paper/CC	Title of the Paper	I	T	Total
I/CC1	Social work History and Ideology- Indian Perspective	20	80	100
II/ CC2	Population and Environment	20	80	100
III/ CC 3	Working with Groups / Group Work	20	80	100
IV/ CC 4	Social work Research – Qualitative Method	20	80	100
V/ CC5	Human Growth and Development	20	80	100

MSW (MASTER of SOCIAL WORK) II SEMESTER(Effective from Jan2018)

Paper/ CC	Title of the Paper	I	T	Total
VI/ CC 6	Social work History and Ideology- Western Perspective	20	80	100
VII/ CC 7	Political Economy of Development	20	80	100
VIII/ CC 8	Process and Evaluation of Group Formation	20	80	100
IX/ CC 9	Social work Research –Quantitative Method	20	80	100
X/P 1	Social Work Practicum	-	-	100

MSW (MASTER of SOCIAL WORK) III SEMESTER(Effective from July 2018)

Paper/ CC	Title of the Paper	I	T	Total
XI/ CC 10	Sociology for Social Work in India	20	80	100
XII/ CC 11	Social Work Personal, Training and Development	20	80	100
XIII/ CC 12	Family Social Work	20	80	100
XIV/ CC 13	Social Policy in India	20	80	100
XV/ CC14	Legal System in India	20	80	100

MSW (MASTER of SOCIAL WORK) IV SEMESTER(Effective from Jan 2019)

Paper/ CC	Title of the Paper	I	T	Total
XVI/ CC 15	Social Control and Change in India	20	80	100
XVII/ CC 16	Social Development	20	80	100
XVIII/ CC 17	Social Planning in India	20	80	100
XIX/ CC 18	Integrated Social Work Practice	20	80	100
XX/ P 2	Research Project With Block Placement and Field Work Report	-	-	100

MSW (MASTER of SOCIAL WORK) Ist SEMESTER

Paper/CC	Title of the Paper	I	T	Total
I/CC1	Social work History and Ideology- Indian Perspective	20	80	100
II/ CC2	Population and Environment	20	80	100
III/ CC 3	Working with Groups / Group Work	20	80	100
IV/ CC 4	Social work Research – Qualitative Method	20	80	100
V/ CC5	Human Growth and Development	20	80	100

Paper I/CC 1 Social work History and Ideology- Indian Perspective

UNIT -I Indian History of Social Work Education

a)Concept of Social work education b)Beginning of Social work education: History

c)Welfare orientation in social work

d)Development orientation in Social Work.

UNIT-II Professionalization of:-

a)Social work values b)Social work Education c) Social work Knowledge

d)Professional Association of social work in India.

UNIT-III Social Work

a)Goals and values of social work

b)function/ role of social work

c) process of social work

d)interface between professional and voluntary social work

UNIT-IV Indian history of Ideology for social change

a)Social change: Concept Causes and theory

b) Social Change in Ancient period.

c) Social Change in medieval period

d) Social Change in modern Period

UNIT-V Ideology of Social Change

a)Gandhian ideology and Sarvoday movement

b)Nationalism and Social Change

c)Ideology of Indian Constitution and Social Change

d)Ideology of Voluntary organization and voluntary action

REFERENCES:-

1	Agrawal, M.M 1998	Ethics and Spirituality, Shimal: Indian Institute of Advanced Study
2	Chatterjee, P. 1996	Approaches to the welfare State, Washington D.C: National Association of Social workers
3	Desai M,2000	Curriculam development on history of ideologies for Social Change and Social work, Mumbai: Social work education and Practice Cell
4	Diwakar, V.d(Ed) 1991	Social Reform Movement in India: A historical Perspective, Bombay Popular Prakashan.
5.	Feibleman,J.K.1986	Understanding Philosophy: A popular history of ideas, New York Souvenir Press
6	Ganguli, B.N 1973	Gandhi's Social Philosophy, Delhi: Vilas Publishing House.
7	Gore, M.S. 1993	The Social Context of Ideology: Ambedkar's social and political Thought, New-Delhi: Sage.
8	Kappen, S. 1994	Tradition Modernity Counter culture: An Asian Perspective, Bangalore: Visthar.
9.	Panikkar ,K/N.1995	A History of Indian People, London: Methuen.
10	University Grants Commission 1980, 1990	Review of Social work education in India: Retrospective and Prospect, New Delhi: UGC, Curriculum development Centre Reports New-Delhi, UGC.
11	Woodrofe, K. 1962	From Charity to Social work , London: Routledge and Kegan Paul

12	Borgatta , E.F (Ed) 1992	Encyclopedia of Sociology, New-York: Macmillan
13	The Cultural Heritage….	The Cultural Heritage of India (Vol 1-6) ,Calcutta: The Ramkrishna Mission
14	Encyclopedia of Social Work 1987	Encyclopedia of Social Work in India, New delhi: Ministry of welfare.
15	Economic and Political weekly	Human scape, The Indian Journal of Social work, Lokayan

Paper II/CC 2 Population and Environment

UNIT-I Characteristics of Population & population Policy

Population growth, Determinants of population growth

Population policy, Family size, Family Planning, Family Planning methods

World Action plan, Population policy and programme implementation.

UNIT-II Population & Environment: A Global Challenge

Human population and its impact on environment

Concept of Environment : Social and Physical environment

Lifestyle, degradation. Environment management and maintaining life style.

Current issues of environment.

UNIT-III Organizations & Their roles

Role of Govt and NGO for environmental protection.

International treaties and agreements legislation in India.

Environment movement in India.

UNIT-IV Natural resources and diversity

Forest, Land, Water, Air, energy and human resources.

Treatment and Prevention of natural resources

Waste material- Recycling and Renewal.

Waste material –disposal technique and methods.

UNIT-V Population and Environment protection Laws

Environment Protection laws: water ,land, forest, noise, air

Unplanned urbanization and its impact on society.

REFERENCES

1	Kaplan P S 1988	The Human Odyssey: life Span development , St . Paul West publishing Company.
2	Kapur M 1955	Mental Health of Indian Children, Delhi : Sage Publication.
3	Le. Francois G.R 1990	The Life Span 3rd EDS. University of Alberta.
4	Magmesson D and Allen VC 1983	Human development : An International Perspectives, New-York, Academic Press.
5	Maier HW 1965	Three Theories of child development, N.Y Haper & Row
6	Misra G 1990	Social Psychology in India , N.D Sage Publication.
7	Rapoport Rhona 1980	Growing through Life , Life cycle book , N.Y Haper & Row
8	Rogers D 1977	Child Psychology, Monterry C.A Brooks / Cole Publishing Co.
9	Schiamberg L.B 1985	Human development , N.Y l mac Millian Publishing
10	Seifert K Hoffnung R.J 2000	Life Span Development (2nd Eds) N.Y Hoghton Miffin Co.
11	Sharma N 1999	Adolescent Girl Child in India , News Bulletin of the Indian Council of Child welfare.
12	Sheehy G 1976	Passages : Predictable Crises of Adult Child Life, New-York Bantam Books.
13	Sigclman C.K and Shaffer,	Life Span human development 2nd ed. Pacific

grove, CA Brooks / Cole Publishing Co.

Paper III /CC3 Working with Groups/ Group Work

UNIT-I Introduction of Social Group

a)understanding of groups

b)Characteristics & Significance of Groups

c)Definition of Social Group work d) Purpose of Social Group work

Unit-II Theories of Social Group

a)Historical Evolution of social group with special emphasis on the Indian context

b)Theories applicable to group work

c)Models in group work

UNIT-III Types , Characteristics of Group/ group work

a)Types, objectives and purpose of group work.

b)Type of membership

c) Analysis of group process

UNIT-IV Principles of Group/ group work

a)Principles in group work b)Values in Social Group work

c)Factors of group formation d)Formulation of goals.

e) Identification of problem for work

Unit- V Initial phase of group work

a)Planning Model

b)Characteristics of pre-Group Phase

c) Characteristics of Initial Phase

d)Group Structure

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14.	Treker, Harleigh b 1990	Social Group Work: Principles and Practice, New-York: Association Press
15	Wilson, G. Ryland G 1949	Social Group Work Practice, Boston: Houghton Mifflin .Co.

Paper IV/CC 4 Social work Research – Qualitative Method

Unit-I Scientific Inquiry

Scientific meaning and assumption. Scientific approach to inquiry in

Comparisons to the native or common sense approach : Science and the study of social phenomena

UNIT-II Hypotheses and theories.

a) Hypothesis : Meaning , attributes of a sound hypothesis, role in explanatory research.

b)Theory –Meaning: Inductive and deductive theory, construction.

UNIT-III Social work research- meaning, purpose, the research process, scope and importance

Qualitative research- General characteristics, use of Qualitative methods in inquiry,. Case study and content analysis.

UNIT-IV Research design:

Meaning, process, types and significance.

UNIT V Sampling Technique

Sampling : Meaning, types, Characteristics and utility; General coordination in the determination of sample size.

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1	Ackoff, R.L.1962	Scientific Method: Optimising Applied, research designs, New-York: John Wiley and Sons.
2	Anderson J1970	Thesis and Assignment writing, New-Delhi: Wiley Eastern limited.
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4	Blaikle, Norman, 1993	Approaches in social enquiry, Cambribge: Policy Press
5	Blalock, H.M and Blalock A.M.(Eds) 1968	Methodology in social research, New-York, MacGraw Hill
6	Collidge, Frederick L 2000	Statistics: A gentle introduction, New-delhi: Sage Publications.

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10	Forster, J.J1998	Data Analysis using SPSS for windows: A beginners guide, New-Delhi :Sage Publications.
11	Reid, William J and Smith Andry D 1981	Research in social Work, New-York : Columbia University Press.
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17	Society for Participatory research in Asia 1995.	Participatory research: an Introduction, Participatory research Network Series No.3 New-Delhi PRIA.
18	Stewart, Alex 1998	The ethnnographer'sMethod, New-Delhi: sage Publication
19	Yin Robert K 1994	Case study Research: Design And Methods, New-Delhi: sage Publication

Paper-V /CC5 Human Growth and Development

UNIT-I Life Span Heredity and environment

a) Stages of Life Span, life span perspectives and the systems approach.

b) Principles of Growth and Development.

UNIT-II Theories of Human Development.

A critical look at the theories of Human development like those of Freud's Psycho-sexual theory, Erikson's Psycho-Social theory, Learning Theories and Piaget's Theory Maslow.

UNIT-III A) Indian Concept:

a)Prenatal stage and genetic factors, infancy and adjustment to immediate world.

b) Early child hood, growth Play , relationship with family .

c) Indian Youth and Hazards life –style effects.

UNIT-IV a)Adulthood: -growth, personal and social adjustment, health, sexuality

b) vocational and mental adjustment.

c)Aging:- Aging Characteristics, Adjustment to physical and mental health, and aging problems.

UNIT-V Relevance to social work Practice , across the stages of development, and Method of assessment.

REFERENCES:-

1	Baltes, P.B 1978	Life Span development and Behaviour, New-york: Academic Press Inc.
2	Bronfenbrenner, U 1979	The ecology Human Development, Cambridge, Harward University Press.
3	Chowdary D.P 1992	Aging and the Aged, New-Delhi: Inter-India Publication.
4	Clarke- Stewart, A FriedmanS and Koch J 1985	Child development : A topical Approach (for UNIT-I)

5	Dash and Dash	The Psychology of Poverty.
6	Garg, P and Parikh I 1970	Indian Youth at the Cross Road; profiles in Identity.
7	Gore, M.S 1978	Changes in the Family and the process of Socialization in India in Anthony E.J. & Colette C .The child in his Family , Wiley, 365-574
8	Kail, R.V and Cavanangh,	Human Development, Pacific Grove, CA Books/ Core Publishing Company.
9	Kakar S 1979	Indian Child Hood, Cultural Ideals and social reality, Delhi Oxford University Press.
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19	Rapoport Rhona 1980	Growing through Life , Life cycle book , N.Y Haper & Row
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25	Sigclman C.K and Shaffer,	Life Span human development 2nd ed. Pacific grove, CA Brooks / Cole Publishing Co.

MSW (MASTER of SOCIAL WORK) II SEMESTER

Paper/ CC	Title of the Paper	I	T	Total
VI/ CC 6	Social work History and Ideology- Western Perspective	20	80	100
VII/ CC 7	Political Economy of Development	20	80	100
VIII/ CC 8	Process and Evaluation of Group Formation	20	80	100
IX/ CC 9	Social work Research –Quantitive Method	20	80	100
X/P 1	Social Work Practicum	-	-	100

Paper VI/CC6 Social work History and Ideology- Western Perspective

UNIT- I **Western history of Ideology for Social Change**

a) Beginning of Social work education in Western Country

b)Charity Organization

c)Clinical social work d) Ecological Social work

UNIT-II a)Attributes of profession & Professionalization

b)Social work education , Knowledge and Professional association

c) Goals ,values, function/ role and process of Social work

UNIT-III Western history of Social work Profession

a) History of social work in America

b) History of social work in England

c)Secular humanism and Protestantism

UNIT-IV Modern period -I

a)Rationalism and welfarism

b)Liberalism and Democracy

UNIT-V Modern period -II

a)Utilitarianism and social Darwinism

b)Socialism and human rights

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2	Chatterjee, P. 1996	Approaches to the welfare State, Washington D.C: National Association of Social workers
3	Desai M,2000	Curriculum development on history of ideologies for Social Change and Social work, Mumbai: Social work education and Practice Cell
4	Diwakar, V.d(Ed) 1991	Social Reform Movement in India: A historical Perspective, Bombay Popular Prakashan.
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8	Kappen, S. 1994	Tradition Modernity Counter culture: An Asian Perspective, Bangalore: Visthar.
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	1990	Reports New-Delhi, UGC.
11	Woodrofe, K. 1962	From Charity to Social work , London: Routledge and Kegan Paul
12	Borgatta , E.F (Ed) 1992	Encyclopedia of Sociology, New-York: Macmillan
13	The Cultural Heritage….	The Cultural Heritage of India (Vol 1-6) ,Calcutta: The Ramkrishna Mission
14	Encyclopedia of Social Work 1987	Encyclopedia of Social Work in India, New Delhi: Ministry of welfare.
15	Economic and Political weekly	Human scrape, The Indian Journal of Social work, Lokayan

Paper VII/CC7 Political Economy of Development

UNIT -I Introduction to Political Economy

Meaning of Political Economy

Significance of the study of Political Economy

Meaning and Characteristics of development and under development

UNIT-II Development –A human Right Perspective

Social ideals of Indian Constitution

Fundamental rights

Human rights

UNIT-III Socio economic order and Comparative economic system,

Capitalism, Socialism and Mixed economy, their features, merits and demerits.

UNIT-IV Poverty in India – A Structural Problem its Causes , effects and implications.

Entitlement approach to understanding poverty.

UNIT-V Approaches to development

Modernization, Capitalist, Socialist and Gandhian approaches to development.

REFERENCES

1	Agrawal A.N Lal Kundan 1989	Economics and development and planning , New-Delhi: Vikas publishing house private limited.
2	Augushine, John S 1989	Strategies for third world development, New-Delhi: Sage Publication.
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12	Sharma S.L 1986	Development : Socio Cultural Dimensions, Jaipur: Rawat publication
13	Tandon BB KK Tandon	Indian Economy, New-Delhi Tata MacGraw Hill Publishing Co.

Paper –VIII/CC8 Process and Evaluation of Group Formation

UNIT-I **Group Process-I**

a)Importance of group Process

b)Typical pattern

c)process in different types of group

d)workers skills in identifying and understanding process

UNIT-II **Group Process-II**

a)Bond, Subgroup Role

b)Leadership c) Isolation

d)Decision making e) Contagion f) Conflict

g)Communication h) relationship

Unit -III **Middle Phase**

a)Characteristics of middle phase

b)Group structure c) Group dynamics

d)Role of group workers e) facilitation skills

a) comparison across phases

UNIT-IV **Use of Programme**

a)Concept and principle b) Programme Planning

c)principle of recording d) type of recording

UNIT-V **Evaluation of Group/ Termination Phase**

a)Method of Evaluation b) Importance and types of Evaluation

c) Need of termination

d)Type of termination and Characteristics of termination phase

REFERENCES:-

1	Alissi,A.S.1980	Perspectives on social group work practice; A book of reading, New York: The free press.
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Paper IX /CC9 Social Work Research –Quantitative Methods

UNIT -I **Data and its sources-**

Source of data: primary and secondary, Methods and instruments of Data collection. Qualitative and Quantitative observation; Participant observation life histories, Group Interview (Including telephonic interview)

UNIT-II **Measurement**

Participatory and rapid Appraisal technique; triangulation levels of measurement

Scales: Need for scales, Some prominent scaling procedures(Thrustone-type, Likert- type, Bogurdus –type, Semantic differentials

UNIT-III **Data processing , presentation and research Report**

Graphical, tabular: Analysis and interpretation, use of computers.

Participatory and Evaluatory Research.- Conducting participatory

Research: Monitoring and research

Research Report: writing research Abstracts, Research proposals

Ethics- Ethics in research

UNIT-IV **Statistical Tools and their use**

Use of statistical tools and techniques - Descriptive and inferential uses and limitations of statistics

Proportion of Percentage, Ratio

Measurement of central tendency:- Mean, Mode, Median

Unit -V **Measures of dispersion**

Range, Quartile Deviations, Mean Deviations

Standard Deviations. The index of qualitative variation

REFERENCES:-

1	Ackoff, R.L.1962	Scientific Method: Optimising Applied, research designs, New-York: John Wiley and Sons.
2	Anderson J1970	Thesis and Assignment writing, New-Delhi: Wiley Eastern limited.
3	Bailey, Kenneth ,D 1987	Methods of social Research, New-York, The free Press.
4	Blaikle, Norman, 1993	Approaches in social enquiry, Cambribge: Policy Press
5	Blalock, H.M and Blalock A.M.(Eds) 1968	Methodology in social research, New-York, MacGraw Hill
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19	Yin Robert K 1994	Case study Research: Design And Methods, New-Delhi: sage Publication

Paper X /P1 Social Work Practicum

	Social work Practicum	Comprises of Maximum Marks (Internal)
i.	Agency Placement (to develop the knowledge of Administration, Management, Training)	15
ii	Rural Camp	05
iii	Visits	15
iv.	Social work in Communities	15
		Total: 50(internal)
*	Valuation of Complete Report & Viva-Voce	50(external)
		Total : 100

In social work practicum, each student must prepare a complete "Report" valuation of Social work practicum "Report" & Viva voice by External Examiner appointed by university.

MSW (MASTER of SOCIAL WORK) III SEMESTER

Paper/ CC	Title of the Paper	I	T	Total
XI/ CC 10	Sociology for Social Work in India	20	80	100
XII/ CC 11	Social Work Personal, Training and Development	20	80	100
XIII/ CC 12	Family Social Work	20	80	100
XIV/ CC 13	Social Policy in India	20	80	100
XV/ CC14	Legal System in India	20	80	100

Paper XI/CC 10 Sociology for Social Work in India

UNIT -I a)Meaning, Scope and significance

b) Sociology- its relationship to other disciplines such as history, Economics, Political science, psychology, anthropology and social work

UNIT-II Society and Culture:-

a)Society-meaning, Characteristic, society as a system of relationship

b)Social status and role: meaning and importance.

c)Culture – Meaning and content: Traditions, Customs,

norms Folk-ways and mores

d)Socialization- Meaning, Process and agencies

UNIT-III Indian Society

a)Composition of Indian society

c) The Concept of unity in Diversity

d) Social Classification in India- tribal, rural and Urban Division

UNIT-IV Social Group

a)Social Stratification in India- Meaning and bases of stratification Caste, Class and gender.

b) Meaning characteristics and types of primary and Secondary

groups.

Unit-V Institution

a)Concept of Institution: Characteristics,functions,significance.

bType of Social Institution: Marriage, Family, religion, state and Law.

REFERENCES

1	Bert N Adams. 1975	A sociological Interpretation, Chicago: Rand McNally College.
2	Bharadwaj,A.N.1979	Problems of SC/ST in India, New-Delhi Light and Life publication.
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4	Deshpandey, Shrinivasan narain,1978	Society economy of Polity in India, Mumbai: University of Mumbai
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Paper-XII/CC11 **Social Work Personnel- Training and Development**

UNIT-I **Training for Personnel**

Training- meaning and concept

Need for personnel training

Social work educational curriculum ,Role of Social Work-educational curriculum in changing society.

Levels of Social work ,and levels of Training, Role of training for Social Workers.

UNIT-II **Principles of learning**

Concept of learning and adult learner

The adult learner and principles of adult learning.

Practice learning: Instructional Process, educational and supportive aspects:

Orientation: Role of Orientation for adult learner.

UNIT-III **Curriculum Designing**

Concept of Curriculum Designing

Principles and process of Curriculum Designing

Education Technology: Methods and tools

Social work practice learning instruction

UNIT-IV **Traning Programme Design and Training Effectiveness**.

Training Designing- Concept and steps.

Implementing and evaluating training programmes for social work personnel.

Training and its Characteristics.

Enhancing trainer, Effectiveness: Facilitation Skills.

Assessment of Training- Tool, method and technique.

UNIT-V **Staff Development**

Staff development –concepts and needs

Process of staff development, Short term services .

Technique and methods of Staff development, Role of motivation for staff development.

REFERENCES:-

1 Asian and Pacific Association for social work education (APASWE 1994) : Social work profession: reflection and future directions, Mumbai TISS.

2 Baldwin, J and Williams H 1988 Active learning: A trainers Guide, England: Blackwell Education.

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9 Hokenstad M and Rigby B 1977 Training of Trainers: Participate in Teaching and learning, An ideal book for social work, New-York

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14 Kroehnert G 1995 Basic Training for Trainers: A Hand book for New Trainers New-York: MacGraw Hill Book Co.

15 Martin R 1983 Skills and Strategies , Hand Book for working with people. Engle wood Cliffs: Prentice Hall Inc.

16 Nandurbar : trace Team : TRACE (Training Animators in Conscientization and Education) Nandurbar: Trace Team.

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20 Society for Participatory Research in Asia (PRIA) 1987Training for Trainers : A Manual for participatory training methodology in Development, New-Delhi: Society for Participatory Research

Paper-XIII/CC12 **Family Social Work**

UNIT-I **Theoretical and conceptual frame work to study family.**

Concept and Characteristics of Family

Concept and objective of Marriage.

Origin and evolution of family and marriages.

Ideology of family rights and responsibilities.

UNIT-II	**Normative Family Functions And Structure, And Changes**
	Normative Family Functions and structure, ethnicity and socio-economic background.
	Social change and changes in family and marriage functions and structure.
	Implications for the family and its members.
UNIT-III	**Alternative family and Marriage patterns and structure.**
	Dual earner/ Career families , Single parent Families
	Female headed house holds , Childless families
UNIT-IV	**Family socialization of child, Family**
	Socialization- Concept, Characteristics ,Stages, Agencies and theories
	Family interactions
	Family development/ Family life Cycle.
UNIT-V	**Family assessment and creating public awareness for promoting family rights and Responsibility**
	Some methods and its implications
	Modes of awareness building- workshop, seminar, value education in school.

REFERENCES:-

1	Desai M 1994	Family and Intervention: A Course Compendium, Bombay: Tata Institute of Social Sciences.
2	Engles F 1944	Origin of the Family, Private Property and the state, Bombay, People's Publishing House.
3	Hartman A and Laird J 1983	Family Centered Social Work Practice, New-Your. The free press.
4	Horchschild A 1989	The second shift; working parents and revolution at Home, New-York.

5 India: Ministry of welfare 1994: India's Commitment of Family well being,

An overview of the report of the national seminars on the International year of the family, 1994, Bombay: Tata Institute of Social Sciences

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12 Unit of Family Studies 1994: Enhancing the role of the family as an agency for social and economic development , Mumbai . Tata Institute of Social Sciences

Paper-XIV/CC13 **Social Policy In India**

UNIT-I **Concept of social policy, sectoral policies and social services**

a)Evolution of social policy in India in a historical Perspective.

b)Relationship between social policy & social development.

UNIT- II Social policy and planning on the constitutional provisions ie. The directive Principles of the state policy and Fundamental Rights and the Human Rights.

UNIT-III **Policy formulation**

a)Approaches to social policy unified , integrated

b) Different models of social policy and their applicability to the

Indian situation.

c)The process of social policy formulation, the contribution of research, the role of interest groups , the problem of conflict of interest and it's solution.

UNIT- IV Different Sectoral Policies -I

Different sectoral policies and their implementation eg. Policies concerning education, health, social welfare, women, children , welfare of backward classes,

UNIT-V Different Sectoral Policies –II

Social security, housing, youth, population an family welfare, environment and ecology , urban and rural development, tribal development and poverty alleviation.

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2	Blumer, M 1989	The Goals of social policy, London, Unwin Hyman.
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5	Ham,C Hill M 1993	The policy process in the modern capitalist state 2nd New-York,

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14 Lindblom, C.E 1980 The policy making process, New-Jersey, Prentice Hall

15 Livingstance, A 1969 Social policy in developing countries, London, Routledge & Kegan paul

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19 Mundle S 1993 -Policies, Paradigms and development Debate at the close of twentieth Century, Economic and political weekly, Vol.XXVII No26 Sept.4 1993

20 Mishra, R 1977 — Society and social policy, London Mac Millan ltd.

21 Mullard M and Spicker 1988 — Social policy in a changing society, London, Routledge & Kegan paul

22 Rao V –Social Policy: The means and ends question , Indian journal of public administration vol. L No.1 Jan-Mar 1994.

23 Rao, V & Mandar H — An Agenda for caring; Interventions for the Marginalized, New-Delhi.

24 Yadav C.S 1986 — Urban planning and polities Part A New-Delhi Concept publishing Co.

Paper –XV/ CC 14 Legal System in India

UNIT -I Rights and Role of Social workers

Concept of rights, Legal rights, Civil rights

Rights of children, women and Schedule Caste and Schedule Tribes.

Role of Social worker, Social work interventions,

UNIT-II Defines the rights and duties of each individual, criminal code (Penal code)

Procedure law; when a crime is committed , the procedure law is activated (Cr.Pc.Evidence Act etc)

Civil Law (Private wrongs) like those for inheritance, divorce, juvenile justice laws

UNIT-III Criminal Justice System

Criminal justice system in the country, police, prosecution, judiciary & correction.

Courts: Structure and Functions District Court, Session Court, High Court, supreme Court.

UNIT-IV The components

Police; Structure, reporting registration, investigation, arrest (how and what can be done) power of the police, bail and critique.

Correction: structure, Functions, Treatments, Rehabilitation and critique.

UNIT-V Legal aid , public interest litigation

History of legal Aid, concept of legal aid, need for legal aid, who needs legal aid schemes and problems.

History of public interest litigation with special reference to India, meaning and concept of public interest litigation process & problems of public interest litigation

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1	Aranha,T	Social Advocacy –perspective of Social work, Bombay , college of social work
2	Buxi, U 1982	Alternatives in development; Law the crises of the Indian legal System, New-Delhi: Vikas Publishing house.
3	Bayley D.M 1969	The police and political development in India , New-Jersey

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8 Iyer VRK 1981 Law versus Justice:Problems and solutions, New-Delhi, Deep &Deep.

9 Khanna H R 1980 Justice and Beyond, New-Delhi IIPA

10 Mathew P.D Legal Aid series, delhi, Indian social Institute.

11 Mc.Donald W.F 1979 The Presentator, California , Berkeley Hill

12 Newman G 1999 Global report on crime & justice, New-York: Oxford university press.

13 Nirmal Anjali 1992 Role & Functioning of Central police organization, New-Delhi

14 Peak,K.J 1988 Justice Administration- Police, Courts and Correction, New-Jersey: Prenctice Hall

15 Singh L.M 1973 Law and Poverty: Cases and materials, Bombay

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18 Government of India 1973: Report of the Legal Aid Committee.

MSW (MASTER of SOCIAL WORK) IV SEMESTER

Paper/ CC	Title of the Paper	I	T	Total
XVI/ CC 15	Social Control and Change in India	20	80	100
XVII/ CC 16	Social Development	20	80	100
XVIII/ CC 17	Social Planning in India	20	80	100
XIX/ CC 18	Integrated Social Work Practice	20	80	100
XX/ P 2	Research Project With Block Placement and Field Work Report	-	-	100

Paper XVI /CC 15 Social Control and Change in India

UNIT-I **Social Control**

a)Meaning b)functions

Unit-II **Theories of Society**

a)Significance of a theoretical understanding of society

UNIT-III **Social Change**

a)Concept of Social Change b) Characteristics

c)Factors of social change :Demographic, Cultural, Technological and Mass Media.

UNIT-IV **Social Movement in India**

a) Concept of social movement

b)Factors of social movement

c)Social reform movement and Contribution of social reformers

UNIT- V **Type of Movement and Change**

a)Peasant Movement b) Trade Union Movement

c)Social Movement and Social Change in India

REFERENCES

1	Bert N Adams. 1975	A sociological Interpretation, Chicago: Rand McN
2	Bharadwaj,A.N.1979	Problems of SC/ST in India, New-Delhi Light and publication.
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4	Deshpandey, Shrinivasan narain,1978	Society economy of Polity in India, Mumbai: Univ Mumbai
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19	Sharma , R.K.1997	Indian Society institution and change , New-Delhi Publishers
20	Singh K.S. 1985	Tribal Society in India , New-Delhi ,Manohar Pub

House.

21 Shrinivas M.N 1996 Village, Caste, gender and Method(essay in Indian social Anthropology) Delhi: Oxford University Press

22 Social Change, Issues and Perspectives (Journal of the council for social Deelopment

Paper XVII/CC 16 Social Development

UNIT-I **Concept of Social Development**

a) Defining social Development.

b)Theory of Development

c) Development Indicators

d). Current debates on Social Development

UNIT-II **Social Development Around the World And in India-I**

a) Historical Experience of development process

b)Social and economic transformation in India.

c)The Historical and social context- Development in Indian Sub-Continent in pre Independence Phase.

UNIT-III **Social Development in India-II**

a) The post Independence Phase: Government measures and five year plans.

b) Political economy and social structural change.

c) Demographic Transition.

Unit-IV **Development Sectors and understanding of nature of Intervention themes-I**

a) Rural Development: Agrarian and Land reforms Green Revolution

b) Industrialization and Urban development

UNIT-V **Development Sectors and understanding of nature of Intervention themes-II**

a) Labour Relations in organized sector.

b) Gender Issues

c)Environmental Issues (Land, water, Forest)

d) Education and Health

References;-

1	Bagchi, A.K 1982	Political economy of Underdevelopment, Cambridge; Cambridge University Press.
2	Desai v 1988	Rural development (vol.i) Mumbai; Himalaya Publishing House
3	Fidelma, A 1999	Contemporary Social and Political theory: An Introduction, Buckingham: Open university press.
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5	Jacob K.K 1992	Social development Perspectives
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10.	Rao, D.B (ed)1998	World Summit for Social Development.
11.	Roychoudhary T 1982	The Cambridge economic History of India Vol I &II New-Delhi
12	Singh RR1995	Whither Social Development? New-Delhi ASSWI
13	Singh Y 1974	Modernization of Indian Tradition, del;hi Thomas Press.
14	The Probe Team 1999	Public report on basic education in India , New-Deldi Oxford University Press.
15	UNDP	Human development Reports, Oxford University Press

16	World Bank	World development reports (Annual) Oxford University Press
		Encyclopedia of Social Sciences
		Encyclopedia of Social Work

Paper- XVIII /CC17 Social Planning in India

UNIT-I **Planning-**

a)Concept of Social and Development planning.

b)Scope of Social planning

c)Linkage between social policy and planning- planning as an instrument and source of policy making in India.

d)Role of Ideology.

UNIT-II **Planning Process I**

a)Indian planning in a historical Perspective

b)Federal political system and the planning process

c)The Constitutional position of planning in India. The legal Status of the planning commission.

UNIT- III **Planning Process II**

a)Coordination between centre and the state and the need for decentralization.

b)Panchayat raj, people participation.

c)Role of political, Social movement and voluntary action.

UNIT-IV The planning, Machinery and monitoring plans & programmes

a)Planning of Monitoring- Concept and Characteristics

b)Planning of evaluation- Concept and Characteristics

c) Need for decentralization

UNIT- V a)A broad review of the five year plans

b)objectives of growth and social justice and with special reference to the areas of health and family welfare, education,

c)social welfare ,anti poverty programmes and advocacy

REFERENCES:-

1	Bhanti,R 1993	Social policy and development in Rajasthan, Udaipur, Himanshu Publication.
2	Blumer, M 1989	The Goals of social policy, London, Unwind Hyman.
3	Dimtto, D.M 1991	Social welfare: politics and public policy New-Jersey, Prentice Hall
4	Ganapathy R.S 1985	Public policy and policy analysis in India . Delhi Sage publication.
5	Ham,C Hill M 1993	The policy process in the modern capitalist state 2nd New-York, Harvester.
6	Hebsur R.K	Social intervention for justice, Bombay TISS
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15	Livingstance, A 1969	Social policy in developing countries, London, Routledge & Kegan paul
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18	Mathur k Bjorkman	Top Policy makers in India , New-delhi Concept publishing co.
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21	Mullard M and Spicker 1988	Social policy in a changing society, London, Routledge & Kegan paul
22	Rao V –Social Policy: The means and ends question , Indian journal of public administration vol. L No.1 Jan-Mar 1994.	
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24	Yadav C.S 1986	Urban planning and polities Part A New-Delhi Concept publishing Co.

Paper IXX/CC 18 **Integrated Social Work Practice**

UNIT-I **System and Social Work**

Concept of Social work

Characteristics of social Systems, Units of social work

	Individual, Family, Groups, communities and Organization
UNIT-II	Approaches To Integration
	The system Approach , Environmental approach
	Understanding of life sustaining elements and their inter-relationships,
UNIT-III	Social Work Roles
	Concept and types of Role, Role of Social worker.
	Roles –theories- theoretical insights.
	Role tasks, skill and techniques, outcomes.
UNIT-IV	Action for and Action In
	The client system, the problem, process and phases.
	Initiating contact, collecting data, assessment, negotiation of contract.
	Problem solving, termination and evaluation for integrated practices.
Unit-V	Social Work Professional and Practice
	Concept of Social Work Profession.
	Social work professional as a single change actor as one in the team
	Integrated social work practice,

REFERENCES:-

1	Barborka, G.A 1972:	The Devine Plane, Adyar ,Chennai, India, The Therosophical Publishing House.
2	Barlett Harriett, 1970	The common base of social work practice., National Association of social workers.
3	Connaway Ronda, S 1988	Social work Practice , New Jersey: Prentice Hall.
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10	Swamy Chinmayananda 2000	Atema Bodha –A Contemporary of Swamy Chinmayananda Mumbai Central Chinmaya Mission Trust.
11	Uberroi N.K 1995	Professional Competency in Higher education, Centre for Professional Development in Higher education

	Paper XX/P2 **Research Project With Block Placement and Field Work** Marks distribution of paper XX	**Maximum marks**
1	**Block Placement**	**25**
2	**Study Tour/field work**	**15**
3	**workshop**	**10**
	Total	**50(Internal)**
4	**Research project**	**50(External)**
5	**Grand total**	**100**

Out of 50 marks allotted for research project; valuation of research project and viva-voice will be examined by external examiner appointed by university.

M.Phil . SOCIOLOGY
SCHOOL OF STUDIES IN SOCIOLOGY
Pt.RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR
w.e.f 2017-2018

Marks-100

Sl.No	Papers	Marks
1.	**Research Methodology: Quantitative Techniques, Computers**	100
2.	**Contemporary Indian Social Problems**	100
3.	**Gender and Society**	100
4.	**Seminar based theory**	50
5.	**Dissertation** **a. Seminar based Dissertation** **b. Script,writing** **c. Viva-Voce**	 50 75 25
	TOTAL	500

PAPER – I: Research Methodology: Quantitative Techniques, Computer

Unit I. Science and Social Science Research
a) Nature of Science, Scientism as a process of Science, Ideal type v/s Reality
b) Methodological approaches to social world; Values, Science and Sociology, Ethics in Social Research.

Unit II. Logic of Scientific Reasoning
a) Elements of Logic and Reasoning; Terms, Propositions and Arguments
b) Deductive and Inductive reasoning.

Unit III. Formulation of Research proposal
a) Formulations of Research Problems
b) Monitoring and Evaluation.

Unit IV. Statistical Tools, Quantification and Interpretation
a) Mean, Median, Mode, Standard Deviation, Correlation, Chi-Square
b) Data Processing : Interpretation and drawing of conclusions,

Unit V. Computer:
a) Organization and Working of a computer – Hardware: RAM, ROM, PROM, EPROM, EEPROM, primary and secondary data storage, Software: operating systems – Windows-Ward, Power Point, Excel

b)Internet and Social Science Information :Advantages of networking and Internet, E-Mail, World Wide Web, Browsing, Search Engines, Important Social Science Portals

References:
1. Manheim, Henry L.1977, Sociological Research: Philosophy and M Dorsey Press. Illinois.
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3. Ronald J.1988: Approaches to Social Research, Oxford University Press,
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8.Timothy, J and Linda O'Leary: Micro computing, New York: McGraw-Hill,1995
9.Tolwer, Romela et. al: Microsoft Office 2000, New York: Addison Wesley, 2000

Marks-100

PAPER-II: Contemporary Indian Social Problems

Unit I. Tribal India
a. Discruption of Tribal Economy, Vulnerability and Loss of Livelihoods
b. Protest Movements: Naxal Movement and Counter Movement

Unit II. Rural India
a. Agricultural and Educational Backwardness and Response of the State
b) Vulnerability, Farmers Suicide, Distressed Migration

Unit III. Urban India
a) Over- crowdedness, Crimes, Ethnic and Linguistic Divide
b) Slums, Environmental Degradation,

Unit IV. Development Based Issues
a) Displacement, Human Rights, Social Exclusion and Sustainability
b) Response of the State-RTI, MNREGA, NRHM, Inclusive Policies

Unit V. Problems of Senior Citizens of India.
a. Gerentological Problems-Social, Economic, Psychological and Health
b. Response of the Community, Family , State and Civil Society

References:
1. Journal of the Natural Human Rights Commission, India, Vol.1, 2002, New Delhi-110001.
2. Natural Human Rights Commission, Annual Report, 2000-2001, New Delhi-110001.
3. G.R. Madan, Indian Social Problems, Vol, I Allied Publishers Pvt, Ltd, New Delhi.
4. V.S.Katyar Environmental Concerns: Depleting Resource and Sustainable Development, Aviskar Publishing's Distributors, Jaipur
5. R.N.Pati and B. Jena (ed) Aged in India. Ashish Publication House, New Delhi.

6. The state of Indian Environment II Centre for Science and Environment. New Delhi
7. Rogers, John J.W & P.G.,!998, People and The Earth Barie Issues in the Sustainable of Resource and Environment, Cambridge University

Marks-100

PAPER-III:GENDER AND SOCIETY

Unit-I: Social Construction of Gender and Emergence of Women's Studies

a. Gender Vs. Biology, Equality Vs. Difference, Women in the Family: Socialization, Nature Vs. Culture, Gender Roles
b. Patriarchy as Ideology and Practice, Emergence of Women's Studies

Unit-II: Theories on Feminism

a. Feminist Liberalism, Feminist Essentialism
b. Feminist Socialist, Feminist Post-modernist

Unit-III: Gender and Society in India

a. Economy: Marginalisation of women and Sexual Division of Labor, Polity: Reservation for Women
b. Religion and Culture: Women as Repositories of cultural practices and Traditions, Marriage, Dowry and Property, Health and Education: problems women Encounter.

Unit-IV: Contemporary situation of women in India

a. Constitutional provisions and National Policy on Women Empowerment
b. Women Welfare Organizations and Agencies

Unit-V: Women in the Era of Globalization

a Impact of Liberalization and Globalization on Women,
b Women's Movements

References:

1. Altekar, A.S. 1983 — The Position of Women in Hindu Civilization Motilal Banarasidas, New Delhi
2. Desai, N. and Krishnaraj, M. 1987 — Women and Society in India Ajanta, New Delhi
3. Dube, L et al (ed) 1986 — Visibility and power: Essays on women in Society and Development , Oxford, New Delhi.
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5. Myers, K.A. et al (ed) 1998 — Feminist Foundations: towards Transforming Sociology. Sage, New Delhi.
6. Mills, M. 1980 — Indian Women and patriarchy: conflicts and Dilemmas of Students and Working Women Concept, New Delhi.
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COURSES WORK FOR THE Ph.D (Sociology)

2017-2018

Sl.No	Papers	Marks
1	Methodological aspect of Sociological Research	100
2	Practical	100
	a. Review of Concerned Literature :(Marks-20)	
	b Seminar :(Marks-20)	
	c Project Work (Marks 60) {External –40}&{Internal –20}	
	TOTAL MARKS	200

PAPER –I: Methodological aspect of Sociological Research (Max. Marks 100)

UNIT-I

i. Research –Concept and types.
ii Motivation of research
iii Criteria of a good research

UNIT II Research Methodology

i Scientific method
ii Research Design
iii Sampling.

UNIT-III

i Formulation of research Problem
ii Data Collection- Method, Tool, technique
iii Data processing

Unit-IV Computer application in Social Research

i Statistical Tool
ii Statistical Software
iii Data entry and Commands for Analysis

Unit- V Research Writing Style

Paper-II:Practical (Max. Marks 100)

Part-I- Review of Concerned Literature :(Marks-20)

The candidate shall review minimum 20 research articles of a broad research area from referred journals of the discipline. After reviewing the research articles the candidate shall submit a summary chronologically developing the arguments to the Department within two months from the beginning of the Course. On the basis of the review of literature the candidate shall prepare a Synopsis Including.

i. Research Topic.
ii. Review of Literature.

iii. Gaps in earlier Studies.
iv. Statement of Problem.
v. Objectives
vi. Hypotheses
vii. Methodology
viii. Plan of the Study

Part-II-Seminar :(Marks-20)

The candidate shall present a seminar on the basis of Part-I

Part-III: Submission of Project Report :(Marks-60- External Examiner-40 Marks Internal Examiner-20 Marks)

The candidate shall submit a project report on the basis of the suggestions made in the seminar. Final examination will be conducted with the help of an external examiner in the presence of the internal examiner.

COURSES WORK FOR THE Ph.D (Social Work)

2017-2018

Sl.No	Papers	Marks
1	Methodological aspect of Sociological Research	100
2	Practical	100
	a. Review of Concerned Literature :(Marks-20)	
	b Seminar :(Marks-20)	
	c Project Work (Marks 60) {External –40}&{Internal –20}	
	TOTAL MARKS	200

PAPER –I: Methodological aspect of Sociological Research (Max. Marks 100)

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i. Research –Concept and types.
ii Motivation of research
iii Criteria of a good research

UNIT II Research Methodology

i Scientific method
ii Research Design
iii Sampling.

UNIT-III

i Formulation of research Problem
ii Data Collection- Method, Tool, technique
iii Data processing

Unit-IV Computer application in Social Research

i Statistical Tool
ii Statistical Software
iii Data entry and Commands for Analysis

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The candidate shall present a seminar on the basis of Part-I

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The candidate shall submit a project report on the basis of the suggestions made in the seminar. Final examination will be conducted with the help of an external examiner in the presence of the internal examiner.

Pt. RAVISHANKAR SHUKLA UNIVERSITY: RAIPUR
SCHOOL OF STUDIES IN STATISTICS

Syllabus for M.A./M.Sc. (Statistics) Semester Course 2016-17

FIRST SEMESTER

S. No.	Paper	Subject	Theory Exam Marks	Internal assessment Marks	Total Marks	Credit points
1	I	Real Analysis	80	20	100	04
2	II	Statistical Methods	80	20	100	04
3	III	Applied Statistics	80	20	100	04
4	IV	Probability and Measure	80	20	100	04
5	V	Lab Course I : Practical Based on Courses II			100	02
6	VI	Lab Course II :Practical Based on Courses III			100	02
			Total Credit points			**20**

SECOND SEMESTER

S. No.	Paper	Subject	Theory Exam Marks	Internal assessment Marks	Total Marks	Credit points
1	I	Linear Algebra	80	20	100	04
2	II	Stochastic Processes	80	20	100	04
3	III	Statistical Computing	80	20	100	04
4	IV	Sampling Theory	80	20	100	04
5	V	Lab Course I :Practical Based on Courses I & III			100	02
6	VI	Lab Course II :Practical Based on Courses IV			100	02
			Total Credit points			**20**

THIRD SEMESTER

S. No.	Paper	Subject	Theory Exam Marks	Internal assessment Marks	Total Marks	Credit points
1	I	Multivariate Analysis	80	20	100	04
2	II	Inference - I	80	20	100	04
3	III	Operation Research-I	80	20	100	04
4	IV	Statistical Quality Control	80	20	100	04
5	V	Lab Course I : Practical Based on Courses I and II			100	02
6	VI	Lab Course II :Practical Based on Courses III and IV			100	02
			Total Credit points			**20**

FOURTH SEMESTER

S. No.	Paper	Subject	Theory Exam Marks	Internal assessment Marks	Total Marks	Credit points
1	I	Design of Experiment	80	20	100	04
2	II	Inference-II	80	20	100	04
3	III	Operation Research II	80	20	100	04
4	IV	Any of the following (Major Elective) (a) Reliability and Life Testing (b) Demography (c) Econometrics	80	20	100	04
5	V	Lab Course : Practical Based on Courses I, II, and III			100	02
6	VI	Project Work			100	02
			Total Credit points			**20**

Grand Total of Credit Points = 80

Note: Students of Statistics shall offer Minor Elective from other programmes

FIRST SEMESTER

Paper I: Real Analysis
Paper II: Statistical Methods
Paper III: Applied Statistics
Paper IV: Probability and Measure
Paper V: Lab Course I: Practicals Based on Papers II
Paper VI: Lab Course II: Practicals Based on Papers III

Course –I
Real Analysis

UNIT-I
Recap of elements of set theory; Introduction to real numbers, Introduction to n-dimensional Euclidian space; open and closed intervals (rectangles), compact sets, Bolzano - Weirstrass theorem, Heine - Borel theorem. Sequences and series and their convergence.

UNIT-II
Real valued function, Properties of real valued continuous function on R^n , Uniform continuity, Sequences and series of functions, Uniform convergence. Power series and radius of convergence.

UNIT-III
Differentiation, maxima - minima of functions; functions of several variables, constrained maxima - minima of functions. Multiple integrals and their evaluation by repeated integration, Dirichlet and Lioulle's Theorem. Change of variables in multiple integration.

UNIT-IV
Reimann-Stieltjes integral of real valued function & its properties, Mean value theorem, Integration by parts and change of variables, Term by term integration, Differentiation & integration under the integral

sign. Improper integral, Uniform convergence in improper integrals, Test for absolute and conditional convergence.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Apostol, T.M. (1985). Mathematical Analysis, Narosa, Indian Ed.
2. Courant, R. and John, F. (1965). Introduction to Calculus and Analysis, Wiley.
3. Miller, K.S. (1957). Advanced Real Calculus, Harper, New York.
4. Rudin, Walter (1976). Principles of Mathematical Analysis, McGraw Hill.
5. Hewitt and Stromberg : Real and Abstract Analysis.
6. G. Das and S. Pattanayk : Fundamental of Analysis, TATA Mc Graw Hill.
7. Shanti Narayan: A course of mathematical analysis. S. Chand & Co. Ltd.

Course -II

Statistical Methods

UNIT-I

Frequency distribution, measures of location, dispersion and skewness, Moments and cumulats, moment generating function.

Simple correlation coefficient, Intra class correlation, Multiple and Partial Correlation. Linear and Multiple Regression, and their application.

UNIT-II

Testing of hypothesis, Level of significance, degrees of freedom, Central and Non-central chi-square, t and F- distributions, their properties and related tests. Sampling distributions of mean and variance of a sample from a normal population, sampling distribution of simple correlation coefficient in null case.

UNIT-III

Definition of probability, Bayes' theorem, Basic distribution function probability mass function, probability density function, joint, marginal and conditional p.m.f. . Random Variables and its mathematical expectations, conditional Expectation, Expectation of sum and multiplication of random variables, Markov Holder-Jensen and Liapounov inequalities.

Standard Discrete Distributions- Bernoulli, Binomial, Poisson, Geometric, Hyper geometric and Multinomial distribution. Limiting form of Binomial and Poisson distributions.

UNIT-IV

Standard continuous distributions-Uniform, Exponential, Normal Beta, Gamma and Cauchy distributions. Order Statistics-their distributions and properties. Joint & Marginal distributions of Order-Statistics.

UNIT V

Four short notes, one from each UNIT will be asked. Students have to answer any two.

REFERENCES

1. Dudewicz, E.J. and Mishra, S.N.(1988) : Modern Mathematical Statistics, Wiley, Int'I Student's Edition.
2. Rohatgi, V.K. (1984) : An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern.
3. Rao, C.R. (1973) : Linear Statistical Inference and its Applications, 2/e, Wiley Eastern.
4. Weather ,Burn,C.E. : A first Course in Mathematical Statistics.

5. Keany,J.F. and Keeping,E.S. : Mathematics of Statistics Pt. I and II
6. Kendall,M.G. and stuart A : Advanced Theory of Statistics.
7. Mood ,gybrill and Boes : Introduction to theory of Statistics
8. Hogs and Craig : Mathematical Statistics
9. Goon,gupta and Dasgupta : Fundamental of Mathematical statistics Vol.I

Course-III

Applied Statistics

UNIT-I

Sources of demographic data –census, register, adhoc survey, hospital records, measurement of mortality ,crude death rate, age specific death rates, standardized death rate infant mortality rates, Complete and abridged life table-Kings method, Greville's method and method of Reed and Merrel, Construction of life table.

UNIT-II

Laws of mortality-Fitting of Makeham's law, Measurement of fertility-crude birth rate, general fertility rate ,age-specific birth rate, total fertility rate ,gross reproduction rate. The Stable and Stationary populations, Logistic curve for population growth, Population Projection.

Unit III

Different Component of time series, Measurement of secular trend: Fitting of mathematical curves, method of moving average, variate difference method, effect of elimination of trend ,merits and demerits of different methods of trend estimation. seasonal components, Determination of cyclical component., Periodogram analysis, Yule-Slutsky effect, correlogram Analysis.

Unit IV

Index number :meaning and costruction of index number,different formulae for constructing index numbers, tests of consistency of index number formulae, Chain base index numbers, Cost of living index numbers, Whole sale price index numbers. Demand Analysis: Demand and supply curves, Price elasticity of demand and supply, determination of demand curves from market data, Engel' Law and Engle's Curve.

Unit V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. O. S. Srivastava (1983) – A text book of demography ,Vikas Publishing House.
2. Parimal Mukhopadhaya (1999) – Applied Statistics, Books and Allied (P) Ltd.
3. V. K. Kapoor and S. C. Gupta: Applied Statistics, Sultan Chand and Sons.

Course-IV

PROBABILITY AND MEASURE

UNIT-I

Random experiment, Definition of Probability, Additive and multiplicative theorems of probability, Axiomatic approach to probability, Bayes Theorem. Classes of sets, fields, sigma-fields, minimal sigma-

field, Borel sigma-field in R_k, sequence of sets, limsup and liminf of a sequence of sets. Measure, Probability measure, properties of a measure, Lebesgue and Lebesgue- Steljes measure on R_k.

UNIT-II

Measurable set, Measurable functions, Random variables, sequence of random variables, almost sure convergence, convergence in probability (and in measure). Integration of a measurable function with respect to a measure, Monotone convergence theorem, Fatou's lemma, Dominated convergence theorem.

Unit III

Borel-Cantelli Lemma, Independence, Weak law and strong law of large numbers for iid sequences, Definition and examples of Markov dependence, Chebychev's Inequality, Probability generating function.

Unit IV

Convergence in distribution, characteristic function, uniqueness theorem, Levy's continuity theorem (statement only), CLT for a sequence of independent random variables under Lindeberg's condition, CLT for iid random variables.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Ash, Robert.(1972): Real Analysis and Probability. Academic Press.
2. Billingsley, P.(1986): Probability and Measure. Wiley.
3. Dudley, R. M. (1989): Real Analysis and Probability, Wadsworth and Brooks/Cole.
4. Kingman, J F C and Taylor, S.J. (1966). Introduction to Measure and Probability. Cambridge University Press.

Paper V : Lab Course I – Practicals Based on Paper II
Paper VI : Lab Course II – Practicals Based on Paper III

SECOND SEMESTER

Course – I	**:**	**Linear Algebra**
Course - II	**:**	**Stochastic Processes**
Course - III	:	**Statistical Computing**
Course - IV	:	**Sampling Theory**
Paper-V: Lab Course - I	**:**	**Practical based on Papers I and III**
Paper-VI: Lab Course - II	**:**	**Practical based on Papers IV**

Course -I

Linear Algebra

UNIT-I

Fields, vector spaces, subspaces, linear dependence and independence, basis and dimension of a vector space, finite dimensional vector spaces, completion theorem, examples of vector spaces over real and complex fields, linear equations. Determinants.

UNIT-II
Vector spaces with an inner product, Gram-Schmidt orthogonalization process, orthonormal basis and orthogonal projection of a vector. Linear transformations, algebra of matrices, row and column spaces of a matrix, elementary matrices, rank and inverse of a matrix, null space and nullity, partitioned matrices, Kronecker product.

UNIT-III
Hermite canonical form, generalized inverse, Moore-Penrose generalized inverse, Idempotent matrices, Solutions of matrix equations. Real quadratic forms, reduction and classification of quadratic forms, index and signature, triangular reduction of a positive definite matrix.

UNIT-IV
Characteristic roots and vectors, Cayley-Hamilton theorem, minimal polynomial, similar matrices, algebraic and geometric multiplicity of a characteristic root, spectral decomposition of a real symmetric matrix, reduction of a pair of real symmetric matrices, Hermitian matrices. Singular values and singular value decomposition, Jordan decomposition, extrema of quadratic forms, vector and matrix differentiation**.**

UNIT-V
Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Graybill, F.A.(1983). Matrices with applications in statistics, 2nd Ed. Wadsworth.
2. Rao, C.R.(1973). Linear statistical inference and its applications, 2nd ed. John Wiley and Sons, Inc.
3. Searle, S.R. (1982). Matrix Algebra useful for Statistics. John Wiley and Sons. Inc.
4. Shanti Narayan: Matrices
5. Vashishtha, A. R.: Matrices

Course– II
Stochastic Processes

UNIT-I
Introduction to stochastic processes (sp's).; classification of sp's according to state space and time domain. Countable state Markov chains (MC's), Chapman-Kolmogorov equations; calculation of n-step transition probability and its limit. Stationary distribution, Classification of states; transient MC; Probability generating function. Properties of probability generating function .Laplace transform & its properties.

Unit II
Random walk and Gambler's ruin problem ; Applications from social, biological and physical sciences. Renewal theory: Elementary renewal theorem and applications. Statement and uses of key renewal theorem; study of residual life time process. Martingle in discrete time, inequality, convergence and smoothing properties.

Unit III
Discrete state space continuous time MC ; Kolmogorov- Feller differential equations ; Poisson process, birth and death process ; Applications to queues and storage problems. Wiener process as a limit of random walk; first - passage time and other problems.

UNIT-IV

Stationary process: weakly stationary and strongly stationary processes; Moving average and auto regressive processes. Branching process : Galton-Watson branching process, probability of ultimate extinction, distribution of population size. Statistical inference in MC and Markov processes.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Adke, S.R. and Manjunath, S.M. (1984): An Introduction to Finite Markov Processes, Wiley Eastern.
2. Bhat, B.R. (2000): Stochastic Models: Analysis and Applications, New Age International, India.
3. Cinlar, E. (1975): Introduction to Stochastic Processes, Prentice Hall.
4. Feller, W. (1968): Introduction to Probability and its Applications, Vol.1, Wiley Eastern.
5. Harris, T.E. (1963): The Theory of Branching Processes, Springur-Verlag.
6. Hoel, P.G., Port, S.C. and Stone, C.J. (1972): Introduction to Stochastic Processes, Houghton Miffin & Co.
7. Jagers, P. (1974): Branching Processes with Biological Applications, Wiley.
8. Karlin, S. and Taylor, H. M. (1975): A first Course in Stochastic Processes, Vol.1, Academic Press.
9. Medhi, J. (1982): Stochastic Processes, Wiley Eastern10. Parzen, E.(1962): Stochastic Processes, Holden-Day.

Course - III

Statistical Computing

UNIT I

FORTRAN Language: Constants & Variables, Control statements, Subroutine & Function subprograms Use of Excel for Statistical methods and graphical representation of data.

Unit II

Programming in C and in C^{++}: All Syntax ,Pointers, Arrys, Functions and Input / Output statements. Use of Statistical package. SPSS for large sample data analysis.

Unit III

Numerical Analysis : Finite differences & interpolation, Interpolation with unequal intervals, Central differences Interpolation-Gauss's, Stirling's and Bessel's Formulae.

UNIT IV

Numerical differentiation and integration, Trapezoidal rule, Simpson's one third, 3/8 rule, Weddle's `rule, Euler-Maclaurin Summation Formula, Newton-Cotes Formula, Gauss formula for approximation to factorials, Difference equation of first and second order.

UNIT V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Balagurusamy,E.: Programming in ANSI C .Tata McGraw Hill.
2. Kanetkar ,Y.P.:Working with C.BPB Publication.

3. Reddy,R.N. and Ziegler,C.A.: FORTRAN-77 With Application for Scientiests and engineers,JAICO Publishing House Bombay,Calcutta & Madras.
4. Rajaraman: Computer Programming in FOTRAN-77,Prentice Hall.
5. B.W. Kernighan and D.M. Ritchie (1988). The C Programming Language, Second Edition. Prentice Hall.
6. W.H. Press, S.A. Teukolsky, W.T. Vellering, and B.P. Flannery (1993). Numerical Recipes in C, Second Edition. Cambridge University Press.
7. R.A. Thisted (1988). Elements of Statistical Computing. Champman and Hall.
8. Rajaraman,V.: Computer Oriented Numerical Methods.
9. Grewal, B. S.: Numerical methods.
10. Saxena, H. C.: Finite differences.

Course -IV

Sampling Theory

UNIT-I

Sample Surveys : concept of population sample and properties of estimator for finite populations, need for sampling, census and sample survey ,sample selection and sample size,Basic finite population sampling techniques ,simple random sampling with and without replacement, Estimation of population proportion ,Non-sampling errors, estimation of population mean in presence of non-response. Randomised response technique: Warner's method.

UNIT-II

Stratified sampling, systematic sampling and related results on estimation of population mean/total. Allocation problem in stratified sampling. Optimum allocation, Neyman allocation and Proportional allocation, estimation of gain in precision due to stratification, Post Stratification, Construction of strata, Effect of increasing number of strata. Comparison of stratified, systematic and simple random sampling, Systematic sampling under a linear model.

UNIT-III

Ratio regression estimators based on srswor and stratified methods of sampling. Bias of ratio estimate and optimum property of ratio estimate, Ratio estimate in stratified sampling, Regression estimate with pre-assigned and with estimated regression coefficient, comparison of ratio and regression estimate with sample mean. Unequal probability sampling: pps wr/wor methods [including Lahiri's scheme] and related estimators of a finite population mean [Desraj estimator and Murthy's estimator].

UNIT-IV

Cluster sampling. One stage cluster sampling, variance and cost functions ,sampling with probability proportional to cluster size,Hurwitz-Thompson estimation , two stage cluster sampling ,Allocation of sample to two stages :equal first stage UNIT comparison of two stage with one stage sampling. Double sampling ratio and regression estimate with and without cost aspect .

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Cochran, W.G. : Sampling Techniques [3rd Edition, 1977). Wiley
2. Des Raj and Chandak (1998) : Sampling Theory. Narosa
3. Murthy, M.N. (1977). Sampling Theory & Methods. Statistical Publishing Society, Calcutta.
4. Sukhatme et al (1992). Sampling Theory of Surveys with Applications. lowa State University Press & IARS.

5. Singh, D. and Chaudhary, F.S. (1986). Theory and Analysis of Sample Survey Designs. New Age International Publishers.

Paper V: Lab Course I – Practicals Based on Paper I and III
Paper VI: Lab Course II – Practicals Based on Paper IV

THIRD SEMESTER

Course – I	**:**	**Multivariate Analysis**
Course - II	**:**	**Inference I**
Course - III	**:**	**Operation Research I**
Course - IV	**:**	**Statistical Quality Control**
Paper-V: Lab Course - I	**:**	**Practical based on Papers I and II**
Paper-VI: Lab Course – II	**:**	**Practical based on Papers III and IV**

Course I

Multivariate Analysis

UNIT-I

Gauss- Markov set-up, Estimability condition, best point estimates/interval estimates of estimable linear parametric functions ,Normal equations and Least squares estimates, Gauss-Markov Theorem, Introduction to fixed, mixed and random effects linear models. Analysis of variance for one way and two way classified data with equal and unequal number of observations per cells, Analysis of covariance model.

UNIT-II

Multivariate Normal Distribution and its properties, Reproductive property, transformation by a vector, singular /non-singular matrix, conditional distribution of a sub-set of multivariate normal variable/ Random sampling from a multivariate normal distribution. Maximum likelihood estimators of parameters. Distribution of sample mean vector. Wishart matrix - its distribution and properties, Characteristic function of Wishart distribution ,chi-square distribution as a particular case of Wishart distribution.

UNIT-III

Distribution of sample generalized variance. Null and non-null distribution of simple correlation coefficient. Null distribution of partial and multiple correlation coefficient. Distribution of sample regression coefficients. Distribution of Hotelling's T^2 statistic. Application in tests on mean vector for one and more multivariate normal populations and also on equality of the components of a mean vector in a multivariate normal population, Fisher-Behran statistic, Mahalanobis D^2 Statistic.

UNIT-IV

Multivariate linear regression model-estimation of parameters, tests of linear hypotheses about regression coefficients. Classification and discrimination procedures for discrimination between two multivariate normal populations - sample discriminant function, probabilities of misclassification and their estimation, classification into more than two multivariate normal populations. Principal components, Dimension reduction, Canonical variables and canonical correlation - definition, use, estimation and computation. Factor Analysis. An Introduction to cluster Analysis.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Cook, R.D. and Weisberg, S. (1982). Residual and Influence in Regression. Chapman and Hall.
2. Draper, N.R. and Smith, H.(1998). Applied Regression Analysis. 3rd Ed. Wiley.
3. Gunst, R.F. and Mason, R.L.(1980). Regression Analysis and its Applications – A Data Oriented Aproach. Marcel and Dekker.
4. Rao, C.R.(1973). Linear Statistical Inference and Its Applications. Wiley Eastern.
5. Weisberg, S. (1985). Applied Linear Regression. Wiley.
6. Andrson, T.W.(1983) : An Introduction to multivariate statistical analysis. 2nd Ed. Wiley. Giri, N.C.(1977) : Multivariate Statistical inference. Academic Press.
7. Kshirsagar, A.M. (1972) : Multivariate Analysis. Marcel Dekker.
8. Morrison, D.F. (1976) : Multivariate statistical methods. 2nd Ed. McGraw Hill.
9. Muirhead, R.J.(1982) : Aspects of multivariate statistical theory, J. Wiley.
10. Seber, G.A. F.(1984) : Multivariate observations. Wiley.
11. Sharma, S.(1996) : Applied multivariate techniques. Wiley.
12. Srivastava, M.S. and Khatri, C.G. (1979).: An introduction to multivariate statistics. North Holland.
13. Johnson, R. and Wychern (1992): Applied multivariate Statistical analysis, Prentice Hall, 3rd Ed.

PAPER - II

INFERENCE- I

UNIT- I

Unbiasedness , Consistency, efficiency and sufficiency of point estimator ,. Fisher –Neymann factorization theorem, Cramer Rao inequality, Bhattacharya bounds, Minimum Variance unbiased estimators, Minimal sufficient statistics,

Unit –II

Liklihood function, examples from standard discrete and continuous distributions. such as Bernoulli, Binomial, Possion, normal, exponential gamma etc) Methods of estimation – Method of maximum likelihood estimators, properties of maximum likelihood estimators. Method of scoring, method of moments, method of minimum chi-square, method of minimum variance, B.A.N. estimators.

Unit- III

Rao Blackwell theorem. Completeness of sufficient statistics. Completeness and Bounded Completeness, Koopman's theorem (Distributions admitting sufficient statistics),.Lehmann-Scheffe theorem, Invariant estimators. Confidence interval and confidence coefficients, Theory of confidence set, Relationship with the theory of hypothesis testing, Confidence interval for large samples.

Unit-IV

Loss function, Risk function, admissibility Minimax rule, Bays rule, Structure of Bay's rule, Construction of a Minimax rule, point and interval estimation as decision problem. State of nature,

payoff opportunity loss or regret, expected monitory value(EMV) criterion for decision making, maximum, maximax and minimax regret strategy, expected value of perfect information (EVPI).

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

Reference :

1. Kale, B.K. (1999): A first Course on Parametric Inference, Narosa Publishing House.
2. Rohatgi V. (1988): An Introduction to Probability and Mathematical Statistics. Wiley Eastern Ltd. New.Delhi (Student Edition)
3. Lehmann, E.L.(1986)-(Latest): Theory of point Estimation (Student Edition).
4. Lehmann, E.L.(1986): Testing Statistical hypotheses (Student Edition).
5. Rao, C. R. (1973): Linear Statistical Inference.
6. Zacks, S. (1971): Theory of Statistical Inference, John Wiley and Sons, New York.
7. Dudewicz, E.J. and Mishra, S.N. (1988). Modern Mathematical Statistics. Wiley Series in Prob. Math. Stat., John Wiley and Sons, New York (International Student Edition)
8. Ferguson, T.S. (1996). A course on Large Sample Theory. Chapman and Hall, London.
9. Ferguson, T.S. (1967) : Mathematical Statistics, Academic Press.

Course - III

Operation Research I

UNIT-I

Definition and scope of Operational research ; phases in Operations Research ; models and their solutions ; decision-making under uncertainty and risk, use of different criteria ; The structure and formation of a linear programming problem,Graphical and simplex procedure,Two phase methods, and charne's-M method with artificial variables ; duality theorem .

Unit II

Transportation and Assignment problems, Routing and traveling salesman problem .

Unit III

Inventory problems – Deterministic models of inventory , Economic Lot size formula ,instantaneous production case ,finite production rates situation ,cases when shortages are allowed /not allowed. Stochastic inventory models – a single period model with no set up cost.

UNIT IV

Basic characterics of queuing systems, Steady-state solutions of M/M/1 and M/M/c models with associated distributions of queue-length and waiting time. M/G/1 queue and Pollazcek Khinchine result. Steady-state solutions of M/Ek/1 and E_k/M/1 queues, Machine interference problem. Transient solution of M/M/1 queue .

Decision-making in the face of competition, two-person games, pure and mixed strategies, existence of solution and uniqueness of value in zero-sum games, finding solutions in 2x2, 2xm and mxn games. Non-zero sum games, co-operative and competitive games, equilibrium solutions and their existence in bi-matrix games. Nash equilibrium solution. ;

UNIT V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Taha H.A. (1982) Operational Research : An Introduction ; Macmillan.

2. Hillier F.S. and Leiberman G.J. (1962) Introduction to Operations Research ; Holden Day.
3. Kanti Swarup, Gupta, P.K. and Singh M.M. (1985) Operations Research ; Sultan Chand& Sons.
4. Philips D.T., Ravindran A. and Solberg J. Operations Research, Principles and Practice.
5. Churchman C.W., Ackoff R.L. and Arnoff E.L.(1957) Introduction to Operations Research ; John Wiley.
6. Kleinrock L. (1975) Queueing Systems, vol. 1, Theory ; John Wiley
7. Saaty T. L. (1961) Elements of Queueing Theory with Applications ; McGraw Hill
10. Hadley G.and Whiting T.M. (1963) Analysis of Inventory Systems ; Prentice Hall
11. Starr M.K. and Miller D.W. (1962) Inventory Control-Theory and Practice ; Prentice Hall
12 . Mckinsey J.C.C. (1952) Introduction to the Theory of Games ; McGraw Hill
13. Wagner H.M. (1973) Principles of O.R. with Applications to Managerial Decisions ; Prentice Hall
14. Gross, D. and Harris, C. M. (1974) Fundamentals of Queueing Theory ; John Wiley

Course - IV
Statistical Quality Control

UNIT-I

Basic concept of process monitoring and control, process capability and process optimization. General theory and review of control charts for attribute and variable data ; O.C. and A.R.L. of control charts, control by gauging ;

UNIT-II

Moving average and exponentially weighted moving average charts ; Cu-sum charts using V-masks and decision intervals ; Economic design of X-bar chart. Capability indices Cp, Cpk and Cpm ; estimation, confidence intervals and tests of hypotheses relating to capability indices for Normally distributed characteristics.

UNIT-III

Acceptance sampling plans for attribute inspection ; single, double and sequential sampling plans and their properties ; Bayesian sampling plan.

UNIT-IV

Plans for inspection by variables for one-sided and two-sided specifications ; Continuous sampling plans of Dodge type and Wald-Wolfiwitz type and their properties. Use of Design of Experiments in SPC ; factorial experiments, fractional factorial designs, construction of such designs and analysis of data. Multivariate quality control ; use of control ellipsoid and of utility

UNIT V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Montgomery, D.C. (1985) Introduction to Statistical Quality Control ; Wiley
2. Ott, E.R. (1975) Process Quality Control ; McGraw Hill
3. Wetherill, G.B. (1977) Sampling Inspection and Quality Control ; Halsted Press
4. Wetherill, G.B. and Brown, D.W. (1991) Statistical Process Control, Theory and Practice ; Chapman and Hall.

5. Duncan, A. J.(1986): Quality Control and Industrial Statistics. 5th ed., Richard D. Ervin, Homewood, Illiions.
6. Ekambaram, S.K. (1963): The Statistical basis of quality control charts. Asia Publishing House, London.
7. Grant, E.L. & Leavenworth, R.S. (1988): Statistical Quality Control. 6th ed., McGraw-Hill Book Co., New York.
8. Bowker, A.H. & Goode, H.P. (1952): Sampling inspection by variables. McGraw-Hill Book Co., New York.
9. Schilling, E.G. (1982): Acceptance sampling in quality control. Marcel Dekker, Inc., New York.

Paper V: Lab Course I – Practicals Based on Papers I and II
Paper VI: Lab Course II – Practicals Based on Papers III and IV

FOURTH SEMESTER

Course – I	**:**	**Design of Experiment**
Course - II	**:**	**Inference II**
Course - III	**:**	**Operation Research II**
Course - IV	:	**Reliability and Life Testing**
Paper-V: Lab Course - I	**:**	**Practical based on Papers I, II and III**
Papers-VI: Lab Course - II	**:**	**Project Work**

Course - I

Design of Experiment

UNIT I
Introduction to design of experiments, Principle of design of experiments, Completely ranomized design, Ranomize block design, Latin square design. Missing plot technique - general theory and applications, efficiency of design.

UNIT II
Graeco Latin Square design, Cross-over designs, Analysis of covariance: Applications to standard designs with one concomitant variable, Testing the homogeneity of a group of regression coefficients. Split plot and split block experiments, efficiency of whole plot and sub plot treatments, merits and demerits of split plot experiments in comparison to factorial experiments.

UNIT III
General factorial experiments, factorial effects; best estimates and testing the significance of factorial effects ; study of 2 and 3 factorial experiments in randomized blocks ; Complete and partial confounding. Fractional replication for symmetric factorials, 2^n experiment with 2^k blocks per replicate, 3^2 experiment.

UNIT IV
General block design and its information matrix. criteria for connectedness, balance and orthogonality, BIBD- Analysis with intrablock information and recovery of interlock information ; PBIBD, Youden design - intrablock analysis.
Application areas: Response surface experiments; first order designs and orthogonal designs.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Aloke Dey (1986) :Theory of Block Designs, Wiley Eastern.
2. Angela Dean and Daniel Voss (1999) : Design and Analysis of Experiments, Springer.
3. Das, M.N. and Giri, N.(1979) : Design and Analysis of Experiments, Wiley Eastern
4. Giri, N. (1986) : Analysis of Variance, South Asian Publishers
5. John, P.W.M. (1971) : Statistical Design and Analysis of Experiments, Macmillan.
6. Joshi, D.D. (1987) : Linear Estimation and Design of Experiments, Wiley eastern.
7. Montgromery, C.D.(1976): Design and Analysis of Experiments, Wiley, New York.
8. Pearce, S.C. (1984): Design of Experiments, Wiley, New York.

Course-II
Inference II

Unit I

Test of Hypothesis: Concepts of critical regions, Test functions, two kinds of errors. Size function, power function, level, M. P. and U,M.P. Test, Neymann Pearson Lemma, M.P. test for simple null against simple alternative hypothesis ,UMP test for simple null hypothesis against one sided alternatives in one parameter exponential family .Unbiased test, UNIFORMELY most powerful unbiased test ,Type "A" critical region or locally most powerful unbiased test. Generalized form of Neyman Pearson lemma.

Unit II

Composite Hypothesis and similar regions, similar regions and complete sufficient statistics, Construction of most powerful similar regions, Unbiased critical regions, optimum regions and Sufficient Statistics. Likelihood ratio test, properties of likelihood ratio test, Likelihood ratio test for the mean of normal population, LR test for equality of means and variances of two and several normal populations.

Unit III

Sequential analysis: Wald's sequential probability ratio test (SPRT) with prescribed errors of two types, OC and ASN function of SPRT

Unit IV

Non parametric test, Rank test, Wilcoxon test, Median test, Sign test, Mann-Whitney U test, Wald-Wolfowitz run test, Kolomogorov-Smirnov test, One sample location problem, chi square test of goodness of fit.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Kale, B.K. (1999): A first Course on Parametric Inference, Narosa Publishing House.

2. Rohatgi V. (1988): An Introduction to Probability and Mathematical Statistics. Wiley Eastern Ltd. NewDelhi (Student Edition)
3. Lehmann, E.L.(1986)-(Latest): Theory of point Estimation (Student Edition).
4. Lehmann, E.L.(1986): Testing Statistical hypotheses (Student Edition).
5. Rao, C. R. (1973): Linear Statistical Inference.
6. Zacks, S. (1971): Theory of Statistical Inference, John Wiley and Sons, New York.
7. Gibbons,J.D.(1985) : Nonparametric statistical inference 2nd Ed.,Marcel dekker,Inc.
8. Dudewicz, E.J. and Mishra, S.N. (1988). Modern Mathematical Statistics. Wiley Series in Prob. Math. Stat., John Wiley and Sons, New York (International Student Edition)
9. Ferguson, T.S. (1996). A course on Large Sample Theory. Chapman and Hall, London.
10. Ferguson, T.S. (1967) : Mathematical Statistics, Academic Press.

Course –III

Operation Research II

Unit I

Repllacement problems : Replacement of items that fails and those that deteriorate ,group and individual replacement policies

Unit II

Network analysis,-Shortest Path Problem, Project planning and control with PERT and CPM

Unit III

Integer programming-Branch and Bound technique. Dynamic programming , Deterministic and Probabilistic Dynamic programming: decision tree and Bellman's Principle of optimality, models of dynamic programming,

Unit IV

Quadratic programming ,Kuhn-Tucker conditions for quadratic programming problem, Wolf's modified simplex method, Beale's method Goal Programming simulation :Monte Carlo method.

UNIT V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCES

1. Taha H.A. (1982) Operational Research : An Introduction ; Macmillan.
2. Hillier F.S. and Leiberman G.J. (1962) Introduction to Operations Research ; Holden Day.
3. Kanti Swarup, Gupta, P.K. and Singh M.M. (1985) Operations Research ; Sultan Chand& Sons.
4. Philips D.T., Ravindran A. and Solberg J. Operations Research, Principles and Practice.
5. Churchman C.W., Ackoff R.L. and Arnoff E.L.(1957) Introduction to Operations Research ; John Wiley.

Paper – IV: Any one of the following (Major Elective)

(a) Reliability and Life Testing

(b) Demography

(c) Econometrics

(a) Reliability and Life Testing

Unit I

Reliability concepts and measures ; reliability function ; hazard rate ; components and systems ; coherent systems ; reliability of coherent systems ; cuts and paths ; modular decomposition ; bounds on system reliability ; structural and reliability importance of components.

Unit II

Life distributions ; common life distributions-exponential, Weibull, gamma etc. Estimation of parameters and tests in these models. Notions of ageing ; IFR, IFRA, NBU, DMRL, and NBUE Classes and their duals ; loss of memory property of the exponential distribution ; closures or these classes under formation of coherent systems, convolutions and mixtures.

Unit III

Univariate shock models and life distributions arising out of them ; bivariate shock models ; common bivariate exponential distributions and their properties. Reliability estimation based on failure times in variously censored life tests and in tests with replacement of failed items .

Unit IV

Stress-strength reliability and its estimation. Maintainability and availability, Maintenance and replacement policies ; availability of repairable systems ; modeling of a repairable system by a non-homogeneous Poisson process. Reliability growth models; Hollander-Proschan and Deshpande tests for exponentiality; tests for HPP vs NHPP with repairable systems. Basic ideas of accelerated life testing.

Unit V

Four short notes, one from each unit will be asked. Students have to answer any two.

References

1. Barlow R.E. and Prochan F.(1985) ,Statistical theory of reliability and life testing ,Rinehart and Winston
2. Lawless J.F. (1982) ,Statistical Models and Methods of Life time data ; John Wiley .
3. Bain L.J. and Engelhardt (1991) ;statistical Analysis of Reliability and Life testing Models ,Marcel Dekker.
4. Nelson ,W (1982) ;Applied Life data analysis ; john Wiley .
5. Zacks S.;Reliability Theory ,Springer.

(b) DEMOGRAPHY (Major Elective)

UNIT – I

Coverage and content errors in demographic data, Chandrasekharan-Deming formula to check completeness of registration data, adjustment of age data-use of Whipple, Myer and UN indices, Population transition theory.

UNIT – II

Measures of fertility; Stochastic models for reproduction, distributions of time of birth, inter-live birth intervals and of number of births (for both homogeneous and homogeneous group of women), estimation of parameters; estimation of parity progression from open birth interval data.

UNIT – III

Measures of Mortality; construction of abridged life tables, infant mortality rate and its adjustuemts, model life table. Stable and quasi-stable populations, intrinsic growth rate. Models of population growth and their filling to population data.

UNIT – IV

Internal migration and its measurement, migration models, concept of international migration. Methods for population projection, component method of population projection, Nuptiality and its measurements.

References:

1. Kumar, R.(1986): Technical Demography, Wiley Eastern Lts.

2. Benjamin, B.(1969): Demographic Analysis, George, Allen and Unwin.
3. Chiang, C.L.(1968): Introduction to Stochastic Progression.
4. Cox, P.R. (1970): Demography, Cambridge University Press.
5. Keyfitz, N. (1977): Introduction to the Mathematics of Population-with Revision, Addison-Wesley, London.
6. Spiegelman, M.(1969): Introduction to Demographic Analysis, Harvard University Press.
7. Wolfenden, H.H.(1954): Population Statistics and Their Compilation, Am Actuarial Society.

(c) ECONOMETRICS

UNIT – I

Nature of econometrics, the general linear model (GLM) and its extensions, ordinary least squares (OLS) estimation and prediction, generalized least squares (GLS) estimation and prediction, heteroscedastic disturbances, pure and mixed estimation.

UNIT – II

Auto correlation, its consequences and tests. Theil BLUS procedure, estimation and prediction, multicollinearity problem, its implications and tools for handling the problem, ridge regression. Linear regression and stochastic regression, Instrumental variable estimation. Errors in variables.

UNIT – III

Autoregressive linear regression, lagged variables, distributed lag models, estimation of lags by OLS method, Koyck's geometric lag model, Simultaneous linear equations model and its generalization, identification problem, restrictions on structural parameters, rank and order conditions.

UNIT – IV

Estimation in simultaneous equations model, recursive systems, 2 SLS estimators, limited information estimators, k-class estimators. 3 SLS estimator, full information maximum likelihood method, prediction and simultaneous confidence intervals.

References:

1 Apte, P.G.(1990): Text books of Econometrics, Tata Mcgraw Hill.
2 Cramer, J.S.(1971): Empirical Econometrics, North Holland.
3 Gujarathi, D.(1979): Basic Econometrics, McGraw Hill.
4 Intrulligator, M.D.(1980): Econometric models-Techniques and applications, Prentice Hall of India.
5 Johnston, J.(1984): Econometric methods. Third edition, McGraw Hill.
6 Klein, L.R. (1962): An introduction to Econometrics, Prentice Hall of India.
7 Koutsoyiannis, A. (1979): Theory of Econometrics, Macmillan Press.
8 Malinvaud, E. (1966): Statistical methods of Econometrics, North Holland.
9 Srivastava, V.K. and Gelies D.A.E.(1987): Seemingly unrelated regression equations models, Maicel Dekker.
10 Theil, H. (1982): Intruduction to the theory and practice of Econometrics, John Wiley.
11 Walters, A. (1970): An introduction to Econometrics, Macmillan & Co.
12 Wetherill, G.B.(1986): Regression analysis with application, Chapman Hall.

Paper V : Lab Course I : Practical's based on Papers I, II and III
Paper VI : Project Work

Syllabus for M.Phil (Statistics) Course, 2017-18

Scheme of Examination

S.No.	Title of the Paper	Max.Mark
1.	Paper – I Research Methodology ,Quantitative Methods & Computer application	100
2.	Paper – II Advanced Operations Research	100
3.	Lab Course : Based on Theory Papers I & II	100
4.	Dissertation	200
5.	Seminar & Viva-voce on Dissertation	100
	Total Marks	**600**

Paper-I

Research Methodology, Quantitative Methods & Computer applications

Unit I

Research methodology: An introduction, meaning of research, objective of research, Research Methods versus Methodology, Selection of research problem, Necessity of defining the problem. Technique involved in Defining a problem. Methods of Data Collection: Collection of Primary data, construction of questionnaire, Collection of data through questionnaire, Difference between questionnaires and schedules ,Some other methods of data collections, Collection of Secondary data, Processing and analysis of data. Use of Statistical packages, SPSS for data analysis.

Unit II

A review of Simple Random Sampling, Estimation of population proportion, Stratified sampling, Optimum Allocation, Practical difficulty in adopting Neyman Allocation, formation of strata. Systematic sampling. PPS sampling, Multistage sampling.

Unit III

The structure and formation of a linear programming problem,Graphical and simplex procedure,Two phase methods, and charne's-M method with artificial variables ; duality theorem. **T**ransportation and Assignment problems, Routing and traveling salesman problem. Inventory problems – Deterministic models of inventory , Economic Lot size formula ,instantaneous production case ,finite production rates

situation ,cases when shortages are allowed /not allowed. Stochastic inventory models – a single period model with no set up cost.

UNIT-IV

Acceptance sampling plans for attribute inspection ; single, double and sequential sampling plans and their properties ; Bayesian sampling plan. Plans for inspection by variables for one-sided and two-sided specifications; Continuous sampling plans of Dodge type and Wald-Wolfiwitz type and their properties

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

References:

1. Freedman,P.,"The Principles of Scientific Research,2nd ed.,new York Pergamon Press,1960

2. Gaum,Carl G.,Graves ,Harod F.,and Hoffman ,Lyme,S.S.,Report Writing ,New York : Barnes & Noble ,Inc,1956.
3. Weller;S.;Romney,A,"Systematic Data Collection ",(Qualitative Research Method Series 10)
4. C.R.Kothari,"Research Methodology", Second Edition, Wishwa Publication, Wiley Eastern Limited, New Delhi.
5. Mukhopadhyay, P. (1998): Theory and methods of Survey Sampling , Prentice-Hall of India Pvt. Ltd. New Delhi.
6. Sukhatme ,P.V. Sukhatme,B.V. Sukhatme S. and Ashok,C.(1984):Sampling Theory of Survey with Applications, IASRI Publication, New Delhi.

Paper-II

Operations Research

Unit I

Definition and scope of Operational Research ; phases in Operations Research; models and their solutions ; decision –making under uncertainty and risk, use of different criteria; The structure and formation of a linear programming problem, Graphical and simplex procedure, Two phase method and Charne's M-method.

Unit II

Review of LPP Advanced Linear Programming, Validity Proofs of the Simplex Method , Generalized Simplex Tableau in Matrix Form, Efficient Computational Algorithms, Duality LPP, Goal Programming, A Goal-Programming Formulation, Goal-Programming Algorithms, Integer Linear Programming, Applications of Integer-Programming and Solution Algorithms.

Unit III

Decision Environments, Decision-Making under Certainty, Decision-Making under Risk, Decision under Uncertainty. Concept of games and strategy , Pure and mixed strategies, saddle point of a matrix game, Graphical method, Dominance Principle, LPP method for solving games.

Unit IV

Project Management : PERT and CPM, Basic Differences between PERT and CPM, Steps of PERT/CPM Techniques, PERT/CPM Network Components and Precedence Relationships, Critical Path Analysis, Probability in PERT Analysis Project Time Cost Trade off, Updating of the Project, Resource Allocation.

UNIT-V

Four short notes, one from each unit will be asked. Students have to answer any two.

REFERENCE:

1. Hamdy A. Taha : Operations Research an : Introduction. Prentice-Hall India
2. J. K. Sharma : Operations Research : Theory and Applications. Macmillan India Limited.
3. Olvi L Mangasarian : Non Linear Programming : Tata McGraw-Hill Publishing Company Ltd.

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

SCHOOL OF STUDIES IN STATISTICS

Syllabus for Ph. D. Course Work in Statistics, 2016-17

The Ph.D. Course in Statistics shall be of six months.. This course shall have two papers.. Paper I is theory paper and Paper II is project course work. Each paper is of 100 marks .Theory paper will be of 3 hours duration. In paper II, 40% marks will be assigned to seminar which will be evaluated by departmental research committee and 60% marks will be assigned to project work which will be evaluated by external and internal examiner jointly.

Scheme of Examination	
Paper I : **Research Methodology , Quantitative Methods & Computer Applications**	:**100 Marks**
Paper II : **Review of Literature concerning the topic of research and Seminar/Project report** **(a) Seminar** **(b) Project work and Viva Voce**	:**100 Marks** 40 marks 60 marks
Total Marks	**200** Marks

Paper I

Research Methodology, Quantitative Methods & Computer applications.

Unit I: Research methodology: An introduction, meaning of research ,objective of research, Research Methods versus Methodology, Selection of research problem, Necessity of defining the problem. Technique involved in Defining a problem. Methods of Data Collection: Collection of Primary data, construction of questionnaire, Collection of data through questionnaire, Difference between questionnaires and schedules, Some other methods of data collections, Collection of Secondary data, Processing and analysis of data. Use of Statistical package, SPSS for data analysis.

Unit II: A review of Simple Random Sampling, Estimation of population proportion, Stratified, Optimum Allocation, Practical difficulty in adopting Neyman Allocation, formation of strata. Systematic sampling. PPS sampling, Multistage sampling. Ratio and Regression methods of estimation in various sampling designs.

Unit III: The structure and formation of a linear programming problem,Graphical and simplex procedure,Two phase methods, and charne's-M method with artificial variables ; duality theorem. **T**ransportation and Assignment problems, Routing and traveling salesman problem. Inventory problems – Deterministic models of inventory , Economic Lot size formula ,instantaneous production case ,finite production rates situation ,cases when shortages are allowed /not allowed. Stochastic inventory models – a single period model with no set up cost.

UNIT-IV

Acceptance sampling plans for attribute inspection ; single, double and sequential sampling plans and their properties ; Bayesian sampling plan. Plans for inspection by variables for one-sided and two-sided specifications; Continuous sampling plans of Dodge type and Wald-Wolfiwitz type and their properties

UNIT-V: Life distributions ; common life distributions-exponential, Weibull, gamma etc. Estimation of parameters and tests in these models. Notions of ageing ; IFR, IFRA, NBU, DMRL, and NBUE Classes and their duals ; loss of memory property of the exponential distribution ; closures or these classes under formation of coherent systems, convolutions and mixtures. Univariate shock models and life distributions arising out of them ; bivariate shock models ; common bivariate exponential distributions and their properties. Reliability estimation based on failure times in variously censored life tests and in tests with replacement of failed items.

References:

1. Freedman,P.,"The Principles of Scientific Research,2nd ed.,new York Pergamon Press,1960

2. Gaum,Carl G.,Graves ,Harod F.,and Hoffman ,Lyme,S.S.,Report Writing ,New York : Barnes & Noble ,Inc,1956.
3. 3. Weller;S.;Romney,A,"Systematic Data Collection ",(Qualitative Research Method Series 10)
4. C.R.Kothari,"Research Methodology",Second Edition,Wishwa Publication,Wiley Eastern Limited,New Delhi.
5. Mukhopadhyay, P. (1998): Theory and methods of Survey Sampling , Prentice-Hall of India Pvt. Ltd. New Delhi.
6. Sukhatme ,P.V. Sukhatme,B.V. Sukhatme S. and Ashok,C.(1984):Sampling Theory of Survey with Applications, IASRI Publication, New Delhi.

Curriculum Framework

B.ED. TWO YEAR COURSE 2015 -2017.

Curriculum Organization based on NCTE framework			
Semester I	**Semester II**	**Semester III**	**Semester IV**
THEORY	**THEORY**	**THEORY**	**THEORY**
(C)Philosophical perspectives of Education (4 credits)	(C)Sociological perspectives of Education (4 credits)	(S) Pedagogy II (4 credits)	(C S) Gender, School & Society (4 credits)
(C)Learner & Learning Process (4 credits)	(C)Curriculum & Knowledge (4 credits)	(T E) Assessment in Learning (2 credits)	(T E) Language proficiency (4 credits)
	(E) Elective I (4 credits)		(E) Elective II (4 credits)
(S) Pedagogy I (4 credits)	(T E) Arts Education (2 credits)		
PRACTICUM	**PRACTICUM**	**PRACTICUM**	**PRACTICUM**
Preparation of Teaching Aids (2 credits) Community Activities (2credits)	Internship (4 Wks.) (4 credits) School Experience I (2 credits) a) Observation report of school documents b) Mentor's Report.	Internship (16 Wks) (10 credits) Reflective Diary (2 credits) Supervisor's Assessment (2 credits)	Psycho-metric Assessment (2 credits) Teaching Exam & Viva Voce on Teaching
12+4 = 16 Credits	14 + 6 = 20 Credits	6 + 14 = 20 Credits	12 + 2 = 14 Credits
C = Core paper, E = Elective paper, T E = Teacher Enrichment, C S = Contemporary Study.			

SCHEME OF ASSESSMENT
B.Ed. Two Year Course, Session 2015-17

SL.NO.	PAPER	EXTERNAL	INTERNAL
SEMESTER I	THEORY		
Paper I	Philosophical Perspectives of Education	100	
Paper 2	Learner and Learning Process	100	
Paper 3	Pedagogy Part I	100	
	PRACTICUM		
	Preparation of Teaching aids		50
	Community Activities		50
SEMESTER II	THEORY		
Paper 4	Sociological Perspectives of Education	100	
Paper 5	Curriculum and Knowledge	100	
Paper 6	Elective I	100	
Paper 7	Art Education	100	
	PRACTICUM		
	Internship(One month)		50
	School Experience –a) Observation of school Doc.		
	b) Mentor's Report		
SEMESTER III	THEORY		
Paper 8	Pedagogy Part II	100	
Paper 9	Assessment in Learning	100	
	PRACTICUM		
	Internship (4 months)		100
	Reflective Diary & Supervisor's Assessment		50
SEMESTER IV	THEORY		
Paper 10	Gender, School and Society	100	
Paper 11	Language Proficiency	100	
Paper 12	Elective II	100	
	PRACTICUM		
	Training in Yoga and Sports & Games		50
	Psycho-metric Assessment	50	
	Viva voce on Teaching Experience	100	
	TOTAL	1350	350
	GRAND TOTAL	1700	

B.ED. SYLLABUS (SEMESTER I)

PAPER - I

PHILOSOPHICAL PERSPECTIVE OF EDUCATION

COURSE OBJECTIVES

To enable the student- teacher understand

1. The relationship between Philosophy and Education and implications of philosophy on education.

2. The importance and role of education in the progress of Indian society.

3. The contribution of great educators to the field of education.

4. The need to study education in a sociological perspective. The process of social change and socialization to promote the development of a sense of commitment to the teaching profession and social welfare.

5. Their role in creation of a new social order in the country and learn about various social welfare opportunities in which they can participate helpfully.
6. The means and measures towards the promotion of National integration and protection of human rights:

COURSE CONTENTS

UNIT-I: AIMS OF EDUCATION

- Education Nature and Meaning its objectives/ aims in relation to the time and place.

- Educational aims in the Western context: with specific reference to Russell, Dewey. Their impact on educational thought and class room practices, in term of progressive trends in education.
- Educational aims in the Indian context with specific reference to Indian thinkers such as Gandhi, Tagore.

- Philosophy and Education: Significance of studying philosophy in understanding educational practices and problem.

UNIT – II: PHILOSOPHICAL SYSTEMS

Major Philosophical systems - their salient features and their impact on education.

a) Realism with reference to Aristotle and Jainism. —

b) Naturalism with reference to the view! of Rousseau and Rabindra Nath Tagore.

c) Idealism with reference to Plato. Socretes and Advaita Philosophy.

d) Pragmatism with reference to Dewey “instrumentalism & Experimentalism”

e) Humanism . Historical, Scientific and Buddhists.

UNIT-III : INDIAN THINKERS

- Educational thinkers and their contribution in developing principles of education.
- M.K. Gandhi Basic tenets of Basic education.
- Gijju Bhai The world of the child.
- Swami Vivekananda : Man making education.
- Sri Aurobindo Integral education, its basic premises; stages of development.
- J. Krishna murthy; Child Centerd Education.

UNIT – IV: WESTERN THINKERS

- JJ Rousseau
- John Dewey
- Antonio Gramsci (Neo- Gramscian Theory)
- Paulo Friere (Democratic Education)

UNIT – V: CONTEMPORARY THOUGHT

- Critical and comparative study of the period and socio- political perspective of the western and Indian Thinkers.
- Contemporary philosophical perspectives of Education; Modernization, globalization in thought and education

REFERENCES:

1. Anand C.L. et.al. : Teacher and Education in Emerging India, NCERT, New Delhi.

2. Anant Padmnabhan : Population Education in Classrooms, NCERT, New Delhi.

3. Bhatnagar, S. : Adhunik Bhartiya Shiksha Aur Uski Samasyayen, Lyall Book Depot, Meerut.

4. Chakravorty M. : Gandhian Dimension in Education Daya Publishing House New Delhi.

S. Mani R.S. : Educational ideas and ideals of Gandhi and Tagore, New Book Society, New Delhi.

6. Ministry of Human Resource Development: National Policy on Education, 1896, New Delhi.

7. Mohanty Jagannath : Indian Education in Emerging Society, Sterling Publication, New Delhi.

8. Pandey, Shyam Swaroop : Shiksha ki Darshanik evam Samajik Shastriya Pursht Bcomi Vinod Pustak Mandir, Agra.

9. Pathak and Tyagi : Shiksha ke Samnya Siddhant, Vinod Pustak Mandir, Agra.

10. Pathak, RD. and Tyagi, I.S.D. Shiksha ke Samariya Siddhant. Vinod Pust8tk Mandir, Agra.

11. Saxena, N:R. Swaroop Shksha Re Samanya Siddhant, Lyall Book Depot, Meerut.

12. Singh B.P. : Alms of Education in India, Ajanta Publication New, Delhi.

13. Agrawal, J.C..: Nai Shiksha Niti. Prabhat Prakashan, Delhi.

14. Bhatnagar, R.P. Technology of Teaching, International Publishing House, Meerut.

15. .Freire, Paulo; Pedagogy of the oppressed, Translated by Myra Bergaman Ramos, The Continuum Publishing Corporation, New York, NY, 1987.

16. Freire, Paulo; Thepolitics of Education- Culture, Power, Liberation, Translated by Donoldo Mecedo, Bergin & Garvey, New York, NY, 1985.

17. Bhatnagar, Suresh Shiksha Ki Samasyaen, Lyall Book Depot, Meerut.

18. Bhooshan, Shailendra & Anil Kumar : Shikshan Taknik. Vinod Pustak Mandir, Agra.

19. Manav Sansadhan Vikas mantralaya: Rashtriy Shiksha Niti 1986. New Delhi.

21.Safaya. Raghunath,. School Sangathan, Dhanpat Ram & Sons, Delhi.

22. Sampath, K. : Introduction to Educational Technology, Sterling Publishers, New Delhi.
23.Saxena, N.R. Swaroop, Shikshan Kala Ewam Paddatiyan. Lyall Book Depot, Meerut.

24.Sharma & Sharma Secondary Education and teacher Functions, Radha Publisher Mandir Agra.
25.Higher Education in India ; Albach

CORE STUDY (SEMESTER I)

PAPER 1I- LEARNER AND LEARNING PROCESS

COURSE OBJECTIVES

To enable teachers trainee to -

1. Acquire knowledge and understanding of stages of human development and developmental tasks; with special reference to adolescents learners.
2. Develop understanding of process of children learning in the context of various theories of learning.
3. Understand intelligence, motivation and various types of exceptional children.
4. Develop skills for effective teaching learning process and use of psychometric assessment.

UNIT-I

Nature of psychology and learners

- Psychology : Its meaning, nature, methods and scope; functions of educational psychology.
- Stages of human development ;stage specific characteristics and developmental tasks.
- Adolescence in Indian context - characteristics and problems of adolescents; their needs and aspirations.
- Guidance and counselling for adolescents.

UNIT-II

Learning

- Nature of learning; learning theories with specific reference to Piaget (Cognitive)Theory and Vigotsky's social learning.
- Factors influencing learning and teaching process: learner related; teacher related: process related and content related.

UNIT-III

Intelligence

- Nature and characteristics of intelligence and its development.
- Theories of intelligence; two factor theory - Multifactor Theory (PMA) and SI Model.
- Measuring intelligence - Verbal, non-verbal and Performance tests (one, representative of group test and individual test of each),
- Creativity - definition, measurement.

UNIT-IV

Exceptional children

- Concept of exceptional children - types, and characteristics of each type including Children with learning disabilities.
- Individual differences - Nature; accommodating Individual differences in the class-room. learner centered techniques for teaching exceptional children.
- Personality- Definition, meaning and nature; development of personality; type and trait theories of personality.
- Group Dynamics. Psycho-analysis.

UNIT-V: Socialization, Culture and Education in Indian context

- History of Indian psychology with specific reference to religions and epics.
- Durganad Sinha's cognitive development
- Understanding diversity in Indian culture

REFERENCE

1. Bhatia, H.R.: Elements of Educational Psychology, Orient. Langman ltd. Bombay.
2. Chauhan, S.S. : Advance Educational Psychology, Vikas publishing House. New Delhi.
3. Chauhan, S.S. : Psychology of Adolescence, Allied Publishers, New Delhi.
4. Garrett, H.E.: Statistics in Psychology and Education, Vakils, Fetter and simo Ltd. Bombay
5. Gulati, Sushma : Education for Creativity, NCERT, 1985.
6. Huriock, E.B. : Adolescent Development, McGraw Hill. New York.
7. Kapil, H.K.: Sankhiyiki ke Mool Tatva, Vinod pustak Mandir, Agra.
8. Kulshrenta S.P : Educational Psychology.
9. Mangal, S.K. : Psychological Education, Prakash Brother, Ludiana.
10. Mathur, S.S.: Educational Psychology, Vinod Pustak Mandir, Agra.
11. Mathur, S.S. : Shiksha Manovigyan, Lyoll Book Dept Meerut
12. Srivastava, G. N. P.: Recent Trends in Educational Psychology, Psycho, Research Cell. Agra.
13. Tripathi, S. N.: Prathiba Aur Srijntmakta, Mcmillan Co.. Bombay.
14. Psychology in a Third world country: the Indian experience by Durganand Sinha
15. Motivation and Rural development by Durganand Sinha

PAPER III : PEDAGOGICAL STUDIES (SEMESTER I)

PEDAGOGY OF MATHEMATICS (Part I)

Total Marks: 100

Aims of the Course

After completion of course the students will be able to:

- develop insight into the meaning, nature, scope and objective of mathematics education;
- appreciate mathematics as a tool to engage the mind of every student;
- appreciate mathematics to strengthen the student's resource;
- appreciate the process of developing a concept;
- appreciate the role of mathematics in day-to-day life;
- learn important mathematics: mathematics is more than formulas and mechanical procedures;
- channelize, evaluate, explain and reconstruct their thinking;
- see mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on;
- pose and solve meaningful problems;
- appreciate the importance of mathematics laboratory in learning mathematics;
- construct appropriate assessment tools for evaluating mathematics learning;
- develop ability to use the concepts for life skills;
- stimulate curiosity, creativity and inventiveness in mathematics;
- develop competencies for teaching-learning mathematics through various measures

- focus on understanding the nature of children's mathematical thinking through direct observations of children's thinking and learning processes; and

- examine the language of mathematics, engaging with research on children's learning in specific areas.

Course Outline

Part I

UNIT 1: NATURE AND SCOPE OF MATHEMATICS

Meaning and scope of mathematics, A mathematical theorem and its variants—converse, inverse and contra-positive, proofs and types of proofs, Difference between proof and verification; Deductive nature of mathematics; History of mathematics with special emphasis on teaching of mathematics, contribution of Indian mathematicians. Aesthetic sense in mathematics and beauty in mathematics.

UNIT 2: EXPLORING LEARNERS

Cultivating learner's sensitivity like intuition, encouraging learner for probing, raising queries, appreciating dialogue among peer -group, promoting the student's confidence (Carrying out examples from various mathematical content areas, such as Number Systems, Geometry, Sets, etc.).

UNIT 3: AIMS AND OBJECTIVES OF TEACHING SCHOOL MATHEMATICS

Need for establishing general objectives for teaching mathematics; Study of the aims and general objectives of teaching mathematics vis-a-vis the objectives of school education; writing specific objectives and teaching points of various content areas in mathematics like Algebra, Geometry, Trigonometry, etc.

UNIT 4: SCHOOL MATHEMATICS CURRICULUM

Objectives of curriculum, principles for designing curriculum, designing curriculum at different stages of schooling, Some highlights of curriculum like vision of school mathematics, main goal of mathematics education, core areas of concern in school mathematics, curricular choices at different stages of school mathematics education, construction of syllabi in various disciplines of mathematics, for example, Algebra, Geometry, etc.; Pedagogical analysis of various topics in mathematics at various level of schooling—Arithmetic (Development of Number Systems), Algebra, Trigonometry, Statistics and Probability, etc.

UNIT 5: APPROACHES AND STRATEGIES IN TEACHING AND LEARNING OF

MATHEMATICAL CONCEPTS

Nature of concepts, concept formation and concept assimilation, Moves in teaching a concept—defining, stating necessary and/or sufficient condition, giving examples accompanied by a reason. Comparing and contrasting; Giving counter examples; Non-examples; Planning and implementation of strategies in teaching a concept like teaching of algebra, geometry, trigonometry, mensuration, etc.; Difference between teaching of mathematics and teaching of science.

References:

1. The history & concept of mathematical proof- steven G.2007
2. One of the oldest Extent digrams from Euclid – Bill Casselman 2008
3. How to teach mathematics –S.K.Arora (Bhimani) : Shanti Publisher's 1998
4. How children learn mathematics – Capeland (New york): M.C.Millan Pub. 1979
5. Mathematics for modern mind – W.R.Fuch (New york): M.C.Millan Pub. 1967
6. Vidyalaya Ganit ke liye sau prayog – J.N.Kapoor (New Delhi): Arya book Depot 1968
7. How to teach mathematics in secondary school – W.B.Saunders (Company) 1967
8. The spirit of mathematics J.N.Kapoor (New Delhi): Arya book Depot 1964
9. Indian Mathematics – Ashok Jhunjhunwala (New Delhi) Wiley Eastern Ltd. 1993
10. Curricullum and teaching of mathematics in secondary school , (R.C.Sexena) NCERT 1970
11. The teaching of mathematics in the new Education – N.K.Ayangar
12. Teaching of essentials of mathematics,ballard,p.b.
13. The development of mathematics,bell,E.T.
14. The teaching of mathematics,chadha,B. N.
15. The teaching of secondary mathematics,BUTTER &WREN
16. The teaching of arithmetic,POTTER,F.F.
17. MATHEMATICS FOR CLASS 9^{TH} NCERT
18. MATHEMATICS FOR CLASS 10^{TH} NCERT
19. TEACHING OF MATHEMATICS(ENG\HINDI),Dr. S.K. MANGAL
20. TEACHING OF MATHEMATICS(ENG/HINDI),Dr.A.B. BHATNAGER
21. TEACHING OF MATHEMATICS ,A.K. KULSHESTHA.

PAPER III : PEDAGOGY OF BIOLOGICAL SCIENCE

Total Marks: 100

Aims of the Course

After Completion of Course the Students will be able to:

- develop insight on the meaning and nature of biological science for determining aims and strategies of teaching-learning;
- appreciate that science is a dynamic and expanding body of knowledge;
- appreciate the fact that every child possesses curiosity about his/her natural surroundings
- identify and relate everyday experiences with learning biological science;
- appreciate various approaches of teaching-learning of biological science;
- explore the process skill in science and role of laboratory in teaching– learning;
- use effectively different activities/experiments/demonstrations/ laboratory experiences for teaching–learning of biological science;
- integrate the biological science knowledge with other school subjects;
- analyse the contents of biological science with respect to its branches, process skills, knowledge organisation and other critical issues;
- develop process-oriented objectives based on the content themes/units;
- identify the concepts of biological science that are alternatively conceptualised by teachers and students in general;
- explore different ways of creating learning situations for different concepts of biological science;
- formulate meaningful inquiry episodes, problem-solving situations, investigatory and

discovery learning projects based on upper primary, secondary and higher secondary stages,

facilitate development of scientific attitudes in learners;

- examine different pedagogical issues in learning biological science;
- construct appropriate assessment tools for evaluating learning of biological science;
- stimulate curiosity, inventiveness and creativity in biological science;
- develop ability to use biological science concepts for life skills; and
- develop competencies for teaching, learning of biological science through different measures.

Course Outline

Part I

UNIT I: NATURE AND SCOPE OF BIOLOGICAL SCIENCE

Science as a domain of enquiry, dynamic body of knowledge and as a process of constructing knowledge; Biological Science for environment and health, peace, equity; History of biological science, its nature aknowledge of biological science independent of human application; Origin of life and evolution, biodiversity, observations and experiments in biological sciences; Interdisciplinary linkages, biological sciences and society.

UNIT II: AIMS AND OBJECTIVES OF BIOLOGICAL SCIENCE

Developing scientific attitude and scientific temper; Nurture the natural curiosity, aesthetic senses and creativity in biology; Acquire the skills to understand the methods and process that lead to exploration; Generalisation and validation of scientific knowledge in biological science; Relate biology education to environment (natural environment, artifacts and people) and appreciate the issues at the interface of science technology and society; Imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment; Solving problems of everyday life; Know the facts and principles of biology and its applications consistent with the stages of cognitive development of learners; Specific objective of different content areas in biology.

UNIT III: EXPLORING LEARNERS

Motivating learner to bring his/her previous knowledge in science/biology gained through classroom/environment/parents and peer group Cultivating in teacher-learner the habit of listening to child; Generating discussion, involving learners in teaching-learning process, encouraging learners to raise questions, appreciating dialogue amongst peer groups, encouraging learners to collect materials from local resources and to develop/fabricate suitable activities in biological science (individual or group work); Role of learners in negotiating and mediating learning in biology.

UNIT IV: SCHOOL SCIENCE CURRICULUM (BIOLOGICAL SCIENCE)

Trends in Science curriculum; Consideration in developing learner-centred curriculum in biology; Analysis of textbooks and biology syllabi of NCERT and States/UTs at upper primary, secondary and higher secondary stages; Analysis of other print and non-print materials in the area of biological science used in various states.

UNIT V: APPROACHES AND STRATEGIES OF LEARNING BIOLOGICAL SCIENCE

Pedagogical shift from science as fixed body of knowledge to process constructing knowledge, scientific method - observation, enquiry, hypothesis, experimentation, data collection, generalisation (teacher-educator will illustrate taking examples from different stage-specific content areas keeping in mind the variation, e.g. structure and function, molecular aspects, interaction between living and non living, biodiversity, etc.); Communication in biological sciences; Problem solving, investigatory approach, concept mapping, collaborative learning, and experiential learning in biological science (teacher-learner will design learning experiences using each of these approaches); Facilitating learners for self-study.

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11.Dr. Shoti Shivendra Chandra: Contemporary Science Teaching.

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13. Proff. S.K. Tyagi : Teaching of Biological Sciences.

14. Dr. A.K. Kulshrestha: Teaching of Biological Sciences.

15. All NCERT Science Text Books from class lX to Xll.

PAPER III: PEDAGOGY OF PHYSICAL SCIENCE

Total Marks: 100

Aims of the Course

After Completion of Course the Students will be able to

- gain insight on the meaning and nature of physical science for determining aims and strategies of teaching-learning;
- appreciate that science is a dynamic and expanding body of knowledge;
- appreciate the fact that every child possesses curiosity about his/her natural surroundings;
- identify and relate everyday experiences with learning physical science;
- appreciate various approaches of teaching-learning of physical science;
- understand the process of science and role of laboratory in teaching-learning situations;
- use effectively different activities/demonstrations/laboratory experiences for teaching-learning of physical science;
- integrate in physical science knowledge with other school subjects;
- analyse the contents of physical science with respect to its branches, process skills, knowledge organisation and other critical issues;
- develop process-oriented objectives based on the content themes/units;
- identify the concepts of physical science that are alternatively conceptualised by teachers and students in general;
- explore different ways of creating learning situations in learning different concepts of physical science
- formulate meaningful enquiry episodes, problem-solving situations, investigatory and discovery learning projects based on upper primary, secondary and higher secondary

school science/physics and chemistry

- facilitate development of scientific attitudes in learners;
- examine different pedagogical issues in learning physical science; and
- construct appropriate assessment tools for evaluating learning of physical science.

Important: Various Concepts of Pedagogy of Physical Science listed in Units 1 to 10(PART I & PART II) given below will be evolved around the concepts given at upper primary, secondary and higher secondary (Physics and Chemistry) Science syllabi.

Course Outline

Part I

UNIT I: NATURE OF SCIENCE

Science as a domain of enquiry, as a dynamic and expanding body of knowledge; Science as a process of constructing knowledge; Science asinterdisciplinary area of learning (Thermodynamics, Biomolecules, Surface Chemistry, etc.); Facts, concepts, principles, laws and theories—their characteristics in context of physical science (citing examples for each); Physical science for environment, health, peace, equity; Physical sciences and society; Contribution of eminent scientists—Isaac Newton, Dalton, Neils Bohr, De Broglie, J. C. Bose, C. V. Raman, Albert Einstein, etc.

UNIT II: AIMS AND OBJECTIVES OF PHYSICAL SCIENCE

Developing scientific attitude and scientific temper, Nurture the natural curiosity, aesthetic senses and creativity in Science (secondary stage)/ Physics and Chemistry (higher secondary stage); Acquire the skills to understand the method and process of science/physical science that lead to exploration, generation and validation of knowledge in science/physical science; Relate Science/Physics and Chemistry education to the environment (natural environment, artifacts and people) and appreciate the issues at the interface of science technology and society; Imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment, Solving problems of everyday life; Know the facts and principles of science/physics and chemistry and its applications consistent with the stages of cognitive development of learners, (e.g. Mechanics, Heat, Electricity, Magnetism, Light, Acid, Bases and Salts, Thermodynamics,

Metallurgy, Physical and Chemical Changes, Nature and States of Matter, etc.); Specific objective of different content areas in science/physics and chemistry.

UNIT III: EXPLORING LEARNERS

Motivating learners to bring his/her previous knowledge gained in science/ physics and chemistry through classroom/environment/parents and peer group; Cultivating in teacher-learner the habit of listening to child; Generating discussion, involving learners in teaching-learning process; Encouraging learners to raise questions, appreciating dialogue amongst peer group; Encouraging learners to collect materials from local resources (soil, water, etc.) and to develop/fabricate suitable activities in science/ physics and chemistry (individual or group work); Role of learners in negotiating and mediating learning in science/physical science.

UNIT IV: SCHOOL SCIENCE CURRICULUM (PHYSICAL SCIENCE)

Trends in Science curriculum; Consideration in developing learner-centred curriculum in physical science, Analysis of science/physics and chemistry syllabi and textbooks of NCERT and States (at upper primary, secondary and higher secondary stage); Analysis of other print and non-print materials used in various states in the area of physical science.

UNIT V: APPROACHES AND STRATEGIES OF LEARNING PHYSICAL SCIENCE

Pedagogical shift from science as fixed body of knowledge to process of constructing knowledge, scientific method—observation, enquiry, hypothesis, experimentation, data collection, generalisation (teacher-educator will illustrate each taking examples from specific contents of science/physics and chemistry, such as Solutions, Colloids, Chemical Equilibrium, Electrochemistry, Mechanical and Thermal Properties of Matter, Reflection, Refraction, Wave Optics etc.); Communication in Science/Physical science, Problem solving, investigatory approach, concept mapping, collaborating learning and experiential learning in science/ physics and chemistry (teacher-learner will design learning experiences using each of these approaches), facilitating learners for self-study.

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15. Vaidya, N(1996): Science Teaching for the 21st Century Deep & Deep Publications, New Delhi.

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17. S.K. Mangal: Teaching of physical Science.

18. Prof. S.K. Tyagi : Teaching of physical Sciences.

19. Dr. A.K. Kulshrestha: Teaching of physical Sciences.

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21. S.K. Mangal: Teaching of physical Science.

22. Dr. Shoti Shivendra Chandra: Contemporary Science Teaching.

23. R.A. Yadav, Siidiqui: Teaching of Science.

24. Proff. S.K. Tyagi : Teaching of physical Sciences.

25. Dr. A.K. Kulshrestha: Teaching of physical Sciences.

PAPER III: PEDAGOGY OF SOCIAL SCEINCES

Total Marks: 100

This course in the teaching of Social Sciences introduces student teachers to matters of both content and pedagogy. Some emphasis on content seems necessary in view of the fact that many student teachers may not be having sufficient exposure to four major disciplines of Social Sciences. In fact, the pedagogy of a field of enquiry cannot be separated from its content. This course will help student teachers understand key concepts of the various Social Sciences as well as related pedagogical issues. Furthermore, student teachers should be encouraged to see interconnections between the different Social Sciences, i.e. see Social Sciences as an integrated area of study.

Social and economic issues and the concerns of Indian society have been introduced through real-life situations and primary sources of information. *Student-teachers are encouraged to grasp concepts and to develop thinking skills*. That is why, in certain cases, Case Studies for the transaction of topics have been indicated.

Aims of the Course

- To develop an understanding of the nature of Social Sciences, both of individual disciplines comprising Social Sciences, and also of Social Sciences as an integrated/ interdisciplinary area of study;
- To acquire a conceptual understanding of the processes of teaching and learning Social Sciences
- To enable student teachers examine the prevailing pedagogical practices in classrooms critically and to reflect on the desired changes;
- To acquire basic knowledge and skills to analyse and transact the Social Sciences curriculum effectively following wide-ranging teaching-learning strategies in order to make it enjoyable and relevant for life;
- To sensitize and equip student teachers to handle social issues and concerns in a responsible manner, e.g., preservation of the environment, disaster management, promoting inclusive education, preventing social exclusion of children coming from socially and economically deprived backgrounds, and saving fast depleting natural resources (water, minerals, fossil fuels etc.).

Course Outline

Part I

UNIT I: SOCIAL SCIENCES AS AN INTEGRATING AREA OF STUDY: CONTEXT AND CONCERNS

- Distinguishing between Natural and Social Sciences: Major Social Sciences disciplines in Schools.
- What is 'social' about various Social Sciences?
- Uniqueness of disciplines vis-a-vis interdisciplinarity
- Linking child's natural curiosity with natural phenomena like weather, flora and fauna; spatial and temporal contexts; important social and economic issues and concerns of the present-day Indian society.
- Multiple perspectives/plurality of approaches for constructing explanations and arguments.

UNIT II: TEACHING-LEARNING RESOURCES IN SOCIAL SCIENCES

- People as resource: The significance of oral data.
- Types of Primary and Secondary Sources: Data from field, textual materials, journals, magazines, newspapers, etc.
- Using the library for secondary sources and reference material, such as dictionaries and encyclopaedias.
- Various teaching aids: Using atlas as a resource for Social Sciences; maps, globe, charts, models, graphs, visuals.
- Audio-visual aids, CD-Rom, multimedia, internet.

UNIT III: SOCIAL SCIENCES CURRICULUM FOR SCHOOLS IN INDIA

- Curriculum development process: National and State levels.
- Studying the Social Sciences syllabus - aims and objectives, content organisation and presentation of any State Board and CBSE for different stages of school education.

UNIT IV : TEACHING-LEARNING OF GEOGRAPHY—SPACE, RESOURCES AND DEVELOPMENT

- Meaning, Nature and Scope of Geography: Current Trends
- Teaching and Learning Major Themes and Key Concepts in Geography

- LOCATION: Absolute (Grid system of latitudes and longitudes) and relative location: two ways of describing the positions of places and people on the earth's surface. Differentiating between sites (location) and situation (place).
- PLACE: Distinct physical and human characteristic of places that distinguish one from the other.
- MOVEMENTS: Interdependence and interaction across space, migration of people, transport and communication; trade and commerce, patterns of centres, pathways and hinterlands.
- REGIONS : Formation and change.
- The above content may be used to understand teaching, learning strategies and skill development in Geography.
- Developing Skills in Geography
- Observation, recording and interpretation of physical and social features and phenomena; Reading and interpreting geographical information through tables, figures, diagrams, photographs; Map reading and interpreting using scale (distance), direction, symbols, point, line and area; Visual-to-verbal and verbal-to-visual transformation leading to mental mapping; Identifying, constructing and asking geographical questions; Developing and gathering relevant information and data and analysing them to answer geographical questions and offering explanations and interpretations of their findings; applying acquired knowledge and skills for understanding the wider world and taking personal decisions; taking up activities to study environmental degradation in the local area and its preservation methods; studying any disaster involving all factors at the local/global levels.
- Teaching Strategies in Geography
- Questioning; Collaborative strategies; Games, simulations and role plays; Values clarification; Problem-solving and decision-making.
- METHODS : Interactive verbal learning; Experiential learning through activities, experiments; Investigative field visits based on students' own interests with teacher's support as facilitator; Engagement with 'places' at an emotional or sensory level using art, poetry and literature.
- TECHNIQUES: Using textbooks and atlas as a part of oral lessons, non-oral working lessons; using medium and large scale maps; using pictures, photographs, satellite imageries and aerial photographs; using audio-visual aids, CDs, multimedia and internet; case study approach.

- UNIT V: TEACHING-LEARNING OF ECONOMICS: STATE, MARKET, AND
- DEVELOPMENT
- As a branch of social science, economics is concerned with people. It studies how to provide them with means to realise their potential. This unit on economics deals with the broad themes of state, market, and development. Market and state are interrelated as instruments of development. The course endeavours to introduce the learners to key economic concepts and issues that affect their everyday lives.
- Meaning, Nature and Scope of Economics: Current Trends Key Concepts in Economics
- Scarcity and choice, opportunity cost, productivity, demand, supply and market mechanism, Division of labour and specialisation.
- Classification of Economic System
- Capitalism, Socialism, mixed economy (case study: India)
- Developmental Issues in Economics
- Sustainable Development—economic growth and economic development— indicators of measuring the well-being of an economy; Gross Domestic Product; economic planning; Poverty; Food Security; Price rise; Role and functions of Money—formal and informal financial institutions and budget; Classification of Production Activities—primary, secondary and tertiary;

- Economic Reforms and Globalisation (discuss these developmental issues with reference to India).
- The above content may be used to undertstand the teaching, learning strategies and skill development in economics.
- Teaching-Learning Methods in Economics
- In addition to usual methods like lecture, discussion, storytelling, other methods like problem-solving, simulation games, use of media and technology, concept mapping, project and activities like field visits (e.g. visit to a construction site for data on wages and employment), collection of data from documents (e.g. Economic Survey, Five Year Plan), analysing and interpreting data (using simple tables, diagrams and graphs) can be undertaken. Self-study and collaborative learning activities should be encouraged.
- Teaching-Learning Materials
- Using textbook, analysis of news (Newspaper, TV, and Radio); documents (e.g. Economics Survey, Five Year Plan), Journals and News Magazines.

PAPER III

PEDAGOGY OF LANGUAGE (ENGLISH)

Total Marks: 100

School education and teacher-education share a symbiotic relationship. To have qualitative improvement in education, both teacher-education and school education need to mutually reinforce each other. NCF-2005 and the Right to Education Act, 2009 suggest a rethinking in the area of teacher-education as well. A need to review and redesign the B.Ed. Syllabus was felt as NCF-2005 expects the teacher to look at school education in a holistic manner. It advocates learner-centred learning rather than teacher-centred teaching. Teacher's attitude, aptitude and motivation play an important role because the teacher needs to engage with the learning process of the learner. Teacher as a facilitator helps learners construct their knowledge. The teacher should be able to participate meaningfully to transact the syllabus and textbooks effectively along with teaching- learning materials. Therefore, the teacher should be well-versed not only with the subject content but also with the pedagogy of learning.

Aims of the Course

After completion of Course the student will be able to-

- understand the different roles of language;
- understand the relation between literature and language;
- understand and appreciate different registers of language;
- develop creativity among learners;
- understand the role and importance of translation;
- examine authentic literary and non-literary texts and develop insight and appreciation;
- understand the use of language in context, such as grammar and vocabulary;
- develop activities and tasks for learners;
- understand the importance of home language and school language and the role of mother tongue in education;
- use multilingualism as a strategy in the classroom situation;
- develop an understanding of the nature of language system;
- understand about the teaching of poetry, prose and drama;
- identify methods, approaches and materials for teaching English at various levels in the Indian context;

- understand constructive approach to language teaching and learning;

- develop an insight into the symbiotic relationship between curriculum syllabus and textbooks;
- develop and use teaching aids in the classroom both print and audio-visual material, and ICT (internet and computer technology);
- understand the process of language assessment;
- understand need and functions of language lab;
- sensitise teacher-students about emerging issues, such as right to education for children,
- peace and environment education in context with language teaching; and familiarise students with our rich culture, heritage and aspects of our contemporary life.
- Language classroom and texts have a lot of scope to make students sensitive towards surroundings, people and the nation.
- Course Outline

(Unit 1-5)

UNIT I: ROLE OF LANGUAGE

1.LANGUAGE AND SOCIETY : Language and Gender; Language and Identity; Language and Power; Language and Class (Society).

2.LANGUAGE IN SCHOOL: Home language and School language; Medium of understanding (child's own language); Centrality of language in learning; Language across the curriculum; Language and construction of knowledge; Difference between language as a school- subject and language as a means of learning and communication; Critical review of Medium of Instruction; Multilingual classrooms; Multicultural awareness and language teaching.

3. CONSTITUTIONAL PROVISIONS AND POLICIES OF LANGUAGE EDUCATION : Position of Languages in India; Articles 343-351, 350A; Kothari Commission (1964-66); NPE-1986; POA-1992; National Curriculum Framework-2005 (language education).

Activities

Discussion on Position paper on 'Teaching of English'

- Position paper on 'Teaching of Indian Languages'
- 'Multilingualism as a Resource'
- Analysis of advertisements aired on Radio/Television on the basis of language and gender.
- Take a few passages from Science, Social Science and Maths textbooks of Classes VI to VII and analyse:

(i) How the different registers of language have been introduced?

(ii) Does the language clearly convey the meaning of the topic being discussed?

(iii) Is the language learner-friendly?

(iv) Is the language too technical?

(v) Does it help in language learning?

- Now write an analysis based on the above issues.
- Project
- Prepare a report on the status of languages given in the Constitution of India and language policies given in Kothari Commission, NPE-
- SYLLABUS FOR TWO-YEAR BACHELOR OF EDUCATION
- 1986, and POA-1992.
    - Visit five schools in the neighbourhood and prepare a report on the three language formula being implemented in the schools.
    - Teaching Practice
- Talk to the students and find out the different languages that they speak.
    - Prepare a plan to use multilingualism as a strategy in the English classroom.
- On the basis of the English Textbooks (VI to XII) prepare a list of
- Topics and activities given on: (i) Language and Gender (ii) Language and Peace. Write a report on their reflection in the textbooks.
- UNIT II: POSITION OF ENGLISH IN INDIA
- ROLE OF ENGLISH LANGUAGE IN THE INDIAN CONTEXT: English as a colonial language,
- English in Post-colonial times; English as a language of knowledge; Position of English as second language in India; English and Indian languages; English as a link language in global context; challenges of teaching and learning English.
- Activities
    - Discuss in groups how the role of English language has changed inthe twenty-first century.
- Topic for Debate: Globalisation and English
- Discussion on the topic ‘War Begins When Words Fail’
- Keeping in view the topics given in this unit, prepare a questionnaire.
- Interview ten people and write a report on ‘English Language in India’.
- Project
- Do a survey of five schools in your neighbourhood to find out

1. Level of Introduction of English

2. Materials (textbooks) used in the classroom

• Prepare a report on the challenges faced by the teachers and the learners in the teaching-learning process.

UNIT III: AN OVERVIEW OF LANGUAGE TEACHING

1. DIFFERENT APPROACHES/THEORIES TO LANGUAGE LEARNING AND TEACHING (MT&SL)

• Philosophical, social and psychological bases of approaches to Language acquisition and Language learning; inductive and deductive approach; whole language approach; constructive approach; multilingual approach to language teaching (John Dewey, Bruner, J. Piaget, L. Vygotsky, Chomsky, Krashen), and Indian thought on language teaching.

• 2. A CRITICAL ANALYSIS OF THE EVALUATION OF LANGUAGE TEACHING METHODOLOGIES:

• Grammar translation method, Direct method, Structural-situational method, bilingual method, communicative approach.

• Activities

• Discussion on the topic ‘Mother Tongue and Other Tongue’

• Project

• Do a comparative study of positive features and weaknesses of different approaches to language learning.

• Teaching Practice

• Prepare four activities keeping in view ‘Constructivism in a Language Classroom’.

• UNIT IV: NATURE OF LANGUAGE

1. ASPECTS OF LINGUISTIC BEHAVIOUR: Language as a rule-governed behaviour and linguistic variability; Pronunciation—linguistic diversity, its impact on English, pedagogical implication; Speech and writing.

2. LINGUISTIC SYSTEM: The organisation of sounds; The structure of sentences; The concept of Universal grammar; Nature and structure of meaning; Basic concept in phonology, morphology, syntax and semantics; Discourse.

Activities

• Have a discussion on the topic ‘Difference Between Spoken and Written Language’.

• UNIT 5: ACQUISITION OF LANGUAGE SKILLS

1. Grammar in context; vocabulary in context

2. Acquisition of language skills: Listening, speaking, reading and writing.

• Listening and Speaking: Sub skills of listening: Tasks; Materials and resources for

developing the listening and speaking skills: Storytelling, dialogues, situational conversations, role plays,

- simulations, speech, games and contexts, language laboratories, pictures, authentic materials and multimedia resources

Reading: Sub skills of reading; Importance of understanding the development of reading skills; Reading aloud and silent reading; Extensive and intensive reading; Study skills, including using thesauruses, dictionary, encyclopedia, etc.

- Writing: Stages of writing; Process of writing; Formal and Informal writing, such as poetry, short story, letter, diary, notices, articles,
- reports, dialogue, speech, advertisement, etc; Reference skills; Study skills; Higher order skills.
- Activities
    - Collect ten examples of Grammar in context from English Textbooks of Classes VI to VIII and have a group discussion.
- Teaching Practice
- Prepare activities for listening, speaking, reading and writing. (5 Each)
- Prepare three activities to develop the reading skills of Class VI students.
- Project
- Keeping in view the needs of the children with special needs prepare two activities for English teachers.

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Suggested Reading:

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PAPER III

हिंदी भाषा का शिक्षण

कुल अंक 100

एक परिचय

राष्ट्रीय पाठ्यचर्या की रूपरेखा 2005 अमयापकों की भूमिका में एक बड़ी तब्दीली की मांग करती है। पाठ्यचर्या में अब तक अमयापकों को ही ज्ञान के स्रोत के रूप में केन्द्रीय स्थान मिलता रहा है, वह सीखने–सिखाने की समूची प्रक्रिया के संरक्षक और प्रबंधक के रूप में मुख्य भूमिका निभाने का काम करते आए हैं। पर 2005 की स्कूली पाठ्यचर्या उनसे मांग करती है कि वे सूचनाओं के वितरक और ज्ञान के स्रोत बन कर न रहें बल्कि विद्यार्थियों द्वारा ज्ञान हासिल करने की प्रक्रिया में स्वयं को सहायक मानें। वे विद्यार्थियों को शिक्षा–प्रक्रिया में सक्रिय भागीदार के रूप में देखें और उनके सवालों को सुनने और समझने की श्जरूरतों को समझें। इन सब तब्दीलियों को उनके व्यवहार का हिस्सा बनाने के लिए श्जरूरी है कि अध्यापक शिक्षा के पाठ्यक्रम में बदलाव आए। स्कूली व्यवस्था में बदलाव की पहल तभी संभव है जब इस व्यवस्था से जुड़े लोगों के दृष्टिकोण में परिवर्तन आए और अध्यापक की भूमिका इस व्यवस्था में सबसे महत्वपूर्ण है। इस दृष्टि से भाषा–शिक्षण का पाठ्यक्रम और भी महत्वपूर्ण हो जाता है क्योंकि भाषा पूरी शिक्षा की श्जमीन तैयार करती है जहां सिर्फ भाषा पढ़ना सीखना नहीं बल्कि भाषा के जरिये और विषयों में भी निपुणता हासिल करने की बात आती है। इसके साथ ही भाषा से जुड़े नए मुपे जैसे बहुभाषिक कक्षा, समझ का माध्यम, शांति की शिक्षा में भाषा की भूमिका आदि की समझ अध्यापकों के लिए जरूरी है जो अध्यापक शिक्षा में व्यापक बदलाव की मॉग करते हैं। यह पाठ्यक्रम भाषा के नए सरोकारों और सीखने–सिखाने की नई दृष्टियों को मयान में रखकर तैयार किया गया है। हमें आशा है कि प्रशिक्षु अध्यापकों को इससे भाषा–शिक्षण की तैयारी में सहायता मिलेगी।

हिंदी भाषा–शिक्षण का पाठ्यक्रम

पाठ्यक्रम के विशेष उद्देश्य

- भाषा के अलग–अलग भूमिकाओं को जानना
- भाषा सीखने की सृजनात्मक प्रव्यिा को जानना
- भाषा के स्वरूप और व्यवस्था को समझना
- स्कूल की भाषा, बच्चों की भाषा और समझ के बीच के संबंध को जानना
- भाषा के संदर्भ में पढ़ने के अधिकार, शांति और पर्यावरण के प्रति सचेत होना
- भाषा सीखने के तरीके और प्रक्रिया को जानना और समझना
- पाठ्यचर्या, पाठ्यक्रम और पाठ्यपुस्तक का विश्लेषण कर कक्षा विशेष और बच्चों की समझ के अनुसार ढालना
- भाषा और साहित्य संबंध को जानना
- हिंदी भाषा के विविध रूपों और अभिव्यक्तियों को जानना
- भावों और विचारों की स्वतंत्रा अभिव्यक्ति करना
- भाषायी बारीकियों के प्रति संवेदनशील होना
- अनुवाद के महन्व और भूमिका को जानना
- विद्यार्थियों की सृजनात्मक क्षमता को पहचानना

- बच्चों के भाषायी विकास के प्रति समझ बनाना और उसे समुन्नत करने के लिए विद्यालय में तरह–तरह के मौके जुटाना
- भाषा के मूल्यांकन की प्रक्रिया को जानना
- साहित्यिक और गैर साहित्यिक मौलिक रचनाओं की समझ और सराहना
- भाषा सीखने–सिखाने के सृजनात्मक दृष्टिकोण को समझना

PAPER II: TEACHING OF HINDI

(इकाई 1–5)

इकाई – 1: भाषा की भूमिका

(बच्चा जब स्कूल आता है तो उसके पास भाषा का एक रूप मौजूद होता है। कक्षा में बच्चों की भाषा के इस रूप को सम्मान देने से उसका आत्मविश्वास बढ़ेगा, यह सीखने की बुनियाद है।)
1 समाज में भाषा – भाषा और लिंग , भाषा और सत्ता भाषा और अस्मिता, भाषा और वर्ग
2 विद्यालय में भाषा – घर की भाषा और स्कूल की भाषा , समझ का माध्यम (बच्चे की भाषा) समूचे पाठ्यक्रम में भाषा , ज्ञान सृजन और भाषा , माध्यम भाषाः एक आलोचनात्मक दृष्टि , विषय के रूप में भाषा और माध्यम भाषा में अंतर , विविध भाषिक प्रयुक्तियॉ बहुभाषिक कक्षा , शिक्षक–शिक्षार्थी संबंध के पहलू के रूप में भाषा

3 संविधान और शिक्षा समितियों के रिपोर्ट में भाषा – भाषाओं की स्थिति (धारा 343–351, 350।) कोठारी कमीशन (64 से 66) राष्ट्रीय शिक्षा नीति –– 1986 , पी.ओ. ए–1992, राष्ट्रीय पाठ्यचर्या – 2005 (भाषा अमययन)

गतिविधि / पोर्टपफोलियो

प्रशिक्षण के दौरान

- छोटे समूह में बांट कर भारतीय भाषाओं के लिए निर्मित पोजीशन पेपर का अध्ययन और उस पर चर्चा
- विज्ञान, समाज विज्ञान और गणित की कक्षा VI से VII की किताबों से कुछ अंश चुनकर निम्नलिखित बिदुंओ को ध्यान में रखते हुए विश्लेषण करिए–
- विभिन्न भाषिक प्रयुक्तियों को कैसे प्रस्तुत किया गया है।
- उस अंश में प्रयुक्त भाषा विषय संबंधी भाव स्पष्ट करने मे कहॉ तक समर्थ है।
- बच्चे के स्तर के अनुरूप हैं?
- क्या इसमें तकनीकी भाषा का बहुत इस्तेमाल किया गया है ?
- क्या यह भाषा सीखने में सहायक है?

कक्षा–शिक्षण के दौरान

☐ कक्षा–शिक्षण के दौरान बच्चों के परिवेश और उनकी भाषा के बारे में जानकारी प्राप्त करें और बहुभाषिकता को स्रोत के रूप में इस्तेमाल करते हुए हिंदी शिक्षण की एक कक्षा–प्रविधि तैयार करें

परियोजना कार्य

- संविधान में भारतीय भाषाओं संबंधी अनुसंशाएँ तथा राष्ट्रीय शिक्षा नीति, पी.ओ.ए. द्वारा संस्तुत भाषा संबंधी सिफारिशों पर एक रिपोर्ट तैयार करना ।
- कक्षा छह से बारह तक के हिंदी की किताबों में लिंग और शांति संबंधी बिंदुओं की सूची तैयार कर उसके लिए कक्षा प्रविधि तैयार करना ।
- अपने आस–पास के पांच स्कूलों का दौरा कर यह जानकारी प्राप्त करते हुए एक रिपोर्ट तैयार
  करें कि त्रिभाषा सूत्र की क्या स्थिति है?

इकाई – 2: हिंदी भाषा की स्थिति और भूमिका

हिंदी भाषा की भूमिकाः स्वतंत्रता से पहले और स्वतंत्रता के बाद हिंदी , हिंदी के विविध रूप , अंतर्राष्ट्रीय स्तर पर हिंदी , ज्ञान की भाषा के रूप में हिंदी , हिंदी पढ़ने–पढ़ाने की चुनौतियॉ।

गतिविधि/पोर्टपफोलियो

प्रशिक्षण के दौरान

- स्वातन्योनर भारत में हिंदी की भूमिका पर समूह में चर्चा करें।
- जब शब्द नहीं रहते तब शस्त्र उठते हैं विषय पर परिचर्चा का आयोजन

कक्षा–शिक्षण के दौरान

☐ चुने हुए कुछ कक्षाओं में बच्चों की भाषा का जायजा लेते हुए हिंदी के विविध रूपों पर एक रिर्पोट तैयार करें।

☐ रोजमर्रा की जिंदगी में प्रयोग होने वाली कम से कम बीस क्रियाओं , जैसे नहाना, आना, पकाना, जाना आदि
को कक्षा में मौजूद बच्चे किस–किस तरह से प्रयोग करते हैं – इस आधार पर सूची बनाएँ

परियोजना कार्य

- इस इकाई में दिए गए विषयों को ध्यान में रखते हुए एक प्रश्नावली तैयार करें, दस व्यक्तियों का साक्षात्कार करे इस साक्षात्कार के आधार पर हिंदी की स्थिति पर एक रिर्पोट लिखें।
- हिंदी भाषा के विकास में क्षेत्रीय जनपदीय हिंदी की भूमिका पर आलेख पाठ करें। (हरेक विद्यार्थी अपने क्षेत्र विशेष को ध्यान में रखते हुए आलेख तैयार करे।)

इकाई – 3: भाषा शिक्षण पर एक दृष्टि

(हिंदी में विज्ञान, गणित, समाज विज्ञान और कला सब कुछ है पर ये विषय स्वयं हिंदी या भाषा नहीं हैं।)

भाषा सीखने सिखाने की विभिन्न दृष्टियॉ – भाषा अर्जन और अधिगम का दार्शनिक, सामाजिक और मनोवैज्ञानिक आधार, समग्र भाषा दृष्टि, रचनात्मक दृष्टि, भाषा सीखने–सीखाने की बहुभाषिक दृष्टि आदि (जॉनडुई, ब्रूनर, जे. प्याजे, एल. वायगात्स्की, चॉम्स्की आदि) भारतीय भाषा दृष्टि (पाणिनी, कामता प्रसाद गुरु, किशोरी दास वाजपेयी आदि)

भाषा शिक्षण की प्रचलित विधियॉ/प्रणालियॉ और उनका विश्लेषण – व्याकरण अनुवाद

प्रणाली , प्रत्यक्ष प्रणाली, ढॉचागत प्रणाली, प्राछतिक प्रणाली, उद्देश्यपरक (अन्तर्विषयक / अन्तर्अनुशासनात्मक)
संप्रेषणात्मक प्रणाली आदि।

गतिविधि / पोर्टपफोलियो
प्रशिक्षण के दौरान

- 'मातृभाषा और अन्य भाषा' विषय पर छोटे समूह में चर्चा करें।

कक्षा शिक्षण के दौरान

- भाषा की कक्षा में रचनात्मक दृष्टिकोण को मयान में रखते हुए चार गतिविधियां तैयार करें।

परियोजना कार्य

☐ विविध राजभाषा शिक्षा प्रणालियों का अध्ययन करते हुए उनका विश्लेषण कीजिए।

इकाई – 4: भाषा का स्वरूप

(कोई व्याकरण भाषा की चाल को बदल नहीं सकता। भाषा लोक व्यवहार से परिचालित होती है।)
1. **भाषायी व्यवहार के विविध पक्ष**– नियमबद्ध व्यवस्था के रूप में भाषा : भाषायी परिवर्ननशीलता (उच्चारण वेफ संदर्भ में) हिंदी की बोलियॉ वाक् तथा लेखन।
2. **भाषायी व्यवस्थाएँ** – सार्वभौमिक व्याकरण की संकल्पना , अर्थ की प्रकृति तथा संरचना , वाक्य विज्ञान तथा अर्थ विज्ञान की मूलभूत संकल्पनाएँ स्वनिम विज्ञान और रूप विज्ञान ,
(उपयुक्त उदाहरण देकर पढ़ाए जाएँगे)

गतिविधि / पोर्टपफोलियो
प्रशिक्षण / कक्षा शिक्षण के दौरान

☐ 'लिखित और मौखिक भाषा में अंतर' विषय पर समूह में चर्चा करें

इकाई –5: भाषायी दक्षताएँ

1. संदर्भ मे भाषा – संदर्भ में व्याकरण और संदर्भ में शब्द
2. भाषायी दक्षताएँ– सुनना, बोलना, पढ़ना और लिखना

- **सुनना और बोलना** – सुनने का कौशल, बोलने का लहजा– भाषाई विविधता और हिंदी पर इसका प्रभाव, पढ़ने–पढ़ाने पर इसका प्रभाव , सुनने और बोलने के कौशल विकास के स्रोत और सामग्री, रोलप्ले, कहानी सुनाना, परिस्थिति के अनुसार संवाद, भाषा लैब, मल्टीमीडिया तथा मौलिक सामग्री की सहायता से संप्रेषणात्मक वातावरण का निर्माण
- **पढ़ना** – पढ़ने के कौशल, पढ़ने के कौशल विकास में समझ का महत्व, मौन और मुखर पठन, गहन–पठन, विस्तृत पठन, आलोचनात्मक पठन, पढ़ने के कौशल विकास मे सृजनात्मक साहित्य (कहानी, कविता आदि) सहायक, थिसॉरस, शब्दकोश और इन्साइक्लोपीडिया का उपयोग / महत्व

  लिखना – लिखने के चरण, लेखन–प्रक्रिया, सृजनात्मक लेखन, औपचारिक और अनौपचारिक लेखन (कहानी, कविता, संवाद, डायरी, पत्र, रिपोर्ट, समाचार आदि)

गतिविधि / पोर्टपफोलियो

- सभी भाषायी कौशलों के सीखने से संबंधित 4–4 गतिविधियॉ तैयार करें और उनका कक्षा शिक्षण के दौरान प्रयोग करें।
- पढ़ने के कौशल विकास को ध्यान में रखते हुए कक्षा छह हिंदी के विद्यार्थी के लिए तीन गतिविधियॉ तैयार करें और उनका कक्षा शिक्षण के दौरान प्रयोग करें।

- सभी विद्यार्थी कक्षा छह से आठ के हिंदी पाठ्यपुस्तकों से संदर्भ में व्याकरण के दस नमूने इकटठा करें और उन पर समूह में चर्चा करें ।

परियोजना कार्य

- सुनने और बोलने में असमर्थ बच्चों को ध्यान में रखते हुए हिंदी शिक्षण की दो गतिविधियॉ तैयार करें ।

CORE STUDY (SEMESTER II)
PAPER IV: SOCIOLOGICAL PERSPECTIVES OF EDUCATION
MARKS-100

OBJECTIVES

i. To understand the social diversity in the state and the class room and its implication for teaching
ii. To understand and be able to use some key concepts relating to social stratification
iii. To understand the nature of caste and changes occurring in it; to focus attention on the scheduled castes and their education
iv. To understand the problems faced by the tribal communities and the issues in education of tribal children
v. To understand how poverty affects schooling prospects of children with special reference to migrant children

UNIT I : **Understanding diversity in Indian society with special reference to**

Chhattisgarh

Diversity in Indian society, especially in Chhattisgarh, would be explored through case studies of some villages, regions or cities. Profile of different communities in terms of their ecology, economy, language, culture and educational status will be taken up for discussion. Special focus will be on childhood in these communities and access to education. Student teachers will be encouraged to look at this diversity as a potential pedagogic resource within the class room.

i. Diversity in this class room. Getting to know the diverse socio-cultural and linguistic background of fellow students. Getting to know about how they got themselves educated
ii. Ethnographic profiling of some five communities of the state (for example, one tribal, one scheduled caste, one artisanal community, one farming caste, one minority religious community)
iii. Children at risk educationally – profiling communities of children who have not been integrated well into schooling (non-enrolment, early dropout, low

achievement).

iv. Profiling of the society of one's own village or town in terms of communities, professional groups, economic status, social respect, power, etc.

v. How can a teacher use the social background of diverse students as a resource for teaching in the class room?

UNIT II: **Sociological concepts relating to social stratification**

Some key sociological concepts like life opportunities, discrimination, exclusion, stratification, etc. will be discussed to enable the student teachers to use them in different social contexts.

i. Life opportunities, class, status and power: frameworks of Marx and Max Weber
ii. Social discrimination, exclusion and exploitation.
iii. Social capital, cultural capital and economic capital – the approach of P Bourdieu
iv. Equality of opportunities and capabilities approach of Amartya Sen

UNIT III : **Aims of education**

- Aims of Education in key policy and documents:
- Mudaliar commission report
- Kothri commission report
- Curriculum frame work, 1975
- National policy on education, 1986
- Curriculum frame work, 2000 and 2005
- NCFTE 2009

UNIT-IV: **DEMOCRACY AND EDUCATION**

- Meaning of the term "National integration and Emotional integration"its need, role of teacher & educational institution in achieving National integration through democratic integraction, explanation of cultural heritage, contributions of different religions (Hinduism,- Buddhism, Sikhism, Islam, Christianity and Jainism) for the same cause and human upliftment, equal communication, philosophy of celebration of Indian festivals.

- Sociological basis of education. Relationship between individual to individual and individual to society, in terms of Norms given by the existing social order; education as liberal utilitarian, education as a tool of economic education, as an agent of Social change, education as a means of National welfare through the Immediate welfare of the society, education and human resource development.
- Meaning of a new social order, eradication of illiteracy, objectives of NAEP; provisions made and channels started for educating socially, culturally and

economically deprived; Means and measures taken for equality of opportunities in terms of castes, tribes. Disabled, Gender and Minorities:

UNIT V **: The current concerns of Indian education**

Private public partnership (PPP); yet others relate to the status of teachers – casualization and informalisation of teachers. Student teachers will be given an opportunity to study these concerns and prospects through case studies and other academic literature.

(i) Professional ethics
(ii) Impact of privatization and Developments on Human Resources on the institution

Practicum

1. Field based surveys of status of marginalised social groups like SC, ST, migrant workers, rural and urban poor, etc and their educational prospects.
2. Action research to understand the problems faced by children of marginalised communities in schools of different kinds.
3. Action research to understand the implementation of government schemes for education of the marginalised groups.
4. Surveys to study condition of different kinds of schools and teachers and other staff working in them.
5. Surveys to understand field realities relating to policy issues under discussion
6. Role play and dramatization of issues relating to education of marginal groups

Essential Readings

1. Position Paper of Focus Group on Education of SC and STs, NCERT
2. SC Dube, Indian Society (Also available in Hindi) NBT, Delhi
3. Russel & Hiralal, Tribes and Castes of CP & Berar
4. S. Thorat, Dalits in India, 2009
5. R Govinda, Who Goes To School? OUP, New Delhi, 2010
6. Danda, Ajit Kumar [edit.]. Chhattisgarh : An Area Study, Calcutta 1977. Anthropological Survey of India.
7. Tribal Situation in Northeast Surguja. Calcutta 1977. Anthropological Survey of India.
8. F. Haimendorf, Tribes in India, OUP
9. P. Veerbhadranaika, Revathi Sampath Kumaran, Shivali Tukdeo A.R.Vasavi 'The Education Question' from the Perspective of Adivasis: Conditions, Policies and Structures, NIAS, Bangalore 2011
10. The Social Context of Elementary Education in Rural India, Azim Premji Foundation, Bangalore, 2004
11. Praveen Jha, Whitherng commitments and Weakening Progress, State and

Education in the Era of Neo liberal reforms, EPW, Aug 2005
12. Poverty and Social Exclusion in India, World Bank, 2011
13. Geetha Nambissan, Exclusion and Discrimination in Schools: Experiences of Dalit Children, UNICEF, 2009
14. Sociology, NCERT Text books for class XI and XII
15. JP Naik & S Nurullah, A Students' History of Education in India, Macmillan (available in Hindi)
16. Education policy documents and Commission Reports:
    Mudaliar Commission, Kothari Commission, National Commission on Teachers, Yashpal Commission, National Policy on Education 1965, 1988 & 1992

Films & Documentaries

1. Shyam Benegal, Making of the Constitution (12 parts)
2. Shyam Benegal, Bharat Ek Khoj (relevant parts on National movement)
3. India Untouched.

CORE STUDIES (SEMESTER II)

PAPER V- CURRICULUM AND KNOWLEDGE

MARKS -100

OBJECTIVES

Objectives

i. To understand the nature of curriculum and its relation to syllabi, text books and class room practices
ii. To understand the nature of knowledge, moral values and skills
iii. To examine the place of work in education
iv. To understand the implications of constructivism for education
v. To develop and apply a framework for studying curriculum documents.

Unit I: Curriculum, Syllabi, Text books and Class room

a. What is a curriculum? Why do we need a curriculum?

Objectives behind framing/developing a curriculum. Aims and curriculum; the relationship between the two. Relationship between these two and pedagogy. Curriculum, syllabi and textbooks: what's the relationship between these? what are implications of this for a teacher?

b. The scope of curriculum:

Knowledge, values, skill, dispositions, etc. some general discussions about each.

c. The context/cultural embeddedness of curriculum.

Curriculum as a mode of transmission of culture and social norms. Diverse strands of culture and contestations and debates within them. Problems involved in questions about cultural choices and their implications for curriculum. Who defines culture? Who defines curriculum? (relate this to the discussion on negotiating diversity in aims of education.

d. Types of curriculum:

Liberal curriculum which seeks to develop understanding and perspectives, vocational curriculum which focusses on skills and is geared towards livlihood, mixed curriculum.

Unit II: Nature of Knowledge

a. Introduction to discussions about knowledge: What is knowledge? Knowledge as human endeavor: Curiosity, Practice and Dialogue. The nature of human curiosity, its limits; the complex interaction between knowledge and social practice; knowledge being formed through dialogues and shared with a larger community.

b. Nature of disciplines/subjects and forms of inquiry in each.

c. Sociology of knowledge: privileging of certain kinds of knowledge through curriculum and its impact upon unequal learning opportunities.

Unit III: Moral Values

a. Nature of value and morality: values are what make people consider life worthwhile. Values and morality involve choices which are arrived at by balancing diverse and often contradictory values. Even so, the choice made by one person may be very different from that made by another. Most educators agree that students need to engage seriously with the task of taking moral decisions, they also agree that preaching a set of values is tantamount to indoctrination at best or promoting hypocrisy at worst.

b. Morality in a multi-cultural, multi religious and democratic society: different cultures/religions have different value systems and preferences. Can any one of them become the basis of moral education in schools? Can there be democratic norms of dialogue between different value systems

c. Objectives of moral education: Is it to impart information about what is valuable or to train the student how to take moral decisions or is it to instill in the student a desire to be moral person? Should investigation into why it is difficult to be moral be a part of curriculum?

Unit IV: Curriculum and Productive Work

a. Understanding work as a productive activity which aims at producing tangible goods or services. Changing nature of work in recent times. Is ‘work’ incompatible with education?

b. Gandhian notion of education through productive work and a review of experience of its actual implementation. Can we substitute traditional crafts with modern industrial work? From Gandhian notion to ‘Socially useful productive work’ (SUPW).

c. Vocational Education: education as preparation for a particular field of employment Vs liberal education to prepare for adult life in general. Possibility of combining work skills of several fields as a part of general education.

d. The place of work in curriculum – its role in integrating knowledge, skill and values in real lifelike contexts. The implication of its absence from curriculum.

Unit V: Frameworks for reviewing curriculum documents

- Visioning human beings and just society.
- Visioning the role of students and teachers
- Visioning the nature of knowledge and learning
- Areas of study (subjects) and the objectives of learning them
- Visioning the role of assessment and evaluation in education

Practicum

i. Conduct a collaborative knowledge construction class in a school and prepare a report on its basis. (some exemplar themes: ‘let us find out about what kind of food we all eat and enjoy.’ Or ‘what is the nature of our family lives?’ or ‘what is the difference between a fly and an ant?’ or let us find out the rules for use of masculine and feminine gender in Hindi language.’)
ii. Comparative study of various curriculum documents.
iii. Prepare a report comparing national curriculum framework, the text books and class room practices in the school in which the student teacher has been interned. To what extent does the class room practice carry out the curricular objectives or the objectives set out in the text books?

Essential readings

1. Christopher Winch, Philosophy and Education Policy, chapter 1&2.
2. John Dewey, Democracy and Education
3. National Curriculum Framework NCERT 2005, (Chapter 2)
4. Position Paper, National Focus Group on Curriculum, Syllabus and Text books (NCERT, 2006)
5. Position Paper, National Focus Group on Work and Education (NCERT, 2007)

6ण ज्ञान षिक्षाक्रम और षिक्षाषास्त्र, डी एड प्रथम एवं द्वितीय वर्स – पठन सामग्री , एस सी ई आर टी, रायपुर 2012

7ण रोहित धनकर, षिक्षा और समझ, आधार प्रकाषन, जयपुर, 2007

8ण रोहित धनकर, लोकतंत्र, षिक्षा और विवेकषीलता, आधार प्रकाषन, जयपुर, 2004

9ण रोहित धनकर, षिक्षा के संदर्भ, आधार प्रकाषन, जयपुर, 2007

10. Ryle, G. ‘Can Virtue Be Taught?’ in R. E. Dearden, P. Hirst and R. S.Peters (eds) Education and the Development of Reason, London, Routledge. (1972)
11. Straughan, R. Can We Teach Children to Be Good?, London, Allen and Unwin. (1982)
12. Kohlberg, L. The development of children's orientations toward a moral order, Vita Humana, (1963).

13. R Meighan, Hidden Curriculum, in Iram Siraj-Blatchford, A Sociology of Educating,
14. Anthony Giddens, Sociology (5th Edition) Cambridge 2006 (Chapter on Education)
15. Relevant sections of 1975, 1988, 2000 and 2005 curriculum documents of NCERT.
16. Christopher Winch and John Gingell. Philosophy and Education: A Critical Introduction. Routledge, 2005.
17. Robin Barrow. An Introduction to Moral Philosophy and Moral Education. Routledge, 2007.
18. Paul Hirst. “The Demands of Moral Education: Reason, Virtues and Practices.” In Education in Morality, edited by J H Halstead and T H Mclaughlin. Routledge, 1999
19. Noah Lemos. An Introduction to the Theory of Knowledge. Cambridge, 2007.

B.ED COURSE (SEMESTER II)
PAPER VI (ELECTIVE GROUP- I)

Marks 100

Note : Any one elective is to be chosen from the options.

(A) Educational and Mental Measurement.
(B) Educational Technology And Management
(C) Educational Administration and Management

One elective subject to be decided by considering the following-

1. All electives must be contributing for extra capability of delivering the goods.
2. All electives should have equal difficulty level.
3. All electives should be unique in native without being covered in any other area (of paper of B.Ed.).
4. All electives should have full bearing over the latest developments of the contemporary world.

(VI A) EDUCATIONAL AND MENTAL MEASUREMENT

COURSE OBJECTIVES

1. To acquaint the student teacher with the basic scientific concepts and practices in educational and mental measurement.
2. To enable the student to tabulate and find out some standard meaning from the raw scores by using statistical procedures.
3. To develop skills and competencies in the student teacher for the use of the techniques in the field.
4. To enable the student teacher to interpret the result of educational measurement.
5. To enable the student understand about various educational and mental measurement tools.

COURSECONTENTS

UNIT- I

- Concept of measurement : testing and evaluation.
- Scales of measurement : nominal, ordinal, interval, and ratio scales.
- Discrete and continuous variables.
- Qua1iies of a test - reliability, validity and usability of a test: item analysis, procedures and item selection.

UNIT-II

- Educational statistics: measures of central tendency from grouped and non-grouped data.
- Measures of variability – range , quartile deviation, standard deviation.
- Graphical Representation of Data.

UNIT- III

- Techniques of test conduct - importance of establishment of rapport with the students, arranging the seats and distribution of questions for minimum pilguage and copying; techniques for avoiding guessing in answering; objective scoring.

UNIT- IV

- Interpreting measurement : normal probability curve, skewness and kurtosis.
- Percentiles and percentile ranks.
- Standard scores,
- Co-efficient of correlation by Spearman's method and its interpretation.

UNIT-V

- Achievement tests : construction of standardized achievement tests.
- Types of test items.
- Measurement of intelligence : Concept of intelligence, Binet test, concept of IQ.
- Individual and group tests of intelligence:
- Aptitudes and personality tests. : use of aptitude tests - overview.
- Use of interest inventories.
- Assessment of personality: interview, self-report inventories, rating scale, projective tech-niques. (Note - Some basic concepts and items covered, under compulsory core courses

  have been dropped here to avoid repetition although these are relevant).

PRACTICUM

- Administration of a psychological test and interpretation of test results.
- Determination of. reliability or validity of any self made test.
- Construction of a test battery with at least five types of test items and trying out of the same on a class/group of students.

REFERENCE

1. Asthana, Biptn & Agrawal, R. N. : Mapan ewam moolyankan. Vinod Pustak Mandir, Agra.
2. Asthana, Bipin and Agrawal, R. N. : Measurement and Evaluation In Psychology and Education, Vinod Pustak Mandir, Agra
3. Bhagwan, Mahesh : Shiksha mein Mapan ewam moolyannkan, Vinod Pustak Mandir Agra
4. Lindeman, R. H. annd Merenda, P.F. : Educational Measurement, Scott foreman & Com-pany, London,
5. Rawat, D.L. : Shaikshlk Mapan ki Naveen Rooprekha, Gaya Prasad and Sons, A9ra
6. Sharma, R. A. : Measurement and Evaluation In Education and psychology, Lyall Book

   Depot Merrut
7. Sharma Shiksha tatha Manovigyan nain mapan Evam moolyankan. Lyall Book Depot Merrut.
8. Verma R.S.: Shaikshik Moolyankan. Vinod Pustak Mandir. Agra.

(VI B) Educational Technology And Management

Course Objectives

1. To obtain a total perspectives of the role of technologies in modern educational practices.

2. To equip the student - teacher with his various technological applications available to him/her for improving instructional practices.

3. To help the teacher to obtain a total gender of his role of scientific management in education.

4. To provide the teacher the skills required for effective instrutional and institutional management.

5. To develop the professional skills required for guiding pupils in the three initial areas educational,penal and victual.

Syllabus

Unit - I Concept of Educational Technology

- Meaning
- Nature
- Scope
- Functions
- Need for educational technology in the schools of chhhattisgarh.

Unit - II Communication Technology

- Concept
- Nature
- Process
- Principles
- Componenets
- Types
- Barriers

Allied Skills Required - micro Teaching and other skill based techniques

Unit - III System Approach

- Concept and characteristics
- System approach , System Analysis, System Design

Physical Resources of an instructional System

- Concept
- Classification (Project/Non Project/hardware/software)

Hardware - Chalkboard, tape recorder, Educational radio, Educational Television,VCR, Instant Slide mker, OHP, Film Strip, Slide Projector,Epidiascope, Interactive Video, Computers, Reprographic Equipement.

Software - Scripts (Audio& Video), slides, Programs, lerning Materials, Film Strips, Transperencies, News Paper, Text Books, Maps etc.

Unit - IV Innovations in Educational Technology

- Video lessons and Talk Back, CAI
- Language laboratory
- Tele conferencing
- Tele-Text and Video Text
- Telephone Conferencing
- Computer Networking

Strategies - Tutorials, Seminar, Brain-Storming, Role-Play, discussion, Conference, Workshop

Unit - V Human Resources of an Educational System & Management

- Identification of the Human Resources, resources within and outside the school system

Meaning of management in Education

- Managing curriculum, managing co-curriculum, Managing school discipline and Managing physical resources

- Developing performance profiles of institutions

Assignments

1. Tutorial/Term paper/Symposium

2. Developing Software - Transparencies/Slides/Scripts/Scenarios

3. Workshop on handling Hardware

4. Preparation of low-cost/improvised material

5. Conducting a lesson - Using OHP/Slide projector or computer

References:

1. Brown, J.W, Lewis Pb. 7 harclerac : AV Instructional Technology: McGraw Hills, new York.

2. Davies, I.K. The Management of Learning, McGraw hills, New York.

3. Goel, D.R, Educational T V in India - Organisation and Wilization, Unpublished post doctoral Thesis, M.S. University of Baroda.

4. Jerone, P.L & Clarence, M.W.: A Guide to programmed Instruction, J. Willey & sons, New York

5. Richmond, W. Kenneth: The concept of educational Technology , A Dialogue with yourself, London,Weldenfeld and Nicols, 1970.

6. Sharma, R.A. : Technology of Teaching , Meerut, Lyall Book Depot, 1986.

7. Singh P.: Cybernetic Approach to Teaching; The progress Education, Pune, May 1984.

8. Smith K.U : Snd smith marget, F. : Cybernetic principles of learning and Evaluation, New York, Holt, Rinehart and Winston, 1966

9. Taber J.J., Glaser F4 & Schasffer, H.N: learning and programmed Instruction, Addison Waler Reading Massachuset, 1965.

10. William D. : using Mass Media in Schools, New York, Appleton century Crops 1962.

[VI C] EDUCATIONAL ADMINISTRATION & MANAGEMENT

COURSE OBJECTIVES

1. To acquaint the student teachers with the concept and concerns of educahonal administra-tion.
2. To develop an understanding of the role of the headmaster and the teacher in school management.
3. To enable the students to understand to concept at Importance of communication and its possible barriers in educational administration.
4. To enable the student teacher to critically analyse the administrative scenario In relation to the functioning of the other secondary schools of the area.
5. To acquaint the student teacher with the scientific practices of educational management and keep him to apply it In work situation.

COURSE CONTENTS

UNIT-I

- Conceptual framework concept of educational administration.
- Concept of educational management human beings as inputs, process and products inputs.
- Nature, objectives and scope of educational aciministration

UNIT-II

- Role and functions of headmaster/teacher: Basic functions administration planning, organising directing and controlling.
- Maintenance of discipline, control management.
- Co-ordination and growth, development,
- Supervision and inspection, defects in the present supervision and inspection.
- Scope of educational supervision,
- Types of supervision.
- Providing guidance; leadership function,
- Crisis In management
- Decision making.

UNIT-III

- Communication in Educational Administration Role of communication in effective manage-ment and administration.
- Methods of communication.
- Barriers of communication in educational administration.
- Overcoming barriers to communication and effective communication In educational admin-istration..

UNIT-lV

- Management of Schools : Role of headmaster in planning of school activities, approaches to management - manpower approach, cost benefit approach, social demand approach, social justice approach.
- Involvement of other functionaries and agencies In the preparation of a plan.
- Delegation of authority and accountability.
- Role of the headmaster in monitoring, supervision and evaluation.
- Role of the headmaster in motivating the staff, in resolution of interpersonal conflicts.

- Role of the headmaster In creating resources and managing financial matters.
- Optimum use of available resources for growth and development of the school.
- Staff development programmes.
- Role of teachers in school management and administration.

UNIT-V

- Educational administration in the state : The administrative structure in the field of education in the state.
- Control of school education in the state - a critical analysis.
- Functions of the state government in relation to secondary and higher secondary schools.
- Functions of the board of secondary education in controlling secondary schools.
- Problems of secondary school administration in government schools.

PRACTICUM

- The student-teacher is expected to conduct a study on any issue or problem relating to a school administration. The report should be in about 700 words.

REFERENCE

1. Bhatnagar, R.P. & Verma. I.B.: Educational Administration, Lyall Book Depot Meerut.
2. Bhatnnagar, R.R & Agrawal, Vidya : Educational Administration, Supervision Planning and Financing. R. Lall nook Depot. Meerut.

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(SEMESTER II)

PAPER VII: ARTS EDUCATION

Objectives:

- To work together on small and large projects.
- To encourage students to free expression and creativity.
- To acquaint students with basic elements of design.
- To develop an insight towards sensibility and aesthetic appreciation.
- Joyful experience
- To develop a perspective of artistic and creative expression.

UNIT I: Art appreciation / brief history of Indian Art

- Sculptures: (Any 2 Sculptures of every period giving brief introduction).

-Indus valley (They must have read in this till 8th standard).

-Mauryan Period

-Gupta Period

-Folk Art

-Modern / Contemporary Art

- Paintings;

- Ajanta and the mural traditions

- Miniature Paintings
- Contemporary Paintings
- Folk Art

UNIT II: Visual Arts.

- History of visual arts
- The concept and meaning of visual arts
- 2D Arts, methods and techniques, Drawing, Painting, Still life, printing, life drawing, composition, collage, wall painting, posters, Alpama / Rangoli / Mandra / Folk art forms etc.
- Tribal computer Graphics: Animations
- 3-D Arts; Methods and techniques : Relief work, clay modelling, Hand poetry, molding, sculpture, Terracotta construction with mixed materials.
- 3-D animation. Folk / Tribal Art

UNIT III: Theatre.

- Sense of theoretical / dramatic self:
  - Factors of Drama; the plot, structure, characters, available material, performance space, performance etc.
  - Street plays; script writing, song writing, clowning, cartooning.
  - Issues of identity, gender, relationships, social status.
- The roots of theatre; Ritual, Festival / Celebration, Myth, Primitive Man, Language Development.
- Modern Indian Drama; Major plays and Play wrights.

UNIT IV: Music and Dance:

- Laya and Swara; Basic concepts of rhythm and note.
- Sangeet; Gayan, vadan and nritya in the context of locally known songs and dances commonly performed.
- Musical Instruments; categorization.

- Music of different geographical areas such as the desert, mountains, jungles and river-belt.
- The term **'Nritya'** or **'Naach'**
  a) Movement of different parts of the body
  b) Expression
  c) Literature
- Percussion instruments
- Any two regional dances
  1. Description of the region
  2. Dialect
  3. Costumes
  4. Music
  5. Tal
- Discussions on -
  1.Rajasthani Folk Dance (ref. Tarang list CIET)
  2.Himachal Pradesh ke Lok Nritya (ref. Tarang List CIET)
  3. Hamare Vadya Yantra Series (ref. Tarana List CIET)

4.	Community Singing	(ref. Tarang list CIET)
5.	Song of Unity (KSSP)	(ref. Tarang list CIET)
6.	Rajasthan Folk	Langas and Manganiars
7.	Best of Carnatic	Various Instrumental
8.	Classical Dances of	(ref. Tarang List. CIET) India Series

UNIT V: Heritage Crafts

- Introduction to the crafts traditions of India, details about the different crafts, their classifications, regional distribution etc. Each of these topics will incorporate aspects such as the Philosophy and aesthetics, Materials, processes and techniques, Environment and resource management, Social structures, Economy and marketing.
- Clay, Stone work, Metal crafts, jewelry, natural fiber weaving and textile weaving.

Some Reference Books Suggested for Teachers:

1.Indian Sculpture - Chintaman Kar.

2.Exploring Sculpture - Jan Amdell Mills and Boon, London.

3.The Technique of Sculpture - John W. Mills, P.T. Patsford Ltd., London.

4. A History of Sculpture of the World - Shelden Cneey, Thames and

Hudson, London.

5.Form and Space -Edward Their, Thames and Hudson, London

6.Sculpture and Ideas - Michael F. Andrews.

7.Modern Sculpture -Jean Selz, Heinemann, London.

8. Creative Carving ads. (Material techniques appreciation) - Dons Z.

Meilach, Pritam Publishing in the format of Posters, magazine layout, illustration animation and television

9. Bharat Ki Chitrakala (Hindi) - Rai Krishna Das

Books published by NBT

1. Pran Nath Mago Contemporary Art in India: A perspective

2.Jasleem Dhamija Indian folk Arts and Crafts

3.	Krishna Deva	Temples of North India
4.	K.R. Srinivasan	Temples of South India
5.	Alokendranath Tagore	Abhanindranath Tagore
6.	Dinkar Kaushik	Nandalal Bose
7.	Madhu Powle	Festival of Colours
8.	Badri Narayan	Find the Half Circles
9.	Ela Datta	Lines and colours
10.	Discovering Indian Art	Upinder Singh

11.Mysteries of the Past; Archeological Sites in India

12.Niranjan Ghoshal Name That Animal

13.	Devi Prasad	Art: The Basis of Education

Publications Division, Government of India

1.	Vidya Daheja	Looking Again at Indian Art

2.Panorama of Indian Painting

3.Buddhist Sculptures and Monuments.

4.	A. Gosh	Ajanta murals
5.	Z.A. Desai	Mosques of India

NCERT: Raja Ravi Varma (Hindi)

Lalit Kala Monographs

SEMESTER III

PAPER VIII : PEDAGOGY OF BIOLOGICAL SCIENCE (PART- II)

TOTAL: 100

UNIT VI: PLANNING FOR TEACHING-LEARNING OF BIOLOGICAL SCIENCE

Identification and organisation of concepts for teaching-learning of biology; Determining acceptable evidences that show learners, understanding; Instructional materials required for planning teaching-learning of biological science and learners' participation in developing them; Identifying and designing teaching-learning experiences; Planning field visits, Zoo, Sea shore life, Botanical garden, etc.; Organising activities, laboratory experiences, making groups, planning ICT applications in learning biology.

UNIT VII: LEARNING RESOURCES IN BIOLOGICAL SCIENCE

Identification and use of learning resources in biological science from immediate environmental, exploring alternative sources; Developing science kit and biological science laboratory; Designing biology laboratory; Planning and organising field observation; Collection of materials, etc.; Textbooks, audio-visual materials, multimedia-selection and designing; Use of ICT experiences in learning biological science; Using community resources for biology learning; Pooling of learning resources in school complex/block/ district level; Handling hurdles in utilisation of resources.

UNIT VIII: TOOLS AND TECHNIQUES OF ASSESSMENT FOR LEARNING BIOLOGICAL SCIENCE

Performance-based assessment; Developing indicators for performance assessment in biological sciences; Learners record of observations; Field diary, herbarium and collection of materials; Oral presentation of learners work in biological science, Portfolio; Assessment of project work in biology (both in the laboratory and in the field), Assessment of participation in collaborative learning; Construction of test items (open-ended and structured) in biological science and administration of tests; Developing assessment framework in biological science; Assessment of experimental work in biological science; Exploring content areas in biological science not assessed in formal examination system and their evaluation through various curricular channels; Encouraging teacher-learners to

examine a variety of methods of assessments in biological science; Continuous and comprehensive evaluation.

UNIT IX: BIOLOGICAL SCIENCE – LIFELONG LEARNING

Nurturing natural curiosity of observation and drawing conclusion; Facilitating learning progress of learners with various needs in biology; Ensuring equal partnership of learners with special needs; Stimulating creativity and inventiveness in biology; Organising various curricular activities, such as debate, discussion, drama, poster making on issues related to science/biology; Organising events on specific day, such as Earth Day, Environment Day, etc.; Planning and organising field experiences, Science club, Science exhibition; Nurturing creative talent at local level and exploring linkage with district/state/central agencies.

UNIT X: PROFESSIONAL DEVELOPMENT OF BIOLOGY TEACHER

Professional development programmes for science/biology teachers; Participation in seminar, conferences, online sharing membership of professional organisation; Teachers as a community of learners; Collaboration of school with colleges, universities and other institutions; Journals and other resource materials in biology education; Role of reflective practices in professional development of biology teachers; Field visits, visit to botanical garden, science park, science centre, zoo, National Laboratories etc.; Teacher as a researcher: Learning to understand how children learn science– action research in biological science.

NOTE: Suggested readings were given at the end of part I of the course.

PAPER VIII: PEDAGOGY OF PHYSICAL SCIENCE(PART II)

Total Marks: 100

UNIT VI: LEARNING RESOURCES IN PHYSICAL SCIENCE

Identification and use of learning resources in physical science from immediate environment (e.g. Natural pH Indicators, Soaps and Detergents, Baking Soda, Washing Soda, Common Salts, Fruits, Fibre, Pulleys, Projectiles, Lenses and Mirrors, Interconversion of one Form of Energy to other, Propagation of waves in Solid, Liquid and Gas etc.), exploring alternative sources; Improvisation of apparatus developing science kit and laboratory in science (secondary stage), physics and chemistry (higher secondary stage); Designing laboratories, textbooks, audio-visual materials; Multimedia–selection and designing; Use of ICT experiences in learning science/physics and chemistry; Using community resources for learning science/physics and chemistry; Pooling of learning resources in school complex/block/district level, handling hurdles in utilisation of resources.

UNIT VII: TOOLS AND TECHNIQUES OF ASSESSMENT FOR LEARNING PHYSICAL SCIENCE

Performance-based assessment, developing indicators for performance-based assessment in science/physical science, learners' records of observations, field diary; Oral presentation of learners work, Portfolio; Assessment of project work in science/physical science; Assessment of participation in collaborative learning; Construction of test items in science/physical science and administration of tests; Developing assessment framework in science/physics and chemistry; Assessment of experimental work in science/physics and chemistry; Exploring content areas in physical science not assessed in formal examination system and their evaluation through various curricular channels; Encouraging teacher-learners to examine variety of methods of assessments in science/ physical science; Continuous and comprehensive evaluation–appreciating evaluation as ongoing teaching-learning process and through overall performance of child.

UNIT VIII: PLANNING FOR TEACHING-LEARNING OF PHYSICAL SCIENCE

Identification and organisation of concepts for teaching-learning of science/ physics and chemistry (on different topics, such as Motion, Work and Energy, Matter and their

Measurements, Carbon and its Compounds, Periodic Properties of Elements, Atomic Structure, Dual Nature of Matter and Radiation, etc.) developing them; Identifying and designing teaching-learning experiences; Organising activities, laboratory experiences, making groups; Planning ICT applications in learning science/physics and chemistry.

UNIT IX: PHYSICAL SCIENCE–LIFELONG LEARNING

Every child has natural curiosity of observation and drawing conclusion; Identification and application of physical and chemical phenomenon in day-to-day life and human welfare, facilitating learning progress of learners with various needs in science/physics and chemistry; Ensuring equal partnership of learners with special needs; Stimulating creativity and inventiveness in science; Organising various curricular activities, such as debate, discussion, drama, poster making on issues related to science/ physics and chemistry; Organising events on specific day, such as Science Day, Environment Day, etc.; Planning and organising field experiences , Science club, Science exhibition, nurturing creative talent at local level and exploring linkage with district/state/central agencies.

UNIT X: PROFESSIONAL DEVELOPMENT OF SCIENCE/PHYSICS/CHEMISTRY TEACHERS

Professional development programmes for science/physics and chemistry teachers; Participation in seminar, conferences, online sharing, membership of professional organisations; Teachers as a community of learners, collaboration of schools with universities; Journals and other resource materials in science/physical science education; Role of reflective practices in professional development of physics and chemistry teachers; Field visit to industries, mines, refineries; National Laboratories, power stations, science centres; etc.; Teacher as a researcher: Learning to understand how children learn science—action research in physical science.

NOTE: Suggested readings were given at the end of part I of the course.

PAPER VIII: PEDAGOGY OF SOCIAL SCIENCES (PART II)

Total Marks: 100

UNIT VI: TEACHING-LEARNING OF HISTORY

Continuity and Change over Time and Historical Construction

This Unit seeks to introduce student-teachers to some of the seminal issues and concepts of social change in Indian and World History. It also aims to explain how historians do History and how it ought to be done in schools. It, therefore, focuses on constructivist pedagogy in History and the general competencies that children are likely to develop through the study of History. Historical Methods

Evidence, facts, arguments, categories and perspective; Distinctions between fact and opinion and between opinion, bias and perspective; Evidence-based History teaching; Primary sources and the construction of History Thinking in terms of problems for analysis in History. Social Formations in History

Different social formations in History and the periodisation of World History; The periodisation of Indian History: Ancient, medieval, modern and contemporary societies State-formation and different types of states in History Capitalism, Select Issues of Social Change in Indian History Culture, social stratification and social change in India; Caste and class in Indian society Shared religious cultures and conflicts between religious communities in India

Gender differentials and how these cut across caste and class structures as well as religious communities. (Case Study: India)

The above content may be used to understand the teaching, learning strategies and skill development in History. Interactive, constructivist and critical pedagogies in History

Going beyond the textbook; Getting children to craft little nuggets of History from primary sources Encouraging children to think from first principle in History.

The Lateral Development of Different Skills

Observation of skills relating to primary and secondary data; Observing coins, inscriptions (if available), the material remains of the past and visuals; Helping children to read passages from primary sources; Thinking about what all these sources might or might not reveal Learning to analyse critically and to argue; Observing how arguments have been made in the standard secondary sources and how these muster facts and evidences Helping children to develop oral and written expression.

UNIT VII: TEACHING-LEARNING OF POLITICAL SCIENCE DEMOCRACY, DEVELOPMENT, AND DIVERSITY

The Unit on Political Science deals with the broad themes of democracy, development, and diversity. These three interrelated themes are concerned with political, economic, and social aspects of our everyday life. The contents in this unit contain key political concepts and issues. While explaining them, teachers are expected to refer to both historical and current events, processes and personalities from India and different parts of the world. They are also expected to make references to key concepts in the disciplines of Sociology, Economics, and Geography, so as to highlight the interrelationship between Political Science and these disciplines.

What is Politics?

Political Science: Nature and scope, key concepts, current trends Elements of State: Population, Territory, Government, and Sovereignty

Forms of Government: Democratic (Liberal and Social), non-democratic, Rule of Law, Authority, Power, Legitimacy, Civil Society, Citizenship, Rights, separation of Powers, Organs of Government: Legislature, Executive, and Judiciary.

Constitutional Vision for a Democratic India .The making of the Constitution of India

Justice (with special reference to Social Justice and Empowerment) Liberty, Equality, Dignity, Socialism, Secularism (Relationship between State and Religion): Western and Indian Versions

Fundamental Rights (Prohibition of discrimination; Rights of Dalits, Tribes, minorities [Religious/Linguistic], Women and Children, the Disabled)

Directive Principles of State Policy (with special reference to welfare of the people)Fundamental Duties.

The Working of the Government

Structures and Functions of the Government at different levels Union, State/UT, District and Local Bodies (Panchayats and Municipalities)

Relationship among the three organs of the Government, Relationship between the three levels of the Government, Democratic decentralisation, citizen participation.

Society and Political Processe , Elections, political parties, pressure groups

Social movements: Dalit movement, Tribal movement, Women's movement, environmental movement; Role of media, Role of NGOs, RTI The above content may be used to understand the teaching-learning strategies and skill development in Political Science.

Teaching-learning Strategies

The teaching-learning process needs to take into account the lived experiences of student-teachers. The issues in this Unit can be introduced by referring to the relevant items from daily newspapers (e.g. instances of violation and protection of human rights). The contents are to be transacted through participatory methods involving all participants. ‘Learning by discussing’ is to be followed as a regular practice in the classroom.

Social inquiry approaches can be used in teaching, learning of Political Science. The student-teachers may be encouraged to observe actual functioning of the institutions of different local Government bodies in own district and prepare reports as group projects. They may also be encouraged to undertake field research, conduct in-depth interviews, and interpret field data and critically understand political concepts.

Teaching-learning Materials: Constitution of India, atlas, political maps (World, Asia, India, States, Districts), globe, two daily newspapers, news magazines.

UNIT VIII: ASSESSMENT FOR LEARNING IN SOCIAL SCIENCES

Characteristics of Assessment in Social Sciences: Types of questions best suited for examining/assessing/understanding the different aspect of Social Sciences; Questions for testing quantitative skills, Questions for testing qualitative analysis; Open-ended questions

.Open-book tests: Strengths and limitations ,Evaluating answers: What to look for? Assessing projects: What to look for? Continuous and Comprehensive Evaluation (CCE) in Social Sciences.

UNIT XI: ANALYSIS OF SOCIAL SCIENCES TEXTBOOKS AND QUESTION PAPERS

Analysing textbooks in Social Sciences in the light of the syllabus and from the perspective of the child (Textbooks of the same class may be taken up for all subjects in Social Sciences)

Analysing question papers of any State Board/CBSE and NCERT's textbooks in the light of the subject specific requirements in terms of understanding and skills.

UNIT X: INTER-DISCIPLINARITY THROUGH PROJECTS AND FIELD VISITS

Projects in Social Sciences should be selected keeping in view the interconnections between the various disciplines that constitute Social Sciences. The interrelationship among various aspect of Social Sciences may be visualised as follows:

Geography and Economics: Transport and communication in a region – assessing current position with reference to development needs

History and Political Science: Socio-political systems; Women's rights in society

Economics and History: Agrarian change in India; Industrialisation in India

History and Geography: Migration of people in a particular region— nature of migration, past and present trends Political Science and Geography: Sharing resources between regions/states and nations (e.g. water)

Economics and Political Science: Family budget and impact of change in prices of essential commodities.

These projects are just a few examples. Similar projects may be designed by student-teachers for better understanding of various issues.

NOTE: Suggested readings were given at the end of part I of the course.

PAPER VIII: PEDAGOGY OF LANGUAGE (ENGLISH) PART II

Total Marks: 100

UNIT VI: LANGUAGE, LITERATURE AND AESTHETICS–I

Different Creative forms of English Language: Understanding different forms of literature; Literature in the school curriculum: Needs, objectives and relevance; Role and relevance of media in school curriculum; Translation: Importance and need, Translation as a creative activity: through examples of translated texts into English from different Indian languages.

Activities

• Take three editorial pieces on the same topic from different newspapers. Have a discussion on

their language and presentation

• Take two translations of any piece of creative writing. Read these pieces and then translate the

piece yourself

• Take any creative writing related to history, e.g. Discovery of India and prepare a flow chart on

the main events

• Review any story and have a discussion in groups

• Take any piece on Geography and prepare a teaching strategy for teaching any Geographical

phenomena, e.g. climate change, water.

Teaching Practice

Take any topic of your choice and write about it in any form of creative writing.

UNIT VII: LANGUAGE, LITERATURE AND AESTHETICS–II

Teaching of Different Forms of English Literature: Poetry, Prose, Drama: The relative importance of Indian, classical, popular, and children's literature in English; Developing tasks and materials for study skills in English literary forms; The study of contemporary Indian, Asian, European and African literature; Lessons planning in prose, poetry and drama at various school levels.

Activities

- Review any two stories of your choice
- Interview any local artist/poet/writer
- Collect Indian folktales in English (translated) for your portfolio
- Prepare a newsletter on the basis of your school experience programme (hand written).

Teaching Practice

Take any creative writing, e.g. a poem or a story and develop teaching strategies to teach:

(a) same pieces for different stages; (b) understanding any creative piece at different levels; and (c) teaching the same piece to children with special needs.

Action Research

- Identify and list language (English) related errors common among students.
- Prepare a list of idioms, proverb in English
- Teaching any creative piece in the classroom on the basis of (a) level of the students

  (b) perspective
- Prepare an outline for action research on the basis of your experience of the difficulties faced during school experience programme.

UNIT VIII : DEVELOPMENT AND ANALYSIS OF SYLLABUS AND TEXTUAL

MATERIALS

Understanding the relationship between curriculum, syllabus and textbook; Selection of materials; Development of activities and tasks; Connecting learning to the world outside; Moving away from rote-learning to constructivism; Teacher as a researcher. (Develop meaningful strategies keeping in view the needs of the learners.)

Activities

Do a comparative study of one textbook of English from any class (VI to VII) developed by any two states

Prepare an outline for the development of the textbook for the same class for your state.

Project

Prepare a collection of poems and stories of your choice.

UNIT XI: TEACHING-LEARNING MATERIALS AND AIDS

Print media; Other reading materials. such as learner chosen texts, Magazines, News papers, Class libraries, etc., ICT– audio-visual aids including CALL programmes; Radio, T.V., Films; Planning co-curricular activities (discussion, debates, workshops, seminar etc.); Language labs, etc.

Activities

• Prepare a list of audio-visual aids related to teaching of English and use them wherever necessary

• Identify and prepare different types of teaching aids for children with special needs (speech impaired) Organise a workshop/seminar/conference on the topic ‘Language of Children’ or any other related topic.

Project

Prepare an outline for a school magazine Development

• The material for the school magazine based on your experiences during school experience practice (Handwritten)

• Review contemporary children’s literature

• Review any two magazines for women.

UNIT X: ASSESSMENT–ITS ROLE AND IMPORTANCE

Progress and assessment of development of language; Continuous and comprehensive evaluation; Techniques of evaluation—oral, written, portfolio; Cloze test, Self evaluation; Peer evaluation; Group evaluation.

Typology of questions; Activities and tasks (open-ended questions, MCQ, true and false etc.) reflecting—Problem solving, creative and critical thinking, Enhancing imagination and environmental awareness.

Feedback to students, parents and teachers.

Activities

- Write a report on current practices of assessment and evaluation at the Upper Primary Stage
- Analyse the question papers of English language (Previous-3 Years)— Classes X and XII (any board) in the light of new approach of assessment
- Develop a question paper for upper primary and secondary stage to assess all the aspects of language learning
- Analyse answers given by the learners for one particular question
- Select any ten questions from the Class VI English textbook which lend scope to the creativity of the learners
- Study the key points of the Ist Term assessment of any student of Class VI
- Devise a strategy to incorporate the suggestions given in the Ist CCE report for the progress of the learner.

Note

• Project Work, Students-Teacher's Portfolio, Activities, Presentations, Workshops and Educational tours to be carried out during both the years. (Some activities have been given in each Unit as examples. Such other activities may be developed as per the need. Every student has to prepare his/her own portfolio and four projects are compulsory for each year.)

NOTE: Suggested readings were given at the end of part I of the course.

PEDAGOGY COURSES (SEMESTER III)

PAPER VIII: PEDAGOGY OF MATHEMATICS (PART II)

Total Marks: 100

UNIT VI : PLANNING FOR TEACHING-LEARNING MATHEMATICS

Organisation of concepts for teaching-learning of mathematics. Stating instructional objectives, identifying learning experiences, appropriate strategies, teaching aids (Using low-cost material – preparation of various activities, such as verification of algebraic identities, surface areas and volumes of cube, cuboids, cylinder, cone, sphere, conic sections, etc.); ICT applications; Evaluation tools and learners participation in developing instructional materials, etc.

UNIT VII: LEARNING RESOURCES IN MATHEMATICS

Textbooks audio-visual multimedia–Selection and designing; Using community resources for mathematics learning, pooling of learning resources in school complex/block/district level, handling hurdles in utilising resources.

UNIT VIII: ASSESSMENT AND EVALUATION

Informal Creative Evaluation: Encouraging learner to examine a variety of methods of assessment in mathematics so as to assess creativity, problem-solving and experimentation/activity performance; Appreciating evaluation through overall performance of the child; Self and peer evaluation.

Formal Ways of Evaluation: Variety of assessment techniques and practices Assessing Product Vs Process, Knowing Vs Doing In practice of midterm/terminal examination, practising continuous and comprehensive evaluation to test regular programmes/achievements of learner.

Assessment Framework

Identifying and organising components for developing framework of question paper at different stages of learning; Framing questions based on concepts and sub concepts so as to encourage critical thinking, promote logical reasoning and to discourage mechanical

manipulation and rote learning; Framing of open-ended questions providing the scope to learners to give responses in their own words; Framing of conceptual questions from simple questions.

UNIT IX: MATHEMATICS FOR ALL

Identifying learners strength and weaknesses; Activities enriching mathematics learning – assisting learning, supplementary text material, summer programmes, correspondence course, mathematics club, contests and fairs, designing mathematics laboratory and its effective use, recreational activities—games, puzzles and riddles in mathematics, cooperative learning ensuring equal partnership of learners with special needs, stimulating creativity and inventiveness in mathematics.

UNIT X: PROFESSIONAL DEVELOPMENT OF MATHEMATICS TEACHERS

Types of in-service programme for mathematics teachers; Role of mathematics teacher's association; Journals and other resource materials in mathematics education; Professional growth—participation in conferences/seminars/workshops.

NOTE: Suggested readings were given at the end of part I of the course.

PAPER VIII

हिंदी भाषा का शिक्षण
भाग–दो
(इकाई 6–10)

कुल अंकµ100

इकाई – 6: भाषा–साहित्य और सौंदर्य – 1
(विभिन्न अभिव्यक्तियॉ भाषा की बारीकियों को जानने का सबसे अच्छा माध्यम है।)

1. सृजनात्मक भाषा के विविध रूप – साहित्य के विविध रूप को जानना, स्कूली पाठ्यक्रम में साहित्य को पढ़ना–पढ़ाना, अनुवाद कला और सौंदर्य में भाषा, स्कूली पाठ्यचर्या मे मीडिया की भूमिका, उद्देश्य प्रासंगिकता, अनुवाद का महत्व और जरूरत, सृजनात्मक अभिव्यक्ति के रूप में हिंदी अनुवाद (अंग्रेजी और अन्य भारतीय भाषाओं के सदर्भ में) चुने हुए उदाहरण के आधार पर बताया जाएगा।

गतिविधि/पोर्टफोलियो
प्रशिक्षण के दौरान

- एक ही विषय पर किन्हीं तीन अखबारों के संपादकीय की भाषा पर बातचीत कर उनकी विषय प्रस्तुति को रेखांकित करें ।
- एक ही अंश के तीन अनुवाद को पढ़ें और अपनी भाषा में नया अनुवाद प्रस्तुत करें
- समूह में बंट कर मीडिया लेखन के तीन अलग–अलग नमूनों (फीचर, रिर्पोट, लेख आदि) को इकट्ठा कर उसमें समानता और अंतर को ध्यान में रखते हुए चर्चा करें ।
- अखबार की किसी खबर के आधार पर संवाद लिखना ।

कक्षा शिक्षण के दौरान

- पानी से संबंधित पाठ पढ़ाने के बाद जलचक्र की जानकारी देना, पानी की बचत पर बातचीत, जल की तरल अवस्था से ठोस अवस्था का हल्का होने के कारण का पता लगाने का कार्य करवाना

इकाई – 7: भाषा साहित्य और सौंदर्य – 2
साहित्यिक अभिव्यक्ति के विविध रूप – कविता को पढ़ना–पढ़ाना, **गद्य** की विविध विधाओं को पढ़ना–पढ़ाना, **नाटक** को पढ़ना–पढ़ाना, समकालीन साहित्य की पढ़ाई (बाल साहित्य, दलित साहित्य, स्त्री
साहित्य) हिंदी के विविध विधाओं के आधार पर गतिविधियों का निर्माण, कविता, कहानी, नाटक, निबंध,
उपन्यास की पाठ विधि तैयार करना।

गतिविधि/पोर्टपफोलियो
प्रशिक्षण के दौरान

- एक कहानी का चार अलग–अलग समूह द्वारा विश्लेषण और उसकी प्रस्तुति

- सभी विद्यार्थी किसी एक रचना की समीक्षा करें तथा एक–दूसरे की समीक्षित बिंदुओं पर कक्षा में चर्चा करें
- समूह में एक ही विषय पर अलग–अलग विधओं की रचनाओं का संकलन और उनका तुलनात्मक विश्लेषण
- वर्तमान बाल साहित्य की समीक्षा
- अपनी मनपसंद तीन कहानियों की समीक्षा

कक्षा शिक्षण के दौरान

- बच्चों से एक ही विषय जैसे 'बादल' पर स्वतंत्रा रूप से कुछ लिखने को कहें (कोई विधा न सुझाएँ).
- रचना को जानें और कक्षा विशेष को ध्यान में रखते हुए कक्षा प्रविधि तैयार करें (किसी एक रचना को सुनकर)
- (क) एक रचना अनेक स्तर ;अलग–अलग कक्षाओं में एक ही रचना को पढ़ाने से संबंधित)
- (ख) एक रचना अनेक अर्थ (अलग–अलग नजरिये से एक ही रचना को पढ़ना)
- (ग) एक रचना विभिन्न बच्चे (संदर्भः चुनौतीपूर्ण बच्चे)
- कोई नाटक या उपन्यास पढ़वाने के बाद उसके पात्रों के रहन–सहन, बोली आदि की चर्चा कर समाज में इनमें आए बदलाव पर चर्चा करना, विभिन्न व्यवसाय तथा व्यवसाय से जुड़े लोगों, उनके कार्यो, समस्याओं पर बातचीत
- कक्षा छह हिंदी की पुस्तक में से झांसी की रानी कविता, नौकर (निबंध) पाठ के बाद –1857 के पहले, दौरान और बाद में घटी घटनाओं का टाइम लाइन (चार्ट) बनाना, गांधी जी के जीवन की महन्वपूर्ण घटनाओं का टाइम लाइन (चार्ट), गांधी जी द्वारा चलाए गए आंदोलनों का टाइम लाइन (चार्ट)

परियोजना कार्य

- (क) विद्यालयी अनुभव कार्यक्रम के दौरान भाषा शिक्षण को लेकर आने वाली कठिनाई पर क्रियात्मक शोध
- (ख) भाषा की कक्षा में उन अनुभवों को पिरोते हुए शिक्षण योजना बनाना स्थानीय कलाकार/कवि/लेखक से साक्षात्कार
- कक्षा 6 से 12 तक की हिंदी की पाठ्यपुस्तकों में से किसी एक कविता को चुनकर परिवेश से जोड़ते हुए उसवेफ शिक्षण बिंदु तैयार करना

इकाई – 8: पाठ्यक्रम और पाठ्य–सामग्री का निर्माण और विश्लेषण

(पाठ्यपुस्तक शिक्षण का एक साधन है, एकमात्रा साधन नहीं)

पाठ्यचर्या और पाठ्यक्रम एक पाठ्य–सामग्री अनेक – पाठ्यचर्या, पाठ्यक्रम तथा पाठ्यपुस्तकों का संबंध, पाठ्यक्रम को बच्चों के अनुरूप ढालना (शिक्षण को स्कूल के बाहरी जीवन से जोड़ते हुए तथा रटंत–प्रणाली का निषेध करते हुए सामग्री चयन, गतिविधि और अभ्यास सामग्री का निर्माण), शोधकर्ता के रूप में शिक्षक (अलग–अलग बच्चों की आवश्यकताओं को ध्यान में रखते हुए)

गतिविधि/पोर्टपफोलियो

प्रशिक्षण के दौरान

☐ नवीन पाठ्यचर्या की समीक्षा और प्रस्तुतीकरण (समूह कार्य)

(क) नवीन पाठ्यचर्या में भाषा शिक्षण से संबंधित अध्याय पर चर्चा

(ख) नवीन पाठ्यचर्या में भाषा शिक्षण से संबंधित अध्याय का विश्लेषण और प्रस्तुतीकरण (समूह)

☐ 'बच्चे की भाषा' या ऐसे अन्य किसी विषय पर एक संगोष्ठी आयोजित करें

परियोजना कार्य

- विभिन्न राज्यों के हिंदी के पाठ्यक्रम का विश्लेषण और प्रस्तुतीकरण (समूह कार्य)
- अपनी मनपसंद कहानियों का संकलन तथा उनसे संबंधित लेख
- किन्ही दो राज्यों द्वारा विकसित किसी भी एक (6 से 12) कक्षा की हिंदी की पाठ्यपुस्तक का तुलनात्मक अध्ययन

इकाई – 9: सहायक शिक्षण सामग्री

प्रिंट मीडिया तथा अन्य पाठ्य सामग्री जैसे बच्चे द्वारा चुनी गई सामग्री, पत्रिकाएँ, अखबार, कक्षा–पुस्तकालय आदि, आई.सी.टी. – दृश्य – श्रव्य सामग्री, रेडियो, टेलीविज़न फ़िल्में, भाषा प्रयोगशाला, सहसंज्ञानात्मक गतिविधियों की रूपरेखा (चर्चा, वादविवाद, खेल, कार्यशालाएँ, गोष्ठी आदि)

गतिविधि/पोर्टपफोलियो

प्रशिक्षण वेफ दौरान

- अपनी मनपसंद कविताओं का संकलन तथा उन पर एक लेख
- हिंदी की किन्ही दो महिला/बाल पत्रिकाओं की समीक्षा
- सीमित संसाधनों में ऑडियों/वीडियों कार्यक्रम के कक्षा में इस्तेमाल की योजना बनाना
- अपने क्षेत्र में प्रचलित लोककथा, लोकगीतों का समूह में बॅटकर संकलन तैयार करना

कक्षा शिक्षण के दौरान

- चुनौतीपूर्ण बच्चों को ध्यान में रखते हुए दो सहायक शिक्षण सामग्री तैयार करना
- विद्यालयी अनुभव कायक्रम के दौरान विद्यार्थियों से हस्तलिखित पत्रिका का विकास या हस्तलिखित पत्रिका की रूपरेखा तैयार करवाना
- विद्यालयी अनुभव कार्यक्रम के दौरान विद्यार्थियों द्वारा हस्तलिखित समाचार–पत्र का विकास करवाना

इकाई – 10: आकलन की भूमिका और महत्व

(मूल्यांकन की भूमिका बच्चों की मौलिकता और भाषा प्रयोग में उनकी सृजनात्मकता को पैना बनाना है।)

1. **भाषा विकास की प्रगति का आकलन**– सतत् और समग्र मूल्यांकन, स्वमूल्यांकन, आपसी मूल्यांकन, समूह मूल्यांकन, पोर्टपफोलियो
2. **प्रश्नों का स्वरूप, प्रश्नों के आधार बिंदु** – समस्या समाधन संबंधी प्रश्न, सृजनात्मक चिंतन वाले प्रश्न, समालोचनात्मक चिंतन वाले प्रश्न, कल्पनाशीलता को जीवित करने वाले प्रश्न, परिवेशीय सजगता वाले प्रश्न, गतिविधि और टास्क (खुले प्रश्न, बहुविकल्पी प्रश्न)
3. **फीडबैक (**विद्यार्थी, अभिभावक और अध्यापक **और रिपोर्ट**

गतिविधि/पोर्टपफोलियो

प्रशिक्षण के दौरान

- दसवीं और बारहवी कक्षा के किसी भी बोर्ड की परीक्षाओं के हिंदी के प्रश्नपत्रों (पिछले तीन वर्षों) की समीक्षा करें
- एक ही सवाल पर बच्चों द्वारा अलग–अलग आए जवाबों पर समूह में चर्चा करें
- कक्षा 6 से 12 तक की हिंदी की पाठ्यपुस्तकों में से ऐसे दस प्रश्न छांटे जिनमें भाषा मूल्यांकन का सृजनात्मक रवैया परिलक्षित होता है (समूह कार्य)

कक्षा शिक्षण के दौरान

(क) कक्षा छह के किसी बच्चे की प्रथम त्रैमासिक आकलन रिपोर्ट में दिए गए सुझावों का अध्ययन करना

(ख) इन सुझावों का बच्चे के भाषायी विकास में इस्तेमाल करने के लिए युक्तियॉ सुझाना

परियोजना कार्य

- उच्च प्राथमिक स्तर पर आकलन एवं मूल्यांकन की मौजूदा प्रक्रिया पर रिपोर्ट तैयार करें

- एन सी ई आर टी द्वारा प्रकाशित आकलन स्रोत पुस्तिका भाषा हिंदी पढें तथा इसमें आए आकलन संबंधी क्रियाकलापों को कक्षा 6 से 12 के अनुरूप विकसित करते हुए एक संक्षिप्त लेख लिखें

सीखने सिखाने की प्रक्रिया में अध्यापकों की भूमिका एक सहायक और मित्र की होगी। अध्यापकों के सामने यह चुनौती होगी कि वह हरेक विद्यार्थी से एक तरह की सृजनात्मक क्षमता (उनर भी) की अपेक्षा न करें)

नोट

परियोजना कार्य, विद्यार्थी और अध्यापक के पोर्टपफोलियो, गतिविधियॉ, चर्चा–परिचर्चा. प्रस्तुतियॉ, कार्यशाला,टूर (नमूने के तौर पर कुछ गतिविधियॉ इत्यादि प्रत्येक इकाई के साथ दी गई हैं। ऐसी अन्य गतिविधियॉ स्वयं भी तैयार कर सकते हैं। प्रत्येक विद्यार्थी को अपना पोर्टपफोलियो तैयार करना है तथा प्रत्येक वर्ष चारपरियोजना कार्य करने अनिवार्य हैं

TEACHER ENRICHMENT (SEMESTER III)

PAPER IX – ASSESSMENT IN LEARNING

Objectives

The course will enable student-teachers to

- gain a critical understanding of issues in assessment and evaluation(from a constructivist paradigm) become cognisant of key concepts, such as formative and summative assessment, evaluation and measurement, test, examination;
- be exposed to different kinds and forms of assessment that aid student learning;
- become the use of a wide range of assessment tools, and learn to select and construct these appropriately; and
- evolve realistic, comprehensive and dynamic assessment procedures that are able to keep the whole student in view;

Course Outline

UNIT 1: OVERVIEW OF ASSESSMENT AND EVALUATION

• Perspective on assessment and evaluation of learning in a constructivist paradigm
• Distinction between 'Assessment of Learning' and 'Assessment for Learning'
• Purposes of assessment in a 'constructivist' paradigm:
(i) To engage with learners' minds in order to further learning in various dimensions.
(ii) To promote development in cognitive, social and emotional aspects.
• Critical review of current evaluation practices and their assumptions about learning and development
• Clarifying the terms
(i) assessment, evaluation, test, examination, measurement
(ii) formative and summative evaluation
(iii) continuous and comprehensive assessment
(iv) grading.

UNIT 2: WHAT IS TO BE ASSESSED?

• Dimensions and levels of learning
• Retention/recall of facts and concepts; Application of specific skills
• Manipulating tools and symbols; Problem-solving; applying learning to diverse situations
• Meaning-making propensity; Abstraction of ideas from experiences; Seeing links and relationships;
Inference; Analysis; Reflection
• Originality and initiative; Collaborative participation; Creativity; Flexibility
• Contexts of assessment ;Subject-related ;Person-related

UNIT 3: ASSESSMENT OF SUBJECT-BASED LEARNING

• Enlarging notions of 'Subject-based Learning' in a constructivist perspective
• Assessment tools
• Kinds of tasks: projects, assignments, performances
• Kinds of tests and their constructions
• Observation of learning processes by self, by peers, by teacher

• Self-assessment and peer -assessment
• Constructing portfolios Quantitative and qualitative aspects of assessment: Appropriate tools
for each.

UNIT 4: TEACHER COMPETENCIES IN EVOLVING APPROPRIATE ASSESSMENT
TOOLS

• Visualising appropriate assessment tools for specific contexts, content, and student
- Formulating tasks andquestions that engage the learner and demonstrate the process of thinking; Scope for original responses

• Evolving suitable criteria for assessment
• Organising and planning for student portfolios and developing rubrics for portfolio assessment
• Using assessment feedback for furthering learning.

UNIT 5: DATA ANALYSIS, FEEDBACK AND REPORTING

• Feedback as an essential component of formative assessment
• Use of assessment for feedback; For taking pedagogic decisions
• Types of teacher feedback (written comments, oral); Peer feedback
• Place of marks, grades and qualitative descriptions
• Developing and maintaining a comprehensive learner profile
• Purposes of reporting: To communicate
• Progress and profile of learner
• Basis for further pedagogic decisions
• Reporting a consolidated learner profile.

Suggested readings:

- Asthana, Biptn & Agrawal, R. N. : Mapan ewam moolyankan. Vinod Pustak Mandir, Agra.
- Asthana, Bipin and Agrawal, R. N. : Measurement and Evaluation In Psychology and Education, Vinod Pustak Mandir, Agra
- Bhagwan, Mahesh : Shiksha mein Mapan ewam moolyannkan, Vinod Pustak Mandir Agra
- Lindeman, R. H. annd Merenda, P.F. : Educational Measurement, Scott foreman & Com-pany, London,
- Rawat, D.L. : Shaikshlk Mapan ki Naveen Rooprekha, Gaya Prasad and Sons, A9ra
- Sharma, R. A. : Measurement and Evaluation In Education and psychology, Lyall Book Depot Merrut
- Sharma Shiksha tatha Manovigyan nain mapan Evam moolyankan. Lyall Book

Depot
Merrut.

- Verma R.S.: Shaikshik Moolyankan. Vinod Pustak Mandir. Agra.
- CBSE Grading system

CONTEMPORARY STUDIES (SEMESTER IV)

PAPER X – GENDER, SCHOOL AND SOCIETY

COURSE OBJECTIVES:

1. Understanding the role of culture (apart from biology) as determinants of gender distinction in social living
2. Awareness of factors that shape gendered roles in Indian society
3. Understand the problems of girl child education in our society
4. Developing a critical perspective on gender-based discrimination and its effects
5. To provide an introduction to and the development of an understanding of feminist approaches to the social and cultural construction of gender.
6. To develop a critical understanding of inter sectionality, including an awareness of gender and its complex intersections with other social and cultural categories, including but not limited to caste, tribe, class, sexuality and ability.
7. To equip the teacher with the ability to create more meaningful and gender just experiences for her students

CONTENT

Unit I: Gender: Key Concepts - Social Construction of Gender

i. Examining one's own growing up as a boy or a girl
ii. Gender, sex, sexuality, patriarchy, masculinity and feminism
iii. Gender bias, gender roles and stereotyping, and its consequences
iv. Gender and other forms of inequality in relation with (caste, class, ethnicity, disability etc)
v. Female sex ratio and child sex ratio.

Unit II: Gender and Schooling

i. Schooling of girls (literacy rate, drop out rate, completion rate etc) and reasons why girls are not able to complete schooling
ii. Why do girls feel uncomfortable in schools?
iii. Can schools be different so that more girls can be educated?
iv. Gender bias in curriculum, textbooks, analysis of hidden curriculum
v. Critical examination of school and classroom processes– challenging gender biases and stereotypes
vi. Understanding relationships within the school – child-child, teacher-child and teacher peer group relationships from the perspective of gender
vii. Feminization of teaching profession

Unit III: Gender and Sexuality

i. Understanding sexuality (sexual orientation and sexual identity – third gender) and the relationship between power and sexuality

ii Violence against women - empirical examples of the graded violence against women, the impact of conflict and violence on the lives of women, efforts to deal with the issue of violence against women

iii Legal (sexual and reproductive) rights of women

Unit IV: Psychological and Sociological Perspectives

i. Radical Feminist
ii. Socialist-Feminist
iii. Psychoanalytical and other perspectives
iv. Recent debates

Unit V: Strategies for Change

i. Policy and management
ii. In the school
iii. Women's action groups
iv. Mass media

Suggested themes for transaction of the content (Group discussions and review of case studies etc.)

i. Telling our own 'gendered' stories
ii. En-culturing 'gendered' roles in upbringing within different kinds of families – case studies
iii. Gender issues in school education – case studies
iv. Gender issues manifest in contemporary public spaces – case studies
v. Responding to various forms of gender discrimination

Suggested Readings

1. Gender Analysis of State Policies: A case study of Chhattisgarh, Dr. Sen Ilina
2. Towards Gender Equality in Education: Progress and challenges in Asia-Pacific Region, R. Govinda, National University of Educational Planning and Administration,New Delhi.
3. Bhattacharjee, Nandini (1999) Through the looking-glass: Gender Socialisation in a Primary School in T. S. Saraswathi (ed.) *Culture, Socialization and HumanDevelopment: Theory, Research and Applications in India*. Sage: New Delhi.
4. Geetha, V. (2007) *Gender*. Stree: Calcutta.
5. Ghai, Anita (2008) Gender and Inclusive education at all levels In Ved Prakash & K.Biswal (ed.) *Perspectives on education and development: Revising Education commission and after,* National University of Educational Planning and Administration: New Delhi
6. Jeffery, P. and R. Jefferey (1994) Killing My Heart's Desire: Education and Female Autonomy in Rural India. in Nita Kumar (ed.) *Women as Subjects: South Asian Histories.* New Delhi:

7. Learning, Livelihoods, and Social Mobility: Valuing Girls' Education in Central India, Peggy Froerer, Brunnel University, Anthropolgy and Education.

TEACHER ENHANCEMENT COURSE (SEMESTER IV)

PAPER XI – LANGUAGE PROFICIENCY

ch-,M- lseslVj **IV**

fo"k;& Hkk"kk izoh.;rk vad&50

;wfuV & 1 Hkk"kk dh izd`fr (Weightage – 2questions 5 marks each)
& Hkk"kk D;k g\
& fgUnh Hkk"kk dh izd`fr
& fgUnh Hkk"kk dh fo'k"krk,¡
& vko';drk vkSj egRo

;wfuV & 2 Hkk"kk dh mi;ksfxrk (Weightage 5 Questions 3 marks)
& Hkk"kk #ikUrj.k ds fu;e
& lkjys[ku
& i= ys[ku ¼vkSipkfjd] vukSipkfjd½
& vifBr x|ka'k
& izfronu ¼jiV½

;wfuV & 3 O;ogkfjd O;kdj.k (Weightage 25 Questions 1 marks each)
& lfU/k vkSj lekl
& lekl
& okD; jpuk
& eqgkojs vkSj yksdksfDr;k¡
& lekukFkhZ ,oa Ik;kZ;okph 'kCn

Semester – IV[B.Ed]

Language proficiency [English Language] [50 Marks]

Unit –I[Nature of Language] (Weightage – 2questions 5 marks each)

- What is Language?

- ❖ Nature of English Language
- ❖ Need and Importance of English language

Unit II [Utility of language] (Weightage 5 Questions 3 marks)

- ❖ Translation: Rules of translation
- ❖ Precis writing
- ❖ Letter writing : formal, informal letters
- ❖ Comprehension
- ❖ Report writing

Unit III [Grammar] (Weightage 25 Questions 1 marks each)

- ❖ Articles (Definite & Indefinite)
- ❖ Tenses (Present, Past, Future)
- ❖ Parts of Speech
- ❖ Antonyms, Synonyms
- ❖ Modals

ELECTIVE GROUP- II (SEMESTER IV)

PAPER XII

Marks 100

Note : Any one elective is to be chosen from the options.

(D) COMPUTER EDUCATION
(E) INCLUSIVE EDUCATION
(F) TEACHING OF VALUES

XII (D) COMPUTER EDUCATION

COURSE OBJECTIVES:
To enable th teacher-trainees:

1. To appreciate the role of computer education in the context of modern technological society,
2. To develop understanding of computers and their application in education,
3. To acquire sufficient knowledge of handling computers with a view to impart computers independently at school level,
4. To use computer based learning packages and organize effective classroom instructions,
5. To acquire necessary skills in using of modern word processing software,

6. To develop skills of creating and managing simple databases and handling of computers

SYLLABUS

UNIT – I

- Importance of information technology
- Classification of computers by technology, type and size.
- Uses and scope of computers
- Fundamentals of computers.
- Input/output devices,
- Central processing unit storage devices,
- Operating systems
- Application software.

UNIT – II

Over view of Modern Operating Systems:

- Files and folders
- Use of pointing devices
- Cut and paste
- Shortcuts to applications
- Use and exploring the contents of storage devices- flippy disk, drives, hard discs,CD ROM etc.
- Running applications and exiting applications.

UNIT – III

Modern word processing applications:

- Importance of word processing in education
- Charecteristics of modern word processing applications
- Toolbars and menu
- Text and objects
- Text entry-Running text and paragraphs
- Formatting text- Bold, Italics, Centre and right, justification, changing font and font size, bullets and numbering.
- Editing text- select text, find and replace, cut,copyand paste.
- Editing document- Applying styles, spell check, hearders and footers, footnotes,pagination, subscript and superscript.
- Insertion of objects, pictures, symbols, fields, page break and section,
- Page setup – Margins, paper size, and layout, printing and saving documents.

UNIT – IV

Modern data base management applications:

- Importance of data base management in education,
- Charecteristics of modern data base management applications,
- Concept of relational data base management system,
- Fields name, Type , Width
- Databases,

- Forms,
- Reports.

UNIT – V

Computers for joyful learning:

- Need for joyful learning,
- Computers as an aid for joyful learning,
- Computer games,
- Multimedia capabilities of modern desk top computers,
- Internet-importance and need,
- Use of interactive and educational software.

Assignments:

1. Write an essay on any topic using word-processing software. Document must include at least three of the following characteristics.
    - Pagination
    - Header
    - Two different paragraph styles
    - Two different fonts,
    - A picture object
    - Bullets and numbering
    - Subscript and super script
    - Symbols or special characters.

2. Use relational database management software for any one of the following activities:
    - Developing question bank
    - Developing a data base for either students or staff including various fields like name, date of birth, date of joining, admission, salary/grade obtained etc.
    - Automated printing of salary statement/ GPF deduction statement or any other administrative activity.

References :

1. Admas, D.M; Computer and Teachewr Training.
2. Bhatnagar,S.C.& Ramani,K.V; Computers and Information management.
3. CO-ROM-Titles available at cyber media 35 (4bays)Echelon Institutional area, sector 32, Gurgaon 122002.
4. Desai, B; Database Management system.
5. Rajaram, V; Fundamentals of computers, Prentice Hall of India, new delhi.
6. SAM's Teach Yourself Office 97 in 24 hrs., Prentice Hall of India, new delhi.
7. Shelly, John and Hunt Roger; Computer studies-first course (second edition), A.H.Wheeler & Co., Delhi.
8. Windows 96: simplified. Complex publishing, New Delhi.
9. Windows 98; No experience required, BPB Publications, New Delhi.

XII (E) INCLUSIVE EDUCATION

Total Marks: 100

Aims of the Course

The students will be able to

- demonstrate knowledge of different perspectives in the area of education of children with disabilities;
- reformulate attitudes towards children with special needs;
- identify needs of children with diversities;
- plan need-based programmes for all children with varied abilities in the classroom;

- use human and material resources in the classroom;
- use specific strategies involving skills in teaching special needs children in inclusive classrooms;
- modify appropriate learner-friendly evaluation procedures;
- incorporate innovative practices to respond to education of children with special needs;

- contribute to the formulation of policy; and
- implement laws pertaining to education of children with special needs.

Course Outline

UNIT 1: PARADIGMS IN EDUCATION OF CHILDREN WITH SPECIAL NEEDS

Historical perspectives and contemporary trends

Approaches of viewing disabilities: The charity model, the bio centric model, the functional

model and the human rights model

Concept of special education, integrated education and inclusive education; Philosophy of inclusive education.

UNIT 2: LEGAL AND POLICY PERSPECTIVES

Important International Declarations/Conventions/Proclamations – Biwako Millennium Framework (BMF, 1993-2012); Recommendations of the Salamanca Statement and Framework of Action, 1994; Educational Provisions in the UN Convention on the Rights of Persons with Disabilities (UNCRPD), 2006;

Constitutional Provisions; The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 (PWD Act); The Rehabilitation Council of India Act, 1992 (RCI Act); and The National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation and Multiple Disabilities Act, 1999; RTE Act, 2009.

National Policy – Education of Students with Disabilities in the National Policy on Education, 1968, 1986, POA(1992); Education in the National Policy on Disability, 2006.

Programmes and Schemes of Education of Children with Disabilities:

Centrally- Sponsored Scheme for Integrated Education for the Disabled Children (IEDC), 1974; PIED (1986) and District Primary Education Programme (DPEP); Scheme for Inclusive Education for the Disabled Children (IEDC, 2000), Education of Special Focus Groups under the *Sarva Shiksha Abhiyan* (SSA, 2000); Goals and Strategies in the Comprehensive Action Plan for Including Children and Youth with Disabilities in Education, MHRD, 2005, Scheme of Inclusive Education for the Disabled at Secondary School (IEDSS, 2009).

Special Role of Institutions for the Education of Children with DisabilitiesRehabilitation Council of India, National Institutes of Different Disabilities, Composite Regional Centres (CRCs), District Disability Rehabilitation Centres (DDRCs); Structures like BRCs, CRCs under SSA, National Trust and NGOs.

UNIT 3: DEFINING SPECIAL NEEDS

Understanding diversities–concepts, characteristics, classification of children with diversities
(Visual Impairment, Hearing Impairment, Specific Learning Difficulties, Locomotor and Neuromuscular
Disorders, Mental Retardation, Autism, Leprosy Cured Persons,

Mental Illness and Multiple Disabilities)

- Special needs in terms of the curriculum in the context of different disabilities and their learning styles
- Concept of an inclusive school – infrastructure and accessibility, human resources, attitudes to disability, whole school approach
- Community-based education.

UNIT 4: INCLUSIVE PRACTICES IN CLASSROOMS FOR ALL

- School's readiness for addressing learning difficulties
- Assessment of children to know their profile
- Technological advancement and its application – ICT, adaptive and assistive devices, equipments and other technologies for different disabilities

- Classroom management and organisation
- Making learning more meaningful—Responding to special needs by developing strategies for differentiating content, curricular adaptations, lesson planning and TLM
- Pedagogical strategies to respond to individual needs of students: Cooperative learning strategies in the classroom, peer tutoring, social learning, buddy system, reflective teaching, multisensory teaching, etc.

- Supportive services required for meeting special needs in the classroom — special teacher, speech therapist, physiotherapist, occupational therapist,

and counsellor

- Development and application of learner -friendly evaluation procedures; Different provisions for examination by CBSE and the board in their State
- Documentation, record keeping and maintenance.

UNIT 5: DEVELOPING SUPPORT NETWORKS

- Addressing social climate of the classroom
- Child-to-child programme
- Developing partnerships in teaching: Teacher and special teacher; Teacher and co-teaching personnel; Parents as partners – developing positive relationships between school and home
- Involving community resources as source of support to teachers
- Involving external agencies for networking – setting up appropriate forms of communication with professionals and para professionals
- Liaising for reciprocal support of pre-school programmes, pre-vocational training programmes, social security, different provisions, concessions, etc.

Books Recommended:

1. Bender, W.N. Learning Disability, Allyn & Bacon, Simon and Schuster, 1995, Boston London

2. Berdine, W.H & Blackhurst A.E.(eds). An Introduction to Special Education, Harpers Collins Publishers, Boston 1980.

3. Dunn., L & Bay, D.M (ed.): Exceptional Children in the Schools, New York : Holt, Rinehart, Winston.

4. Hallahar, D.P & Kauffman, J.M., Exceptional Children: Introduction to Special Education, Allyn & Bacon, Massachusetts, 1991

5. Hewett, Frank M. & Foreness Steven R., Education of Exceptional Learners, Allyn & Bacon, Masachusetts, 1984.6. Jorden, Thomes E. The Exceptional Child, Ohio: Merrill.

7. Kirk, S.A & Gallagher J.J., Education of Exceptional Children ; Houghton Mifflin Co., Boston, 1989

8. Magnifico, L.X: Education of the Exceptional Child, New York, Longman.

9. Shanker, Udey: Exceptional Children, Jullundur: Sterling Publications.

10. Singh, N.N and Beale, I.L. (eds.) Learning Disabilities – Nature, Theory and Treatment Spring-Verlag, New York, Inc:1992.

11. Smith, C.R, Learning Disabilities – the interaction of Learner, Task and Setting. Allyn and Bacon, Massachusetts, 1991.

12. Strange, Ruth : Exceptional Children & Youth J.J. : Prentice Hall.

XII (F) TEACHING OF VALUES

Course Objectives

1. To understand the nature and sources of nature, and disvalues.
2. To understand the classification of values under different types.
3. 1:0 appreciate educational values like democratic, secular, and socialist.

Unit – I

- Nature and sources of values, biological, psychological, social and ecological determinants of values – their bearing on education in varying degrees.

Unit – II

- Classification 01 values into various types, material, social, moral and spiritual values; status of values, how can these be realized through education.

Unit – III

- Corresponding to values there are evils or dis-values- material, social, economic, moral and religious evils leading to faithlessness and irreverence; how can education overcome these negative values.

Unit – IV

- Levels of values realization, how to resolve the conflicts among values, how to work for the intergration of values of values that are embedded in education.
- Development of values as a personal and life-long process-teaching of values as an integral part of education.

Unit – V

- Evaluating that teachers and other school personnel are value laden, students and parents are value laden, curriculum is value laden Evaluate.
- Value of self-sacrifice vs value of selg centredness.
- Values of excellence vs values of eco-centralism.
- Values of work vs values of selfishness.
- Every teacher or all teacher need to teach values.

Reference:

1. Hassh, I R.H. Miller. J.R & fieding, G.D,: Models of moral Education, An Appraisal, Lorigman Inc New York.
2. Passi, B.K. & Singh, p.: Value Education, National Psychological Corporation. Agra.
3. Laths, L.E., Menu Harmins & Sydney. S.: value and Teaching, Menhill, Ohio.
4. Roclceach, M.: The Nature of human Values. Coiler McMilon Publisher, London.
5. Frank &. JR. : How to teach Value: Art. Analytical Approach Prentice Hall, New Jersey.

Pt. RaviShankar Shukla University , Raipur

Bachelor of Education

Internship Guide

Description of Roles

Interns are students who is a graduate in their subject major, and are spending a four month working with experienced mentor teachers on their teaching practice while taking graduate courses in the Teacher Education department.

Mentor Teachers are experienced school teachers who mentor interns. They provide guidance, insight and opportunities for supported practice.

Supervisors work with school administrators/ Mentors to determine school experience for interns, mediate in difficult situations, and oversee interns' progress in schools and with respect to program requirements. They are faculty who organize campus based lectures and seminars in each subject area. They provide supervision and guidance for the interns in and out of the campus.

Intern Responsibilities

Interns are students of teaching. In contrast to traditional student teaching programs, interns are not expected to begin the year ready to teach on their own. Instead, they are expected to engage in observations, co-planning and co-teaching with their mentor teachers and to build their capacity toward assuming responsibility for extended lead teaching during the semester.

Interns are in a period of transition from students to professional teachers. During this transition, they must retain the perspective of a learner as they take on the new and unfamiliar role of a teacher. Interns are expected to take an active role in their own learning and to contribute to the learning of fellow interns.

Planning and Communication

- Keep supervisor informed about classroom schedules and events
- Direct questions or concerns to supervisors or mentor

- Schedule observations and conferences with the mentor and inform supervisor of changes promptly
- Meet regularly with the mentor to discuss planning for instruction
- Prepare written lesson and unit plans according to both mentor teacher and supervisor's expectations
- Arrange to share all plans and materials with the mentor in a timely way, to allow for feedback before using them
- Keep the focus class binder up to date with plans and materials and ensure that it is accessible to the mentor and supervisor at all times
- Engage in reflective diary writing or other communication forums required by mentors and/or supervisors
- Provide mentor/supervisor with copies of plans and materials
- Confer regularly with the mentor teacher and supervisor about progress and concerns

Professional Activities

- Prepare for and participate in seminars
- Participate in orientation activities, faculty meetings and other school events
- Initiate introductions to school faculty, staff and administrators
- Maintain accurate contact information for mentor teacher(s) and supervisor
- In case of absence, inform everyone affected promptly, i.e. prior to the absence
- Comply with the school absence policies and have substitute teacher plans available if scheduled to teach lessons during the absence
- Comply with the internship attendance policy
- Dress professionally
- Comply with the Professional Conduct policy
- Consult mentor teacher and supervisor about the work schedule for any part time job and arrange a mutually acceptable schedule

Personal Learning

- Take initiative in asking questions, searching out resources, inviting feedback and creating opportunities to learn.
- Reflect on teaching and learning through discussions and assignments
- Prepare a professional portfolio (reflective diary)

- Observe teachers and students carefully, taking notes and asking questions
- Study and participate in the formation and maintenance of a classroom learning community
- Begin the year co-planning and co-teaching lessons and activities, moving toward independent planning and teaching as the year progresses

Mentor Teacher Responsibilities

Planning and Communication

- Negotiate with intern and supervisor a sequence of intern responsibilities in accordance with the program standards
- Provide intern with an outline or list of topics intern will be responsible for teaching, allowing extra time for intern to locate resources, plan, receive feedback from mentor teacher and supervisor, and revise
- Establish regular times to confer with the intern about unit planning and provide support for identifying big ideas and appropriate curriculum materials
- Help identify places in the curriculum where the intern can try out ideas learned in seminars
- Confer regularly with the supervisor about progress and concerns
- Participate in all school activities from morning assembly to evening assembly

Supporting Intern Learning

- Facilitate and monitor intern's progress from observation to co-planning and co-teaching to lead teaching
- Guide the intern through daily school-based experiences such as working with other teachers, dealing with classes on an assembly day, etc.
- Provide appropriate, classroom-based learning opportunities throughout the year.
- Work with intern as a co-teacher as soon as possible, sharing decisions and observations
- Observe intern's teaching and help the intern think about student understanding, alternative approaches, grouping, management, etc.
- Provide interns with oral and written feedback about their teaching, including written feedback

- Reflect with the intern about teaching, student learning and ideas and strategies studied in seminars.

Assessment

- Participate in assessment conferences
- Write and submit an Exit Performance Description at the end of the internship programme
- Help interns think about their careers as educators and assist with reviewing portfolios, videotaping, writing letters of recommendation, etc.

Supervisor Responsibilities

Meetings, Observation Visits, and Assessments

- Provide copies of written assessments to interns and mentor teachers
- Conduct five feedback sessions with the intern and mentor teacher, at the appropriate point of time
- Prepare participants for sessions by explaining what to bring and topics to discuss
- Make at least five observation visits during a week
- Prepare written assessments prior to feedback sessions, using the appropriate forms for your intern's subject area, and provide copies for the intern and mentor teacher at the conference
- Write and submit an Exit Performance Description at the end of the internship programme

Communication

- Facilitate communication among interns, mentor teachers and others involved with the internship
- Communicate regularly with each intern, at least every other day
- Communicate regularly with each mentor teacher
- Communicate regularly, as scheduled, with subject area leaders about interns' progress and problems
- Provide the intern and mentor teacher with detailed notes and written feedback about observation visits
- Make sure intern and mentor clearly understand expectations and program standards

- Keep informed about program developments and pass this information on to interns and mentors promptly
- Know where to direct questions and relay answers as soon as possible

Support of Intern Learning by the supervisor

- Observe the intern's teaching and confer about the planning and teaching of each observed lesson
- Provide constructive written and oral feedback for each observed lesson
- Identify the intern's specific needs and work on them with the intern and mentor teacher
- Inform subject area leader about problems promptly
- Help interns to develop their portfolios by giving feedback on materials, assisting with videotaping, etc. Records
- Keep notes of all observation visits including date, progress observed, suggestions made and actions taken
- Keep notes of all communication with interns and mentor teachers
- Keep examples of intern work indicative of progress or problems
- Keep copies of all written assessments and professional development plans
- Submit evaluation reports and professional development plans to the department head

This highlights the intern's field experience that contribute to the overall design of the internship year experience. In schools with other configurations of class time, interns and mentors should discuss with their field instructors how the intern's lead teaching time will be distributed throughout the year. Key aspects of any intern's lead teaching schedule include:

- After the initial week or two of school, the intern should have lead teaching responsibility (but not sole teaching responsibility) for at least one class period in a week .
- Interns are novice teachers for whom out-of-class preparation and reflection takes longer than it does for more experienced teachers. Having regular time during the school day to plan well for their teaching and reflect carefully on it is vital for the growth of the intern's practice and for the quality of the instruction they can provide to

the students they share with their mentor. Interns may spend some of this time outside the classroom, and they may spend some of it in observation and analysis of the mentor's teaching.

- In the initial internship programme, short periods of increased lead(sole) teaching responsibilities should be preceded and followed by periods during which interns return to teaching only the focus class. From each period of increased lead teaching responsibility to the next, the demands on the intern's planning, teaching, and/or assessing should increase.
- Interns' on-campus classes do not meet every week of the internship. During certain weeks, the classes do not meet so that interns can be in their placement schools all five days of the week. Interns' obligations to their courses during this time focus more on at-school or in-class activities and less on lengthy reading or writing assignments.

Format B

SCORE SHEET FOR REFLECTION LOG ON FOCUS LESSON

(*To be filled by the trainee, based on student reflection)*

Name of the trainee:

Duration: **Class:** **Section:**

Unit of teaching:

SL.NO	CRITERION ON STUDENT RESPONSE	0	1	2	3	4
1	Ability to identify specific and/or varied instructional strategies.					
2	Examples to support the strategy					
3	Connectivity across disciplines					
4	Ability to identify learning styles					
5	Examples to reflect according to learning styles					
6	Ability to display personal reflections					
7	Examples reflected in support of personal reflection					
8	Group conformity					
9	Contribution to activity/ strategy					
10	Acceptance in group / solo activity or strategy					

Any other remarks by the trainee:

Mentors' remarks:

Mentor's signature **Trainee's signature**

Format C

MENTOR'S EVALUATION REPORT OF TRAINEE

Name of the Trainee:……

Period of Evaluation: From……to……..

Focus Lesson No. :…….

Subject:

SL.NO	CRITERION	0	1	2	3	4
I	*INSRUCTINAL STRATEGIES USED* -					
1	Are appropriate for the topic/topics					
2	Has scope for learner engagement					
3	Has suitability of learning materials					
4	Assess learner's understanding throughout the lesson					
5	Has effective displays					
6	Are consistant with the objectives					
II	*LEARNER'S(LEARNING STYLES) IN CLASS*					
7	Identification of personalities and talents of learners					
8	Identification of learning styles of learners					
9	Ensuring learner participation					
10	Identification of learner's pace					
III	*LEARNING ENVIRONMENT*					
11	Learners are motivated, appreciated and involved.					
12	Learners are relaxed and confident					
13	Management of classroom					
14	Teacher – Student relationship					
15	Class control					
	Overall performance					

Strengths of the trainee:

(May use separate papers for detailed report)

Areas of Improvement:

(May use separate papers for detailed report)

Sign of Mentor with Name.

(Format D)

Weekly Reflective Diary Format

We learn by doing and reflecting on what we do. (John Dewey)

Use this template to record your observations weekly. This document will be turned in every Monday following each week in the field. The weeks you teach will have a different format to follow. Please note that your document will be longer than one page.

Name:
Date:

Analyze your observations to identify specific teaching and learning strategies you observed involving the classroom teachers and their students. You may include your behavior if you are involved in the teaching process. Include more than one strategy.

Instructional Strategies (Include more than one strategy)	Specific example describing how the strategy was implemented

Learning Styles observed	Specific examples how the learner was supported through instructional delivery

1. **What have you learned about teaching this week?**
2. **What have you observed/learned about students and their learning this week?**

Theory base observed	Specific example from classroom to apply/support theory

Personal Reflection: Reflect specifically on something you observed and connect to personal opinions.

(Format A)

TEACHING REFLECTIVE LOG FORMAT

(This is to be completed daily during the week you teach.)

Objectives for day:

Materials for day:

Instructional Strategies used (explain how the strategies were implemented):

What I did well:

What my students did well:

What I didn't do so well:

What my students didn't do so well:

What I would keep the same:

What I would Change:

What did I learn about teaching today? (If you had to modify your lesson to help students, briefly explain here).

SCHEME OF ASSESSMENT
M.Ed. Two Year Course, Session 2015-17

SL.NO.	PAPER	EXTERNAL	INTERNAL
SEMESTER I	THEORY		
Paper I	Philosophical Perspectives of Education	100	
Paper 2	Sociological Perspectives of Education	100	
Paper 3	Education Technology/ Teacher Education	100	
Paper 4	Strengthening Language Proficiency	100	
	PRACTICUM		
	Exploring Library Resources		50
SEMESTER II	THEORY		
Paper 5	Introduction of Research Methodology in Education	100	
Paper 6	Psychological Perspectives of Education	100	
Paper 7	Specialization part I	100	
	PRACTICUM		
	Proposal of Dissertation	100	
	Internship , School based Activities		50
SEMESTER III	THEORY		
Paper 8	History and Development of Education in India	100	
Paper 9	Economic and Political perspectives of Education	100	
Paper 10	Advanced Edu. Statistics/Edu. Administration	100	
Paper 11	Gender Perspectives in Education	100	
	PRACTICUM		
	Psycho-metric assessment		50
SEMESTER IV	THEORY		
Paper 12	Curriculum Development	100	
Paper 13	Specialization Part II	100	
	PRACTICUM		
	Academic Writing		50
	Dissertation	100	
	Viva Voce on Dissertation	100	
	TOTAL	1600	200
	GRAND TOTAL	1800	

Psychology Practicum

1. **Intelligence Test**
2. **Achievement test**
3. **Mental fatigue**
4. **Physical fatigue by Ergo graph**
5. **Learning by Substitution**
6. **Personality Testing**
7. **Span of attention by Tachistoscope**
8. **Transfer of Learning by mirror drawing**

(Any 5 Practical's are to be conducted)

Curriculum Framework

M.ED. TWO YEAR COURSE 2015 -2017.

Curriculum Organization based on NCTE framework							
Semester I	**PEC**	**Semester II**	**P**	**Semester III**	**P**	**Semester IV**	**PEC**
(C) Philosophical perspectives of Education (4 credits)	**Strengthening language proficiency (4 credits)**	**(C) Introduction to Research methodology in Education (4 credits)**	**Proposal presentation on Dissertation (2 Credits)**	**(C) History and Development of Education in India (4 credits)**	**Psycho-metric Testing (4 Credits)**	**(C) Curriculum Development (4Credits)**	**Academic Writing (2 Credits)**
(C) Sociological perspectives of Education (4 credits)		**(C) Psychological perspectives of Education (4 credits)**	**Internship School based Activities (4 Credits)**	**(C) Economic & Political perspectives of Education (4 credits)**		**(S)Educational Guidance & Counseling / Education for differently abled (4Credits)**	
(E) Education Technology / Teacher Education (4 credits)	**Exploringlibrary resources (4 Credits)**	**(S) Educational Guidance & Counseling (4 Credits)/ Education for differently abled (4 credits)**		**(E) Advanced Education Statistics / Educational Administration and Management (4 credits)**		**Dissertation & Viva-Voce (8 Credits)**	
				(C) Gender perspectives in Education (4 Credits)			
12	**8**	**12**	**6**	**16**	**4**	**16**	**2**
20		**18**		**20**		**18**	
C = Core paper, E = Elective paper, S = Specialization, PEC = Professional Enhancement Course, P = Practicum							

M.ED. TWO YEAR COURSE (2015-17)

CORE STUDY (SEMESTER I)

PAPER I- PHILOSOPHICAL PERSPECTIVES OF EDUCATION

Objectives of the course:

(i) To develop understanding of the interrelationship between Philosophy and Education

(ii) To develop appreciation of the basic tenets, principles and developments of the major Indian Schools of Philosophy and Educational thoughts of Indian Philosophers.

(iii) To develop the appreciation of the basic tenets principles and development of the major Western Schools of Philosophy.

(iv) To acquire knowledge of human values and role of education.

(v) To develop the understanding of interrelationship between Sociology and Education.

(vi) To develop appreciation of education as a means of social reconstruction

(vii) To understand the bearing of various Political & religious ideologies on Education.

UNIT- 1: Philosophical Foundation of Education

1.1 Philosophy of Education

1.2 Nature and Functions of Philosophy of Education

1.3 Interrelationship between philosophy & Education

1.4 Modern Concept of Philosophy: Analysis – Logical empiricism & positive relativism.

1.5 Scope- Functions of Educational Philosophy

UNIT 2 - Indian Schools of Philosophy

2.1 Sankhya, Nyaya,Vedic, Buddhist, Jainism, Islamic Traditions

2.2 Education Implications of these schools with special reference to the concept of Knowledge, reality & values, methodology, public- Teacher. Relationship, freedom & descipline, Basic Tenets, aims, & objectives, curriculum.

2.3 Contributions of Vivekanand, Tagore, Gandhiji, Dr. Ambedkar & J.P.Naik, J. Krishnamurthi, Dr. Radhakrishnan, Arbindo to educational thinking.

UNIT- 3 : Western Schools of Philosophy

3.1 Idealism, Naturalism, pragmatism, realism, Existentialism, Marxism with.

3.2 Educational implications of these schools with special reference to basic tenets, Aims, & objectives curriculum methodology, Teacher. Pupil relationship, freedom & discipline.

3.3 Contribution of Plato, Rousseau, Dewey

UNIT- 4 Axiology & Education

4.1 Meaning of values

4.2 Types of various- spiritual, moral, social, aesthetic values

4.3 Values as mentioned in different schools of philosophy and their educational implications

4.4 professional ethics of teachers.

UNIT -5 Critical Analysis of educational thoughts:

With reference to-

5.1 Concept of man and the process of development

5.2 Epistemological perspectives of different thoughts.
5.3 Schools of Indian and western thought.
Reference books

1 . The Philosophical and Sociological foundations of Education (Doaba House, Book-sellers and Publishers, Delhi-110006) by Kamla Bhatia and Baldev Bhatia

2. Groundwork of Theory of Education – by Ross

3. Modern Philosophy of Education – by Brubacher

4. Foundations of Education – V.P. Bokil

5.Anand C.L. et.al. : Teacher and Education in Emerging India, NCERT, New Delhi.

6.Anant Padmnabhan : Population Education in Classrooms, NCERT, New Delhi.

7.Bhatnagar, S. : Adhunik Bhartiya Shiksha Aur Uski Samasyayen, Lyall Book Depot, Meerut.

8.Chakravorty M. : Gandhian Dimension in Education Daya Publishing House New Delhi.

9.Mani R.S. : Educational ideas and ideals of Gandhi and Tagore, New Book Society, New Delhi.

10.Ministry of Human Resource Development: National Policy on Education, 1896, New Delhi.

11.Mohanty Jagannath : Indian Education in Emerging Society, Sterling Publication, New Delhi.

12.Pandey, Shyam Swaroop : Shiksha ki Darshanik evam Samajik Shastriya Pursht Bcomi Vinod Pustak Mandir, Agra.

13.Pathak and Tyagi : Shiksha ke Samnya Siddhant, Vinod Pustak Mandir, Agra.

14Pathak, RD. and Tyagi, I.S.D. Shiksha ke Samariya Siddhant. Vinod Pust8tk Mandir, Agra.

15.Saxena, N:R. Swaroop Shksha Re Samanya Siddhant, Lyall Book Depot, Meerut.

16.Singh B.P. : Alms of Education in India, Ajanta Publication New, Delhi.

17.Agrawal, J.C..: Nai Shiksha Niti. Prabhat Prakashan, Delhi.

18.Bhatnagar, R.P. Technology of Teaching, International Publishing House, Meerut.

19.Bhatnagar. R.R & Agarwal, Vidya Shaikshlk Prashasan, Eagle Books.

20.Bhatnagar, Suresh Shiksha Ki Samasyaen, Lyall Book Depot, Meerut.

21.Bhooshan, Shailendra & Anil Kumar : Shikshan Taknik. Vinod Pustak Mandir, Agra.

22.Manav Sansadhan Vikas mantralaya: Rashtriy Shiksha Niti 1986. New Delhi.

23.Safaya. Raghunath,. School Sangathan, Dhanpat Ram & Sons, Delhi.

24.Sampath, K. : Introduction to Educational Technology, Sterling Publishers, New Delhi.

25.Saxena, N.R. Swaroop, Shikshan Kala Ewam Paddatiyan. Lyall Book Depot, Meerut.

26.Sharma & Sharma Secondary Education and teacher Functions, Radha Publisher Mandir, Agra.

27.Higher Education in India ; Albach

CORE STUDY (SEMESTER I)

PAPER II : SOCIOLOGICAL PERSPECTIVES OF EDUCATION.

UNIT 1 Sociology & Education

1.1 Meaning & Nature of Educational Sociology

1.2 Interrelationship between Education and Social Variables

(i) Sociology of Education

(ii) Political Education – Process of Socialization

(iii) Education and Family

(iv) Education and Schooling

(v) Education and culture in general

(vi) Education and religion, Caste, Gender, Class

(vii) Education for Weaker Sections

(viii) Education and Development

(ix) Sex Education

(x) Economics of Education

(xi) Education and Constitution

UNIT-2 Education and Socialization

2.1 Process of Socialization

2.2 Social Stratification and education

2.3 Social Mobility and Education

UNIT- 3 Education as a means of social changes

3.1 Education for emotional AND SOCIAL INTEGRATION

3.2 Education for Nationalism and International understanding

3.3 Meaning and need of Equality of Education opportunity and Social Justice with special reference to caste, class, race and religion.

3.4 Education of Socially, Economically under-developed society.

UNIT- 4 social forces and education

4.1 Education for maintaining the peace in diverse religious beliefs.

4.2 World problems and terrorism – its causes, its impact on Society and remedies through Education.

4.3 concept of Secularism in India and World prospect and building of Secularism through Education

UNIT- 5 Political Ideologies and Education

5.1 Totalitarian: Meaning, Main features, aims of Education, curriculum, Methods of teaching and School administration.

5.2 Democracy: Meaning, Values, Main features of democratic Education, aims, curriculum methods of teaching and School administration.

Practical Work (any one)

(i) Study of the comparison between one western school with one Indian school of philosophy.

(ii) Case Study of economically under developed student.

(iii) Study of the impact of modern Technology in one secondary school.

Reference books

1. A Sociological Approach to Indian Education (Vinod Pustak mandir, Agra 2 , by S.S. Mathur)

2. The Philosophical and Sociological foundations of Education (Doaba House, Book-sellers and Publishers, Delhi-110006) by Kamla Bhatia and Baldev Bhatia

3. Groundwork of Theory of Education – by Ross

4. Modern Philosophy of Education – by Brubacher

5. Foundations of Education – V.P. Bokil

6. Educational Sociology – Brown

7. De Schooling Society- Evan Illich.

ELECTIVE COURSE (SEMESTER I)

PAPER III (A) - EDUCATIONAL TECHNOLOGY

OBJECTIVES :

1) To enable the learner to become effective user of technology in Education

2) To acquaint the learner with the challenges and opportunities emerging in integrating new technology in Educational process.

3) To make the student familiar with new trends, techniques in education along with e learning.

4) To enable the student to become good practioner of Educational technology and e-learning.

UNIT – 1: Meaning & Scope of Educational Technology

1.1 Educational Technology as system approach to educator.

1.2 System approach in educational technology and its characteristics.

1.3 Components of Educational technology software and hardware.

1.4 Modalities of Teaching

1.5 Difference between teaching and Instruction, conditioning & training

1.6 Stages of teaching pre – active, interactive and post – active.

1.7 Teaching at different levels one way, understanding and reflective.

1.8 Modification of teaching behavior microteaching, Flander;s interaction analysis simulation.

UNIT 2 – Communication Modes in education

2.1 Concepts and process of communication

2.2 Principals of communications

2.3 Communication and learning

2.4 Modes of communication

- Speaking and listing < --- > Writing and reading < ---- > visualizing and observing

2.5 SMCR model of communication, Sharon's model of communication

2.6 Task analysis

UNIT – 3: Integrating Multimedia in education

3.1 Multimedia concept and meaning text, graphics, animation, audio, video

3.2 Multimedia applications

- Computer based training

- Electronic books and references

- Multimedia application for educationist

- Information kiosks

- Multimedia www and web based training

UNIT - 4 Educational software applications

- Computer assisted instruction

- Drill & practice software

- Educational simulations

- Integrated learning system

- Curriculum specific Educational software

UNIT 5 – e-learning

5.1 E-learning definitions, scope, trends, attributes & opportunities

5.2 Pedagogical designs & e-learning

5.3 Assessments, feedback and e-moderation

5.4 e-learning on line learning management

5.5 On line learning management system

5.6 Digital learning objects

5.7 Online learning course development models

5.8 Management and implementation of e-learning

Reference Books

1. Integrating Technology in the classroom shelly, cashman, gunter and gunter, publication by Thomson course technology

2. Essentials of Educational Technology, Madan Lal, Anmol Publications

3. Online Teaching Tools and Methods, Mahesh Varma, Murari Lal & Sons

4. Education and Communication for development, O. P. Dahama, O. P. Bhatnagar, Oxford IBH Publishing company, New Delhi

5. Information and Communication Technology, N. Sareen, Anmol Publication

6. Communication and Education, D. N. Dasgupta, Pointer Publishers

7. e-learning a Guidebook of principals, Procedures and practices, Son Naidu, Commwealth of Learning, Commonwealth Educational Media Centre for Asis

8. Education and Communication, O. P. Dham

ELECTIVE COURSE (SEMESTER I)

PAPER III (B) : TEACHER EDUCATION

Objectives:

To enable the students

(1) To understand the concept of teacher Education

(2) To develop necessary skills

(3) To develop insight into the problems of teacher Education at different levels.

(4) To develop experimental attitude in teacher Education

(5) To understand new trends, and techniques in teacher Education.

SECTION – 1

UNIT- 1 Historical development of teacher Education in India

1.1Historical development of Teacher Education

1.2 Teacher education as distinguished from teacher training.

1.3The need and importance of Teacher Education

1.4 Concept and structure of teacher Education

1.5 Meaning, Nature, Scope of Teacher education

1.6 Aims and Objectives of teacher Education at different level

1.7 Need for pre-service and in service professional education of teachers at different levels in the present Indian situation.

1.8 Qualifications of teachers-pre-primary, primary, Secondary, Higher Secondary, Higher Education.

1.9 Training of special teacher-Arts, Crafts, Physical Education, Home Science, Vocational Technical and work experience.

UNIT – 2: Content of Teacher Education

2.1 i. Theory of teacher education and its duration.

ii. Practical activities to be conducted during the training Course

iii. Relationship and weightage given to theory and practical work.

iv. Evaluation – Internal and external

2.2 Instructional Methods in Teacher Education

I. Lecture and discussion

II. Seminars

III. Work shops

IV. Symposium

V. Group Discussion

VI. Supervised study

VII. New Methods- Microteaching, Macro-teaching, programme learning, Models of teaching, Content-cum methodology approach.

VIII. Virtual and e-mode

2.3 Practice teaching in Teacher Education

i Demonstrations

ii Experimentation

iiiPractice teaching and observations

iv Significance and Supervision of Practice teaching

v Internship

vi Relationship of College of Education with Co-operating Schools

UNIT-3 Evaluation procedures in Teacher Education

3.1) Assessment

(I) Aspect of Internal & External Assessment

(II) New techniques of Evaluation

3.2 teaching as a profession:

3.3 Recommendations of various commissions on Teacher Education: Kothari Commission, National policy on Education, NCTE policy.

3.4 Professional organizations for various levels of teacher-types and there role & functions

3.5 Performance appraisal of teacher

3.6 Code of conduct and ethics of teaching profession.

3.7Faculty improvement programme for teacher Education.

UNIT-4 Research and Teacher Education

4.1 Need of Research in Teacher Education

4.2 Action Research for quality improvement in T.E.

4.3 Area of Research in T.E.-Teaching Effectiveness, Criteria of admission, Modification Of Teacher behavior, School effectiveness.

4.4 Current problems of Teacher Education

4.5 Teacher Education and practicing schools

4.6 Teacher Education and UGC, NCTE, University.

4.7 Preparing teacher for special school

4.8 Preparing teacher for Inclusive classroom.

4.9 Integrating Technology in Teacher Education.

UNIT- 5 Types of Teacher Education Programmes and Agencies:

5.1 In-service T.E. - Concept, Meaning, Need and nature

5.2 Preserves T.E. - Concept, Meaning, Need and nature

5.3 Orientation and Refresher courses

5.4 Agencies of T.E.-UGC, NCTERT, SCERT, Colleges of T. E., Open University.

Academic Staff colleges, University Department of Education and Teacher

Organization.

Reference Books

1. Sualemeyarl indsey – working with student, Teachers, Eurasla Publishing House (Pvt.) Ltd., New Delhi-55.

2. William Taylor – Society and the Education of Teachers, Faber 7 Faber

3. Dr. G. Chaurasia- New Era in Teacher Education, Sterling Publishing Pvt.,Ltd.

4. Edited by S.N. Mukarji – Education of Teachers in India, Valun 1 e I& II – S Chand & Co., Delhi

5. K.L. Shrimali-Better Teacher Education. Ministry of education, Government of India

6. Dr. S. S. Dikshit- Teacher education in modern Democracies- Sterling Publishers Pvt., Ltd.,

Delhi- G

7. Report of the study Group on the Education of Secondary Teachers in India Association of Training College.

PROFESSIONAL ENHANCEMENT COURSE (SEMESTER I)

PAPER IV : STRENGTHENING LANGUAGE PROFICIENCY

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Semester – I [M.Ed]

Language proficiency [English Language] [50 Marks]

Unit –I[Linguistics] (Weightage – 2questions 5 marks each)

- Linguistics : Meaning Scope and Concept
- Creativity in language : Beautification of language use of simile and methaphore, Rhyme and Rhythm
- Descreptive writing : Picture Scene, Park, Festival, Journey, College Function,Biography etc.

Unit –II [Vocalnlary] (Weightage 5 Questions 3 marks)

- Development of vocabulary
- Dictionary : Use of Dictionary, Difference between dictionary and thesaurus
- Use of vocabulary in noun verb, adjective, etc.
- Use and importance of punctuation in text
- Paragraph writing

Unit –III [Grammer] (Weightage 25 Questions 1 marks each)

- Use of Vowels : Vowel blends usage of C-V-C (Consonant-Vowel-Consonant) in words
- Grammar rules : R rule , W rule
- Phonetics : S sound, G sound
- Diphthong and Digraph
- Parts of sentences

PROFESSIONAL ENHANCEMENT COURSE - SEMESTER I

EXPLORING LIBRARY AND OTHER LEARNING RESOURCES (PRACTICUM)

Objectives

Student-teachers are expected to take some initiative in pursuing interests outside the formal course work from a range of available resources. Some of these resources are as follows:

- The institute library
- Websites on the internet
- Local events and facilities, as well as local issues (in the neighbourhood or town)
- Members of local community
- Visiting resource persons.

This component is aimed at developing a sense of initiative, imagination and discernment of learning potential of the resources available in their surroundings.

Course Outline

UNIT 1

Knowing your library, Layout of the library

Library policies

Library procedures – cataloguing, locating a book/material in the library.

Library Management

UNIT 2

Library as a resource of learning, pleasure and concentration

School library as an intellectual space for students and teachers.

UNIT 3

Types of books and other material used by different readers.

Techniques of keeping these books and materials

Dimensions of setting up of a school library.

UNIT 4

Locating information and using it for one's own career development. Resources helpful in providing information for career development: newspaper, magazines, websites, learning guides, members of local community, resource persons.

CORE PAPER (SEMESTER II)

PAPER V : INTRODUCTION TO RESEARCH METHODOLOGY IN EDUCATION.

OBJECTIVES :

To enable the students to

(1) To understand the concept of research and educational research.

(2) To understand the types and methods of educational research,

(3) To understand the steps involved in educational research,

(4) To understand the use of different tools and techniques in educational research

(5) To use the library, Internet services and other sources of knowledge for educational research Purposes.

(6) To understand the procedure to conduct the research in the educational field.

(7) To understand the nature of issues and problems faced by the State System of education and to find out the remedies to solve them.

(8) To understand the role and use of statistics in educational research.

(9) To select the appropriate statistical methods in educational research.

(10) To review the educational research articles.

(11) Use computers for data analysis.

UNIT –I Concept of Educational Research

1.1 Meaning and nature, need and importance and scope of educational research.

1.2 Scientific Inquiry and Theory Development- some emerging trends in research.

1.3 Areas of educational research and different source of generating knowledge

1.4 Research Proposal

UNIT –2 Types and Methods of Educational research

2.1 Types of educational research – Fundamental, Applied, Action research

2.2 Methods of Educational Research:

(i) Qualitative Research- Ethono-methodical

(ii) Quantitative Research

(iii) Research problems, Variables and Hypothesis

(iv) Population and Sampling

UNIT- 3 Review of related literature-

3.1 purpose and need at different stages of research, sources of literature

3.2 Tools and Techniques of Educational Research- meaning and types of tools

3.3 Qualities of a good measuring tool and standardization procedure

3.4 Collection of Data, Methods of collection of data.

UNIT- 4 : Analysis and Interpretation of Data

4.1 NPC- Properties and uses, Skewness and Kurtosis

4.2 Descriptive Statistics – Significance and uses of:

(i) Measures of Central tendency – Mean, Median, Mode.

(ii) Measures of variability – Range, Q.D. , S.D.

(iii)Measures of relative positions: Quartile, Deciles, Percentile and percentile rank, standard scores and T scores.

(i) Correlation – Concepts, types and uses; assumption and uses of rank difference ,computation of rank difference correlation and Product Moment Method,

(ii) Concepts- Bi-serial, point bi-serial- partial and multiple correlation and phi-coefficient.

(iii) Regression equation and predictions

UNIT 5 : Inferential Methods.

5.1 Concept of parameter, statistic, sampling distribution, sampling error, and standard error.

5.2 Levels of significance, confidence, limits and intervals, degrees of freedom, types of error- Types I, Type II; Tests of significance of mean and of difference between means (both large and small samples) one and two tailed tests.

5.3 Parametric and non-parametric Statistics: uses and computation of Chi-square test and Contingency coefficient.

5.4 Educational Research Report Writing

(i)Format, Style, content and chapterisation

(ii)Bibliography, Appendices

(iv) Characteristics of a good research report.

PRACTICAL WORK: (any one)

(i) Review of Educational research report/article.

(ii) Data analysis using computer

Reference Books

1. Best, J.W. and Kahn research in Education (9th Ed. Prentice of India, Pvt, Ltd, New Delhi,1982)

2. Tuckman Bruce W: Conducting educational Research (Harcourt Brace Javanovich, Inc. New York, 1978)

3. Garrett H.E. Statistics in Education and Psychology (Yakills Fitter & Simsons Pvt. Ltd., Bombay, 1973)

4. Kuriz Albert J. and Samuel T. Mayo, Stastitics in Education and Psychology (Narousa Publishing House, New Delhi, 1981)

5. Buch M.B., A survey of Research in Education (Centre of advanced Studies in Education, M.S. University Baroda, 1974)

6. Buch m.B. et al' second Survey of research in Education.

7. Donald Ary, Lucy Cheser Jacobs, Asghar Razavich "Introduction in research in Education" (Holt Rinehrt and Winston, New York, 19790.

8. Kreppendorff Kians contents analysis: An Introduction to its Methodology, Sage Publications. Beverly Hills, London, 1985.

9. Action research – Corery.

10. Fox David J : Techniques for the Analysis of Quantitative Data, Holt, Rinehart, & Winson, Inc.1969.

11.George Aegyrous , Statistics for research II edition Sage Publication, 2006.

12. Bieger and Gerlach ,Educational Research :A Practical Approach, Thomson Wadsworth Pup.

CORE STUDY (SEMESTER II)

PAPER VI : PSYCHOLOGICAL PERSPECTIVES OF EDUCATION

Objectives:

To enable students:

(1) To develop understanding of the Psychological basis of Education

(2) To understand the Cognitive, Affective and Psychomotor development of adolescents and youth.

(3) To develop the understanding of the theories of Personality and their use in the development of learner's Personality, measurement of personality.

(4) To understand the Changing Concept of Intelligence and it's application.

(5) To understand the theories of Learning and their Utility in the Teaching Learning Process.

(6) To understand the Concept and Process of teaching.

UNIT-1 Introduction to Psychological Basis of Education

1.1 Psychology as scientific study, its concerns-mind, consciousness, behavior, and experience: methods of study in psychology- introspection/self-reporting- observation, survey, case/study, interview, testing, Experimental.

1.2 Major schools of psychology-Structuralism, associationism behaviorism, Gestalt, Psycho-analytic, Humanistic and Cognitive.

1.3 Contribution of these Schools to Education.

UNIT-2 Development

2.1 Development – Concept, stages, dimensions.

2.2 Factors influencing development – genetic, biological environmental and physical.

2.3 Theories of development

- Piaget's Cognitive development

- Freud's Psycho-sexual development

- Erikson's psycho-social development

- Kohlberg's moral development

2.3 Language development with reference to syntax and structure

2.4 Social development – Erisco's Psycho-socio test.

2.5 Moral Development- Theories of Piaget and Kolhers.

UNIT – 3 Personality, Intelligence and Creativity

3.1 Theories of personality

3.2 Measurement of Personality

3.3 Intelligence

3.4 Nature and Theories of Intelligence

3.5 Measurement of Intelligence – Verbal, Non-Verbal Performance, Individual and Group Test of intelligence developed in India

3.6 Creativity

3.7 Creativity Concept, Factors and process, techniques for development of Creativity. Brain-Storming, Synectics, Attribute – listing.

UNIT- 4 Learning

4.1 Theories of Learning

(i)Operant conditioning (Skinner)

(ii) Conditions of Learning (Gagne)

(iii)Information processing (Donald Norman)

(iv) Mastery learning (Bloom)

(V) Hull's reinforcement theory

(Vi) Toleman's theory of learning

(Vii) Levin's field theory

4.2 (i)Constructivism & learning.

(ii) Brain base learning.

4.3 (i)Educational implications of theories of learning

(ii)Factors influencing learning

UNIT-5 Teaching

5.1 Models of teaching –concept and 4 families of models

5.2 Educational implications of researcher in the following areas in teaching :

(i) Teacher's thought processes

(ii) Student's thought processes

(iii) Teaching of learning strategies

(iv) Teacher behavior and student achievement

(v) Teaching functions

(vi) Classroom organization and Management

Reference Books

1. Ausubel D.P. and Robison F.G. : School learning An introduction to Educational Psychology New York Holt, Rinehart & Winston Inc 1969.

2. Bernard H.W. : Psychology of learning & Teaching, New York Macgraw Hill B

3. Gage and Berlinger : Educational Psychology, Boston Houghton Miffins Company 1984.

4. Hays J.R. : Cognitive Psychology, Thinking and Creating. Homewood Illinoins. The Dorsey press 1978

5. Joyce Bruce and well Marsha. Models of Teaching prentice Hall of India Ltd. 1985.

6. Mangal S.K. : advanced Educational Psychology; New Delhi, Prentice Hall of India Pvt,Ltd;193

7. Moully George J : Psychology of teaching botton Allyn & Decan Inc.

8. Wordsworth B.J. piaget's : Theory og cognitive and affective Development, New York, Longman incorporated, 1989.

9. Bower G.H. and Hilgard E.R. : theories of Learning New Delhi Prentice Hall india Pvt. Ltd.

10. Michael Green : Theories of Human Development prentice Hall, englewood cliffs, New Jersy,1989

11. S. Owen, H. Parker Blount, Heny Moscow : Educational Psychology – An Introduction Little, Brown and Company Boston, Toronto, 1978.

12. C.L. Kundu : Personality Development, Sterling publishers Pvt. Ltd., New Delhi, 1989

13. Charles N. Newmark : Major Psychological assessment Instruments : Allyn And Becan Inc. Boston, London, Sydney, Totonto, 1985.

14. Jayaswal, R.L. : Foundation of Educational Psychology : Allied Publishers, Bombay.

15. Bigge M.L. : Learning Theories for Teachers, Harper and Tow publishers, 1971.

16. Hilgard and Atkinson : Introduction to Psychology, Oxford and IBH Publisher, Bombay.

17. Bower G.H. and Hilgard E.R. : Theories of Learning Prentice Hall of India, New Delhi. 1980

18. Anastasi Anne: Psychological Testing, McMillan Co. New York.

19.Passi B.K. : Creativity ineducation NPC Agra 1982.

20.Daniel Goleman : Emotional Intelligence, Bantam books 1995

21.Daniel Goleman 'Working with Emotional Intelligence 1998'

22. Bichler R.F. and Jack Snowman : psychology Applied to Teaching Houghton Miffin Company, Boston 1986

SPECIALIZATION COURSE (SEMESTER II)

ANY ONE COURSE IS TO BE CHOOSEN FROM THE BELOW GIVEN:

A) Educational Guidance and Counseling.

B) Education for differently abled.

PAPER VII (A) - EDUCATIONAL GUIDANCE AND COUNSELLING

COURSE OBJECTIVES:

1. To acquire the students with the concepts, needs and viewpoints about Guidance and Counselling and the underlying principles in reference to normal children as well as in reference to children with special needs.

2. To acquire the students with the organizational framework and procedures of Guidance-Services in educational institutions.

3. To acquire the students with the tools and techniques required for providing guidance and counselling services to students.

COURSE CONTENT

UNIT I

1. Guidance and Counselling : Concept, nature, need, scope and purpose; relationship with education; issues and problems; role of teacher

- Basic types of Guidance and the underlying principles, their nature, scope and purposes.
- Basic approaches of counselling and their underlying assumptions.

UNIT II

1. Educational Guidance: basic assumptions and principles

• Curricular choice and its implications for Career guidance; Guidance and Curriculum and the class room learning.

2. Vocational Guidance: basic principles.

• Vocational choice as a development process

• Nature of work and Job analysis, dissemination of occupational information:

vocationalisation of secondary education and career development

UNIT III

1. Personal Guidance: basic assumptions; types of behavioural problems of school stage

students. Methods and strategies of Personal Guidance

2. Group Guidance: basic assumptions. Group Guidance and Individual guidance. Techniques of Group Guidance

UNIT IV

1. Counselling: Meaning, need, characteristics, principles of Counselling

2. Process and types of Counselling

3. Counselling theories

UNIT V

1. Guidance and Counselling in Groups: Nature, aim, Principles and procedure; Group Counselling Vs Individual counselling; counselling for adjustment. Types of group activities-their merits and demerits

2. Current Trends, Concerns and Demands in Guidance.

(SUGGESTED READINGS ARE GIVEN AT THE END OF SECOND PART OF THE PAPER IN SEMESTER III)

SPECIALIZATION COURSE (SEMESTER II)

PAPER VII (B) - EDUCATION FOR THE DIFFERENTLY ABLED

OBJECTIVES:

1) To enable the learner to understand the concept of Inclusive, Integrated and special education, need of special education and its practices.

2) To understand the various suggestions of recent commissions of education for the differently abled for realizing the concept of universalisation of education.

3) To enable the learner with the new trends in education for the differently abled with respect to the curriculum.

4) To enable the learner to identify the specific needs characteristics and modalities of identification of various types of differently abled.

5) To enable the learner with the educational programmes, equipments and aids for the differently abled.

PART - I

COURSE CONTENTS

UNIT I

Inclusive, Integrated and Special education-concept, meaning and difference .Concept of mainstreaming from segregated, integrated to inclusive. Introduction to education for the disabled, its objectives, assumptions and scope. Key terms – Handicap, Impairment and disability. Historical perspectives of special education.

Special education in India: Constitutional provisions , government policies and legislations. Recommendations of various Committees and Commissions – NPE (1986), POA (1992) , PWD (Person's with Disability) Act (1995). National Institutes for the handicapped and the role of rehabilitation Council of India.

UNIT II

Current issues in education for the differently abled. Cross Disability Approach. Meaning of educational intervention: Nature and objectives of schools and support services for differently abled . Role of family, counselor, peer members and the community in educating the child.

UNIT III

Types of special children : children with exceptional abilities- creative and gifted ; with deficiency and handicaps - mentally retarded , sensory and physically disabled ; with learning disability – slow learners ,under achievers ,and other types of learning disabled ; with social and emotional problems – truant ,delinquents ,drug addicts .Easy identification and educational programmes and their placement.

UNIT IV

Children with exceptional abilities: Types – Gifted and creative ;Meaning, characteristics and identification of each type. Measurement of creativity and fostering activities and programmes for creativity. Psychology of teaching and learning in respect to the gifted and the creative.

Curriculum, Pedagogy , evaluation and placement for each type.

UNIT V

Problem children : concept , meaning of truants , delinquents , drug addicts and other types of problem children. Etiology and prevention. Preventive measures and educational programmes ; placement of delinquents , drug addicts and other types.

PRACTICUM

Visit to integrated school : identification of creative child – measurement of creativity

(SUGGESTED READINGS ARE GIVEN AT THE END OF PART II)

CORE COURSE (SEMESTER III)

PAPER VIII - HISTORY AND DEVELOPMENT OF EDUCATION IN INDIA

Course Objectives-

1.To be acquainted with the salient features of education in India in Ancient & Medieval times.

2. To be acquainted with the development of education in British India.

3. To be acquainted with the development of education in Independent India, including

significant points of selected Education.

4. To be acquainted with current issues and trends in Education.

UNIT– I 1. Synoptic study of Brahmanic, Buddhist and Islamic Education in Ancient and Medieval India with respect to a) Aims and Objectives b) Subject of study c) Methods of teaching including teacher – Pupil relationship. d) Evaluation e) Centre of Learning (f) Education of woman (g) Education in Ancient and Medieval India, characteristics of Gurukul, Matha/Vihar, Madarasah of and Maktabs.

2. Brief outline of events relating education from 1757 to 1947 - Missionaries activities (Srirampur Trio) (3) Charter Act of 1813 Bengal Renaissance – Contribution of Rammohan Ray H.L.V. Derozio. And Vidyasagar. Adams Report.Anglicist –Orientalist controversy – Macaulay's Minute & Bentinck's resolution. Wood dispatch (Recommendations only)

UNIT–II Brief outline of Hunter Commission 1882-83 (Primary and Secondary Education), Curzon Policy (Quantitative development of Primary education, Quantitative and Qualitative development of Secondary education, Qualitative development of Higher education). National Education Movement (cause and effect) Calcutta University Commission

(1917-1919), Basic Education(concept & development) , Sargent Plan, Gokhle-bill, Sadler commission, Wardha Scheme.

UNIT-III 1. Constitutional provision for Education in India 2. Brief outline of the recommendations made by different Education Commission: 3. University Education Commission (1948-49) (4) (Aims of Higher education & Rural University) Secondary Education Commission (1952-53) (5) Aims, Structure & Curriculum of Secondary education) Indian Education Commission (1964-66), National knowledge commission.

UNIT-IV 1. National Policy on Education (1986). 2. Current issues in education: 3. Equalization of Education Opportunities. (3) Programmes on Universal Elementary Education (DPEP &SSA) (4) Non-formal education and alternative schooling, Education of women.

UNIT-V- : (1) Problems in Indian Education ; Secondary & Higher Secondary Education, Environmental Education, Vocational Education. (2) Experiments in Indian Education ; About emenint Viswa Vidhyalaya in India like- Shanti Niketan, Nalanda University, Vanasthali University etc.

References:

1. Atlekar, A.S. -Education in Ancient India. 2. Basu, A.N. -Education in modern India. 3. Basu, A.N. -Adam's Report. 4. Banerjee.J.P. -Education in India-past, Present and future. 5. Dhar, Niranjan. -Fundamentals of Social Education. 5. Keay, E.E. -India Education in Ancient times. 6. Law, N.N. -Promotion of Learning in India. 7. Mukherjee, S.N. -Education in India, Today & Tomorrow. 8. Mukherjee, S.N. -History of Education (Modern Period). 9. Nurulla, S., Naik, J.P. -History of Education in India. 10. Purkait, B.R. -History of Indian Education.7 11. Rawat, P.L. -History of Indian Education. 12. Sreemali, K.L. -The Wardha Scheme. 13. Indian Education act. -1904 14. Govt. of India report of University Education Commission (1948-49). 15. Govt. of India report of Secondary Education Commission (1952-530. 16. Report of education Commission (1966) education and National development, Ministry of Education, New Delhi. 17. Govt. of India, Ministry of Human Resource – Development, National Policy on Education, 1986. New Delhi. 18. Govt. of India, Ministry of

Human Resources Development, National Policy on Education, 1986, Programme of Action, New Delhi. 19. Govt. of India, Ministry of Human Resource Development, Policy of Action, 1992, New Delhi. 20. Dayal` Bhagwan – Development of Modern Indian education. 21. Education of Women key to progress, Ministry of education, New Delhi. 22. Kundu, C.L. -Adult Education. 23. Shah. A. & Ban, S. -National Education. 24. Singh, R.K. -Open University. 25. Srinivastava, K.N. -Education in Free India.

CORE STUDY (SEMESTER III)

PAPER IX - ECONOMIC & POLITICAL PERSPECTIVES OF EDUCATION

UNIT – I Economic Approach to Education

- Economics of Education
- Financing of Education
- Financing Higher Education in India
- Finance Commission and Allocation of Resources to the states for Education
- Economic problems of Education – related to quality and quantity.

UNIT – II Educational Economy & Planning

- Meaning and nature of Economic Planning with special reference to Education
- National Budget of Education

- Principles of Educational Finance
- Methods of Financing Education
- Cost of Education
- Sources of income in Education – Govt., Private & Cooperative patterns of investment in Education
- Grants-in-Aide – Types, principles, practices & procedure

UNIT- III Educational Finance

- Educational Finance – Need, Significance & Principles
- Concept of Educational Finance
- Demand for Education
- Supply of Education
- Educational Financing in India – a historical perspective

UNIT – IV: Political perspective of Education

- Needs of education of Free India
- World New Trends of Education
- Five Year plans in India – Its historical background
- - Main features of Five Year Plans with special reference to Education
- Impact of Five Year Plans on Education
- Perspective Plan for education in the 11th Five Year Plan

UNIT – V Educational Policy

- Indian Constitution & Its provisions for Education, Various articles related to Education, RTE

- Need and importance of Education Policy
- Types of Educational Policy – National, State Level & Institutional Level
- Role, Function & Impact of following organizations in upliftment of Education
  - NCERT
  - UGC
  - NCTE
  - SCERT
  - NUEPA
- Recent Initiatives in Education
  - At National level
  - At Chhattisgarh State Level
  - At District Level

Reference Books:

- History & Problems of Education – Volume I & Volume II Yogendra K. Sharma
- UNESCO – Economic & Social aspects of Educational Planning – 1963
- N.C.E.R.T – NCERT – The First Year Book of Education – 1961
- Bell & Bell (2006) Education Policy & Social Class, Routledge
- Naik J.P (1965) Educational Planning in India, New Delhi: Allied
- Mathur S.P (2001) : Financial Administration & management – The Indian Publications, India
- Ramcharan Padma & R.Vasantha (2005) : Education in India, New Delhi, National Book Trust

• Blaug, Mark (1972) An Introduction to Economics of Education – Allen Lane, The Penguin, London

• Tilak, J.B.G (1988) Cost of Education in India – International Journal of Educational Development

• Educational Planning & Management – Premila Chandran Sekaran, Sterling Publication Pvt. Ltd.

• Perspectives of education – Mahesh Bhargava & Rajshree Bhargava, H.P. Bhargava Book House, Agre

• Educational Planning, Budgeting & Financing in India, J.C.Aggarwal, Arya Book Depot, New Delhi.

(E) ELECTIVE II (SEMESTER III)

PAPER X (A) - ADVANCED EDUCATIONAL STATISTICS

OBJECTIVES :

To enable the students

(1) To understand the role and use of advanced Statistics in educational research.

(2) Select appropriate statistical methods in educational research

(3) To understand various Statistical measures for interpretation of data.

(4) To interpret the Statistical data.

UNIT- 1 The Normal distribution & Statistical measures.

1.1 Properties of normal probability distribution

1.2 Defects in normality-1 Skewness, 2. Kurtosis

1.3 Applications of normal probability curve

1.4 Statistical Measures

1.5 Difference between Statistical Measures

1.6 The significance of mean, median, standard deviation, quartile deviation, percentage and correlation.

1.7 The significance of difference, coefficient of correlation

1.8 Meaning of partial and multiple correlation

1.9 Simple applications of partial and multiple correlation

1.10 Biserial Correlation – Point biserial correlation

1.11 phi-correlation-contingency coefficient

UNIT- 2 The scaling of tests

2.1 Sigma scaling and standard scores

2.2 T scaling

2.3 Stanine scaling

2.4 Percentile scaling

2.5The reliability of test scores and methods of determining it.

2.6 Validity of test scores and determining validity

2.7 Item analysis

UNIT 3 : Analysis of Variance

3.1 Meaning of variance

3.2 Method of analyzing variance

3.3 Meaning of Covariance

3.4 Analysis of Co-variance

UNIT 4: Testing of Experimental hypothesis by, non parametric tests.

4.1 Chi-square test

4.2 Sign test

4.3 Median test

4.4 Man whitney U test

UNIT-5: Regression and prediction.

5.1 Nature of Scatter- diagram

5.2 Meaning of regression

5.3 Regression equations

5.4 Application of regression equations in prediction

Reference Books

1. H.E. garett- Ststistics on Psychology & edn, Longman Green & co., London

2. B. fruchter-Introd 1.1ction to factor analysis – D Van Hostrand & co., N.Y.

3. G Thompson – Frctoranalysis of human Ability, University of London Press

4. Albert Kurtz Semual Mayo –Statistical Methods in education and Psychological springer

International student edition.

ELECTIVE COURSE II (SEMESTER III)

PAPER X (B) - EDUCATIONAL ADMINISTRATION AND MANAGEMENT

OBJECTIVES:

(1) To enable the learner to become effective manager of teaching /Administration of Education.

(2) To enable learner to become & agents of change in various aspects of education i.e. classroom management, curriculum construction, examination systems, Educational policies.

(3) To acquaint the learner with the challenges and opportunities emerging in the management and administration in education.

(4) To acquaint the learner with the Central and State machinery for educational administration and management.

(5) To make the students understand about the finance, management of Education.

(6) To make the student familiar with the new trends and techniques of education.

(7) To enable the students to get some insight into supervision, inspection and know trends of development

(8) To development an understanding of the planning of education in India and its Socio-economic context.

UNIT- 1 Management concept and process

1.1 Management – concept, Need of Management, Characteristics of good Management.

1.2 Management at different levels-Elementary Higher, secondary Higher Education, Time Management, Functions of Management

1.3 Leadership –Meaning and nature of Leadership, Theories of Leadership, Styles of Leadership and Measurement of Leadership.

1.4 Role of Management/Principal characteristics of effective Educational leadership, Time management techniques, manager as a good leader, group dynamics and motivation.

UNIT 2: Application of Management concept in Academic areas of the educational systems-

2.1 Curriculum development /Evaluation

2.2 Teaching Learning Processes

2.3 Evaluation Assessment (Management, Manager, Teacher, student, Parents)- Self Appraisal.

2.4 Professional Growth- In service Training

2.5 Planning in Education – Approaches to Educational Planning

2.6 Communication,

2.7 Communication skills. (Verbal, non-verbal-written),

2.8 Barriers and distortions in communication.

2.9 Information Systems- Modern Information Technology.

UNIT – 3 Machinery for educational Administration

3.1 Central Machinery (CABE,NCTE,UGC,) / State Machinery for educational Administration,.

3.2 Organization and functions of directorate of Education.

3.3 Roll of Central Govt., State Govt., and local bodies in education at all levels.

3.4 Trends in Educational Management

3.5 Decision Making – Nature, division of work, Centralization action and Decentralization of decision making, their merits and limitations.

3.6 Organizational compliance.

3.7 Organizational Development.

UNIT 4 Finance Management-

4.1 National budget of Education

4.2 Principles of Educational finance

4.3 Methods of Financing Education

4.4 Source of Income: Govt, Private and co-operative patterns of investment in education- past, present and future.,

4.5 Grant – in-aid principles, practices, types and procedure in- respect of University level.

4.6 Cost of Education.

UNIT- 5 Quality Management in Education

5.1 Meaning and importance of Quality

5.2 Quality in Higher Education

5.3 Accreditation Concept- Meaning, parameters, Role of NAAC

5.4 Educational Supervision and inspection –

5.5 Meaning and Nature of Educational Supervision

5.6 Functions of a supervisor, Defects in existing system of supervision, Remedies,.

Practical – Any one

(1) Educational Survey of any state educational Institution.

(2) Report on an Institutional Planning of any one Educational Institute.

(3) Report on an Educational Institute on Quality Management...

Reference books

1. School Organisation and Administration- M.S. Sachdeva
2. Management in Education- Namita Roy chaudhary A. P.H. Publishing corporation, New Delhi.
3. Educational Planning and Management Premila Chandrasekaran, sterling Publication Pvt. Ltd.
4. Educational Administration and Management – S.S. Mathur
5. Theory of Educational Administration- S.R. Vashost
6. Efficient School Management and Role of Principals- Alka Karla
7. Administrative Strategy and Decision making- Hardwick Landuyt
8. Administration and management of Education- dr. S.R. Pandya, Himalaya Publishing House
9. Educational Administration Planning and Supervision- T.P. Lambal, V.R. Saxena, V.Murthy, Delhi Daoba house
10. School Organisation and Administration- U.S. Sidhu
11. Administration of Education in India- S.N. Mukharji
12. Educational Administration Principles and Practices- S.S. Mathur

CORE COURSE (SEMESTER III)

PAPER XI - GENDER PERSPECTIVES AND EDUCATION

Aims of the Course

This course will enable the students to

• develop basic understanding and familiarity with key concepts–gender,gender bias, gender stereotype, empowerment, gender parity, equityand equality, patriarchy and feminism;

• understand the gradual paradigm shift from women's studies to gender studies and some important landmarks in connection with gender and education in the historical and contemporary period;

• learn about gender issues in school, curriculum, textual materials across disciplines, pedagogical processes and its intersection with class, caste, religion and region; and

• Understand how gender, power and sexuality relate to education (interms of access, curriculum and pedagogy).

UNIT 1: GENDER ISSUES: KEY CONCEPTS

In this Unit the students will develop an understanding of some key concepts and terms and relate them with their context in understanding the power relations

1.1 Gender, sex, sexuality, patriarchy, masculinity and feminism

1.2 Gender bias, gender stereotyping, and empowerment

1.3 Equity and equality in relation with caste, class, religion, ethnicity, disability and region.

Suggested Practicum

• Preparation of project on key concepts and relating it with the social context of the pupil teacher

• Analysis of textual materials from the perspective of gender bias and stereotype

• Organising debates on equity and equality cutting across gender, class, caste, religion, ethnicity disability, and region.

UNIT 2: GENDER STUDIES: PARADIGM SHIFTS

In this Unit, the students will develop an understanding of the paradigm shift from women studies to gender studies, based on the historical backdrop. They would be able to construct critically the impact of policies, programmes and scheme for promotion of gender equality and empowerment.

2.1 Paradigm shift from women's studies to gender studies

2.2 Historical backdrop: Some landmarks from social reform movements of the nineteenth and twentieth centuries with focus on women's experiences of education

2.3 Contemporary period: Recommendations of policy initiatives commissions and committees, schemes, programmes and plans.

Suggested Practicum

• Preparation of project on critical analysis of recommendations of commissions and policies on capacity building and empowerment of girls and women, how these initiatives have generated in the formation of women collectives and have helped in encouraging grassroots mobilisation of women, such as the Mahila Samakhya programmes

• Project on women role models in various fields with emphasis on women in unconventional roles.

UNIT 3: GENDER, POWER AND EDUCATION

In this Unit, the students will develop an understanding of different theories on gender and education and relate it to power relations. The institutions involved in socialisation processes would be analysed to see how socialisation practices impact power relations and identity formation.

3.1 Theories on Gender and Education: Application in the Indian Context

• Socialisation theory

• Gender difference

• Structural theory

• Deconstructive theory

3.2 Gender Identities and Socialisation Practices in:

• Family

• Schools

• Other formal and informal organisation.

3.3 Schooling of Girls:

Inequalities and resistances (issues of access, retention and exclusion).

Suggested Practicum

• Discussion on theories of gender and education with its application in the Indian context

• Project on analysing the institution of the family

(i) Marriage, reproduction

(ii) Sexual division of labour and resources

• Debates and discussions on violation of rights of girls and women

• Analysis of video clipping on portrayal of women

• Collection of folklores reflecting socialisation processes.

UNIT 4: GENDER ISSUES IN CURRICULUM

Students will build on the previous two Units to understand how gender relates to education and schooling. In this Unit, the students will be able to understand on how school as an institution

addresses gender concerns in curriculum, textual materials and pedagogy. It will enable the student to draw linkages between life skills and sexuality.

4.1 Gender, culture and institution: Intersection of class, caste, religion and region

4.2 Curriculum and the gender question

4.3 Construction of gender in curriculum framework since Independence: An analysis

4.4 Gender and the hidden curriculum

4.5 Gender in text and context (textbooks' inter-sectionality with other disciplines, classroom processes, including pedagogy)

4.6 Teacher as an agent of change

4.7 Life skills and sexuality.

Suggested Practicum

• Preparation of indicators on participation of boys and girls in heterogeneous schools–public and private-aided and managed by religious denominations

• Preparation of tools to analyse reflection of gender in curriculum

• Preparation of checklist to map classroom processes in all types of schools

• Field visits to schools, to observe the schooling processes from a gender perspective.

UNIT 5: GENDER, SEXUALITY, SEXUAL HARASSMENT AND ABUSE

The Unit will enable students to apply the conceptual tools learnt regarding gender and sexuality to understand issues related to Sexual Harassment at the workplace and Child Sexual Abuse.

5.1 Linkages and differences between reproductive rights and sexual rights

5.2 Development of sexuality, including primary influences in the lives of children (such as gender, body image, role models)

5.3 Sites of conflict: Social and emotional

5.4 Understanding the importance of addressing sexual harassment in family, neighbourhood and other formal and informal institutions

5.5 Agencies perpetuating violence: Family, school, work place and media (print and electronic)

5.6 Institutions redressing sexual harassment and abuse.

Suggested Practicum

• Project on how students perceive sexuality and their own body images. It would also focus on how gender identities are formed

• Debate on how they perceive role models in their own lives

• Preparing analytical report on portrayal of women in print and electronic media.

Suggested Readings

1. Gender Analysis of State Policies: A case study of Chhattisgarh, Dr. Sen Ilina

2. Towards Gender Equality in Education: Progress and challenges in Asia-Pacific Region, R. Govinda, National University of Educational Planning and Administration,New Delhi.

3. Bhattacharjee, Nandini (1999) Through the looking-glass: Gender Socialisation in a Primary School in T. S. Saraswathi (ed.) Culture, Socialization and HumanDevelopment: Theory, Research and Applications in India. Sage: New Delhi.

4. Geetha, V. (2007) Gender. Stree: Calcutta.

5. Ghai, Anita (2008) Gender and Inclusive education at all levels In Ved Prakash & K.Biswal (ed.) Perspectives on education and development: Revising Education commission and after, National University of Educational Planning and Administration: New Delhi

6. Jeffery, P. and R. Jefferey (1994) Killing My Heart's Desire: Education and Female Autonomy in Rural India. in Nita Kumar (ed.) Women as Subjects: South Asian Histories. New Delhi:

7. Learning, Livelihoods, and Social Mobility: Valuing Girls' Education in Central India, Peggy Froerer, Brunnel University, Anthropolgy and Education.

CORE STUDY (SEMESTER IV)

PAPER XII CURRICULUM DEVELOPMENT

OBJECTIVES

(1) To understand the concept and principles of curriculum development.

(2) To understand and appreciate curriculum as a means of development of the individual.

(3) To gain insight in to the development of new curriculum.

(4) To understand the Foundations of curriculum development.

(5) To appreciate the need for continuous Curriculum reconstruction.

(6) To help the student to develop skills in framing curriculum for subjects of teaching, analyzing curriculum for teaching-learning process and developing course contents in the subjects of teaching.

UNIT – 1 Principles of Curriculum development

(a) Meaning and Concept of Curriculum

(b) Concept of Curriculum development

(c) Stages in the Process of Curriculum development

(d) Curriculum Syllabus and Units

UNIT- 2 Philosophical, Sociological and Psychological foundation of curriculum.

(a) Philosophical theories and their implications to Curriculum.

(b) Sociological needs and their implications for curriculum development.

(c) Psychological needs their implications for curriculum development.

(d) Curriculum development and teaching-learning process.

UNIT-3 Curriculum Development

(a) Need and Scope for Curriculum development, Criteria for Future Curriculum development and Characteristics of a good Curriculum.

(b) Strategies of Curriculum development.

(c) Guiding Principles for Curriculum development.

(d) Organization of Curriculum

UNIT-4 Procedure of organizing Content

(a) Formation of general objectives at School stage and their specification.

(b) Formation of instructional objectives and their specifications

(c) Terms of expected behavior changes in the students.

(d) Suggesting appropriate content to fulfill the objectives.

4.1 Factors responsible for innovations in curriculum development.

(a) Problems of curriculum reform.

(b) Periodic revisions of curriculum in view of the knowledge.

(c) Evaluation as an integral part of curriculum development.

(d) Need for permanent curriculum research unit.

UNIT-5 Evaluating the Curriculum

(a) A frame work for evaluation

(b) Planning for evaluation

(c) Conducting the Programme evaluation

(d) Evaluating the curriculum materials

(e) Conducting the Curriculum material evaluation

PRACTICAL WORK

1. Seminar on one of the topic assigned.

2. Critical analysis of the existing curriculum at various levels- primary/Secondary/Higher Secondary.

3. A report on the recent research on curriculum development

4. A Comparative study of two syllabi-state Government/ ICSE.

Reference Books

1ण ॆंव्गंपछां ॆडैंवफंदं रू उंनस्व ,व्रंव

2ण ॆंव्गंपछां ॆडैंवफंदंबंꠓ +चतवङ्गं रू कं′ पअंण तंण पठंडजंक्व

3ण ॆंव्गंपछां अलंअुंचदं अं चॄैंदं रूकं′ कनदंङ्गव कं′ चंतेंदॆंꠑ

4. Curriculum Organisation and Design- Jack Walton, Great Briton

5. Curriculum and lifelong Education- Studies for UNESCO

6. School Curriculum- Mohmmad Sharif Khan- ASHISH Publishing House, New Delhi.

7. The Improvement of Curriculum in Indian Schools H.E. Harmay, Ministry of Education.

8. Curriculum reform – B.D. Bhatt, Kanishka Publishers, New Delhi

9. Developing the Core Curriculum 3/ 4 roland C. Faunce, Nelson L. Bossing, Prentice Hall ofIndia, New Delhi

10. Evaluation and Research in Curriculum Construction- M.I. Khan I B.K. Nigam- Kanishka , Publisher, New York

11. Curriculum Development & Educational Technology Mamidj, S. Ravishankar- Sterling Publishers.

SPECIALIZATION COURSE (SEMESTER IV)

PAPER XIII (A) – EDUCATIONAL GUIDANCE AND COUNSELING (PART II)

UNIT I

1. Bases of guidance: Philosophical, Sociological, Pedagogical, Psychological

2. Concept of guidance: Meaning, Basic assumptions Need of guidance, Influence of family and Community on guidance. Functions and purposes of Guidance.

3. Types of guidance: Major guidance areas- Personal, educational, Career, Social, Health, Marital, Moral.

4. Adjustive guidance: Identification of maladjusted children and the principles of dealing with them.

UNIT II

2. Guidance of children with problems and special needs: gifted and creative; Role of the teacher in helping such children.

2.. Group guidance: concept and techniques of group guidance.

3. Principles of mental hygiene and their implications of effective adjustment; mental

health and development of integrated personality.

UNIT III

1. Guidance services: Individual Inventory and Information counselling Group

Guidance services, Placement services and Follow-up services.

• Guidance of children with special needs, role of teacher.

2. Organization of a Guidance programme and its principles-at elementary,

secondary, college and university levels.

• Evaluation of Guidance programmes

UNIT IV

1. Guidance and Appraisal of the Individual: meaning, need, purpose and place of appraisal in Guidance.

2. Techniques of Appraisal: Testing techniques - tests (viz. Intelligence, Aptitude,

Knowledge and Achievement), Interest tests and Personality measures.

• Non-Testing Techniques – Rating scales, Questionnaires, Inventories, records and sociometric tools.

UNIT V

1. Job Analysis: Meaning and objectives of job analysis

2. Outline for job study

3. Job profiles

4. Job satisfaction

Practical Work (any one)

1. Job analysis of any one occupation

2. Prepare an interview schedule for an effective Counselling

3. Visit a guidance Centre and Write a report about its organization and functions.

Reference Books

Blocher, D.H. et al., (Eds. 1971): Guidance systems, New York: The Ronald Press Co.

Bhatnagar, A. & Gupta, N. (Eds. 1999): Guidance and Counselling: A Theoretical Perspective, New Delhi: Vikas Publishing House.

Lakshmi, K.S. (Eds. 2000) : Encyclopaedia of Guidance and Counselling, New Delhi: Mittal Publications.

Shaw, M.C. (1973): School Guidance Systems. Boston: Houghton Mifflin Co.

Anastasi, A. (1982). Psychological testing. London: Collier Macmillan Publishers.

Bernard, H.W. & Fullmer, D.W. (1972). Principles of Guidance- a basic text. Bombay: Allied Publishers.

Dink Mayer, D.C. & Caldwed, C.l. (1970). Development Counselling and Guidance- A Comprehensive School Approach. New York: Mac Graw Hill.

Donald, H.B. Richard, D.C. & Willier, E.D. (1971). Guidance Systems- An introduction to student personal work. New York: The Ronald Press Company.

Fullmer, D.W. & Bernard, H.W. (1972). Counselling: Content and Process. New Delhi: Thompson Press.

Hackney, H. & Nye, S. (1973). Counseling Strategies and Objectives. New Jersey: Prentice Hall Inc.

Indu Dane (1983). The basic essentials of counselling. New Delhi: Sterling Publishers Pvt.

Jones, Stafflire & Stewart (1978). Principles of Guidance Sixth Edition. New Delhi: Mac Graw Hill.

Mortensen, D.U. & Schumuller, A.M. (1976). Guidance in todays schools. New York: John Willy & Sins. Inc.

Moser & Moser (1963). Counselling and Guidance an Exploration. New York: Prentice Hall Inc.
Patterson, C.H. (1980). Theories of Counselling and Psycho Therapy. New York, Harper and Roul.

Richard, C.N. (1972). Guidance and Counselling in the Elementary School. New York: Hlot Rineheart and Winston Inc.

Robert Basell (1971). Interviewing and Counselling. London: H.T. Batsford, Ltd.

Stefflee & Grant (1972). Theories of Counselling. New York: McGraw Hill.

Traxler & North (1966). Techniques of Guidance. New York: Harper & Row Publishers.

Super, D.E. & Crites, J.O. (1966). Appraising Vocational Fitness, Harper & Row.

Raj Singh (1994). Educational and Vocational Guidance. New York: Commonwealth Publishers.

SPECIALIZATION COURSE (SEMESTER IV)

PAPER XIII (B) – EDUCATION FOR THE DIFFERENTLY ABLED(PART II)

COURSE CONTENTS

UNIT I

Children with physical disabilities : Basis of classification (Physical , physiological , social , psychological and mental), characteristics and etiology of each type and difference between them.

Education of visually impaired: Concept , Characteristics , Types (degree of impairment) .Etiology and prevention.

Psychology of teaching and learning in relation to the disability and their specific needs. Curriculum , pedagogy , evaluation and placement . Role of National Institute for the visually impaired.

UNIT II

Education for the hearing impaired : Concept , Characteristics , Types (degree of impairment) .Etiology and prevention.

Psychology of teaching and learning in relation to the disability and their specific needs. Curriculum , pedagogy , evaluation and placement . Role of National Institute for the hearing impaired.

UNIT III

Education for the Orthopaedically handicapped : Concept , Characteristics , Types (degree of impairment) .Etiology and prevention.

Psychology of teaching and learning in relation to the disability and their specific needs. Curriculum , pedagogy , evaluation and placement . Role of National Institute for the Orthopaedically handicapped.

UNIT IV

Education for the mentally retarded : Mentally retarded , slow learners , backward and learning disabled children. Concept , Characteristics , Etiology and prevention.

Psychology of teaching and learning in relation to the disability and their specific needs. Curriculum , pedagogy , evaluation and placement . Role of National Institute for the Mentally retarded.

UNIT V

Socially deprived and emotionally disturbed children : Concept , characteristics and types (Dyslexic and delicate). Etiology and prevention.

Psychology of teaching and learning in relation to the disability and their specific needs. Curriculum , pedagogy , evaluation and placement .

Practicum

Books Recommended:

1. Bender, W.N. Learning Disability, Allyn & Bacon, Simon and Schuster, 1995, Boston London

2. Berdine, W.H & Blackhurst A.E.(eds). An Introduction to Special Education, Harpers Collins Publishers, Boston 1980.

3. Dunn., L & Bay, D.M (ed.): Exceptional Children in the Schools, New York : Holt, Rinehart, Winston.

4. Hallahar, D.P & Kauffman, J.M., Exceptional Children: Introduction to Special Education, Allyn & Bacon, Massachusetts, 1991

5. Hewett, Frank M. & Foreness Steven R., Education of Exceptional Learners, Allyn & Bacon, Masachusetts, 1984.6. Jorden, Thomes E. The Exceptional Child, Ohio: Merrill.

7. Kirk, S.A & Gallagher J.J., Education of Exceptional Children ; Houghton Mifflin Co., Boston, 1989

8. Magnifico, L.X: Education of the Exceptional Child, New York, Longman.

9. Shanker, Udey: Exceptional Children, Jullundur: Sterling Publications.

10. Singh, N.N and Beale, I.L. (eds.) Learning Disabilities – Nature, Theory and Treatment Spring-Verlag, New York, Inc:1992.

11. Smith, C.R, Learning Disabilities – the interaction of Learner, Task and Setting. Allyn and Bacon, Massachusetts, 1991.

12. Strange, Ruth : Exceptional Children & Youth J.J. : Prentice Hall.

Syllabus

Women Law & Gender Justice

Part – I

Theory

Maximum Marks : 100

Unit - I

Basic concept **:** What is Law & Justice, Sex, Gender, Femininity, Masculinity, Androgyny, Sexually, Discrimination and Women Empowerment.

Feminism **:** Concept and Meaning, Feminism in India, Development and Feminist Development theory.

Constitution of India and the Gender question : Fundamentals rights, Directive Principles of state policy and Fundamental duties.

Unit II

Women Human Right : Historical background, UN Conference and Convention on women Need and Principles of Women's Rights. Natural rights of a girl child.

Law : Concept and Importance. Judicial System RTI, PIL, Legal Aid for women in India Family Court.

Unit III

Law for women in India : Marriage laws : Special marriage Act, 1954, Muslim Personal Law (shart) application Act., 1937, Prohibition of Child Marriage act, 2006.

Divorce Law : Judicial Separation, Divorce Restitution of Conjugal Rights and Maintenance (Hindu and Muslim) section 125. Criminal procedure code 1973.

Unit IV

Property Right and Women : Right to succession and inheritance (Hindu and Muslim Law).

Medical Termination of Pregnancy Act.1971, PCPNDT Act, 2000, Prevention of Sexual Harassment of Women in Work place. The indecent – representation of women (Prohibition) Act, 1986, Domestic Violence Act, 2005.

Anti Rap Law (latest criminal amendment act 2012)

Adoption laws in India.

Surrogacy laws in India.

Status of single female parent at the time of adoption.

Succession Act. etc

Unit – V

1. National and State Commission of Women : Role & Responsibilities.
2. Women's contribution in Policy Making and Leadership in Women.
3. Understanding women's issues in Panchyati Raj
4. Gender budgeting.

Part II

Maximum Marks : 100

Project work :

PT. RAVISHANKAR SHUKLA UNIVERSITY

RAIPUR -492010

DEGREE OF

BACHELOR OF VOCATION (B.Voc.)

IN

Renewable Energy Technology & Management

SCHEME AND SYLLABUS

UNDER THE

FACULTY OF SCIENCE

SYLLABUS

(FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2015 – 16 ONWARDS)

AUGUST, 2015

Approved on 07th November,2015 by Board of Studies in Electronics

7/11/2015

07/11/2015

PROGRAMME STRUCTURE

Year-1 Semester- I						
Module Code	**Name**	**L**	**T**	**P**	**Credit**	**Marks**
GENERAL EDUCATION COMPONENT						
RETM-101	Applied Physics	2	1	0	3	100
RETM-102	Environmental Studies	2	1	0	3	100
RETM-103	Fundamentals of Electronics	2	1	0	3	100
RETM-104	Business Communication - I	1	1	1	3	100
SKILL COMPONENT						
RETM-105	Energy Sources and Energy Scenario	2	1	0	3	100
RETM-106	Renewable Energy Sources and Technologies-I	1	1	1	3	100
RETM-107	Solar Photovoltaic Technologies-I	2	1	0	3	100
RETM-108	Waste to Energy Conversion Systems	2	1	0	3	100
RETM-109	Laboratory I (Electronics Lab & Photovoltaic Lab)	0	0	12	6	200
	TOTAL				**30**	**1000**
Year-1 Semester-II						
GENERAL EDUCATION COMPONENT						
RETM-201	Business Communication - II	2	1	0	3	100
RETM-202	Power Electronics	2	1	0	3	100
RETM-203	Biochemistry	2	1	0	3	100
RETM-204	IT FOR BUSINESS	1	1	1	3	100
SKILL COMPONENT						
RETM-205	Solar Thermal Engineering and Applications	2	1	0	3	100
RETM-206	Concentrating Solar Thermal Power Plants	2	1	0	3	100
RETM-207	Renewable Energy Sources and Technologies-II	2	1	0	3	100
RETM-208	Renewable Energy Resources and improved Energy Utilization	1	1	1	3	100
RETM-209	Laboratory II (Computer lab & RE lab)	0	0	12	6	200
	TOTAL				**60**	**2000**

7/11/15

Year-2 Semester- III						
Module Code	**Name**	**L**	**T**	**P**	**Credit**	**Marks**
GENERAL EDUCATION COMPONENT						
RETM-301	Innovations In Science	2	1	0	3	100
RETM-302	Material Science for Energy Applications	2	1	0	3	100
RETM-303	Electronics and Instrumentation	2	1	0	3	100
RETM-304	Digital Electronics & Fundamentals Of Microprocessor.	1	1	1	3	100
SKILL COMPONENT						
RETM-305	Solar Cell and Photovoltaic Technologies	2	1	0	3	100
RETM-306	Programming C++/Java	1	1	1	3	100
RETM-307	Smart and Micro-grid	1	1	1	3	100
RETM-308	Energy Storage Systems	2	1	0	3	100
RETM-309	Laboratory III(Digital Electronics & RE lab)	0	0	12	6	200
Year-2 Semester-IV						
GENERAL EDUCATION COMPONENT						
RETM-401	Life Coping Skills	1	1	1	3	100
RETM-402	Applied Mathematics I	2	1	0	3	100
RETM-403	Basic Electrical Engineering Systems	2	1	0	3	100
RETM-404	Project Writing I	1	1	1	3	100
SKILL COMPONENT						
RETM-405	Energy Management and Auditing	1	1	1	3	100
RETM-406	Solar Photovoltaic Power Plants	2	1	0	3	100
RETM-407	Engineering Drawing	2	1	0	3	100
RETM-408	Wind Energy Conversion Systems	2	1	0	3	100
RETM-409	Workshop Practices I/Minor Project	0	0	12	6	200
	TOTAL				**60**	**2000**

Year-3 Semester-V						
Module Code	**Name**	**L**	**T**	**P**	**Credit**	**Marks**
GENERAL EDUCATION COMPONENT						
RETM-501	Project Writing II	1	1	1	3	100

7/11/15 7.11.15

SKILL COMPONENT						
RETM-502	Energy in Buildings	2	1	0	3	100
RETM-503	Energy Efficiency in Electrical Utilities	2	1	0	3	100
RETM-504	Other Renewable Energy Systems	2	1	0	3	100
RETM-505	Hydrogen Energy and Fuel Cells	2	1	0	3	100
RETM-506	Energy Modelling and Project Management	2	1	0	3	100
RETM-507	Energy Economics and Planning	2	1	0	3	100
RETM-508	Energy Efficiency in Thermal Utilities	2	1	0	3	100
RETM-509	Workshop Practices II	0	0	12	6	200
Year-3 Semester-VI						
GENERAL EDUCATION COMPONENT						
RETM-601	Industrial Training	0	0	20	10	350
RETM-602	Major Project	0	0	40	20	650
	TOTAL				**60**	**2000**

SEMESTER I (Certificate Course)

This course is designed to give you an insight in to the world of renewable energy technologies. You will get a chance to investigate all aspects of renewable energy. In this programme you will explore:

* Solar energy and its thermal and photovoltaic application
* Details of passive solar architecture
* Wind technologies
* Various biomass to energy routes
* Small hydro technologies
* Geothermal, tidal, wave ocean energy technologies
* Hydrogen and fuel cell

RETM-101 Applied Physics

Unit -1

Electric Current and Ohm's Law: Electron Drift Velocity-Charge Velocity and Velocity of Field Propagation- Electric Potential - Conductance and Conductivity- Ohm's Law Resistance in Series- in Parallel-Types of Resistors-Nonlinear - Varistor-Short and Open Circuits- Series Circuit-Equivalent Resistance-Relative Potential-Voltage Divider Circuits

Unit – 2

Electrostatics: Static electricity-Absolute and Relative Permittivity of a Medium-Laws of Electrostatics-Electric Field-Electrostatic Induction-Electric Flux and Faraday Tubes-Electric Flux Density - Electric Displacement D-Gauss Law- Poisson and Laplace-Electric Potential and Energy-Potential and Potential Difference-Potential at a Point-Potential of a charged sphere-Equi potential Surfaces-Voltage and Dielectric Strength-Boundary Conditions

Unit – 3

Electromagnetic Induction: Relation between Magnetism and Electricity-Production of

7/11/15 7.11.15

Induced E.M.F. and Current-Faraday's Laws of Electromagnetic Induction- Lenz's Law Induced E.M.F.-Dynamically-Statically-induced E.M.F.-Self-Inductance-Coefficient of Self Inductance (L)-Mutual Inductance-Coefficient of Mutual Inductance (M)-Coefficient of Coupling-Inductances in Series and Parallel

Unit – 4

Magnetic Hysteresis- Area of Hysteresis Loop Properties and applications of Ferromagnetic Materials-Permanent magnet materials-Steinmetz Hysteresis Law-Energy Stored in Magnetic Field-Rate of Change of Stored Energy- - Lifting Power of Magnet-Rise and Decay of Current in Inductive Circuit- Transient Current Rise and decay R-L Circuit -Automobile Ignition System

References

1. Electrical Technology, Naidu-Kamakshaiah, Tata McGraw-Hill Education, 2006
2. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI Learning Pvt. Ltd.,2005
3. A Text Book of Electrical Technology, B.L. Theraja, S. Chand Limited, 2008
4. Photovoltaics: Design and Installation Manual, Solar Energy International, 2012

Module RETM – 102 ENVIRONMENTAL STUDIES

Unit I

Learning Objectives:

1. To familiarize students to the basic concepts of Environmental studies.
2. To help students develop their own perspectives around environmental issues.
3. To enable students to take practical steps to conserve the environment.

Number of lectures: 45

UNIT 1

Environment [12 lectures]

a. Definition and Composition – Lithosphere, Hydrosphere, Atmosphere, Biosphere, Hydrological Cycle
b. Historical Development and Approaches
c. Man and Nature relation and interaction with respect to Food, Clothing, Shelter and Occupation: Concept of Ecology and Ecosystem.

UNIT 2

Resources and Wealth [12 lectures]

a. Meaning, Types of Resources, Exploitation of Resources, use of Technology and its Impact on Natural Environment
b. Wealth – meaning, Distinction between wealth and resources, Optimum Conversion of Resources into wealth
c. Anthropogenic Waste – its effects, Man-made Industrial waste.

UNIT 3

Environmental Degradation [12 lectures]

a. Meaning, causes : Degradation of Urban Land, Forest and Agricultural Land due to natural causes and human interference.

b. Global Warming : Problems of non-degradable Waste – Electronic Devices, Plastic and Man- made fibres.

c. Environmental Assessment – Environmental Impact Assessment (EIA), Environmental Auditing, Environmental Legislation in India, Carbon Bank.

UNIT 4

Environmental Management [9 lectures]

a. Meaning, development and environmental linkages.

b. Environmental concerns in India. The need for sustainable development.

c. Actions for environmental Protection: national and international initiatives, emerging environment management strategies, Indian initiatives.

d. Environmental Protection Movements and NGOs in India.

Continuous Internal Assessment: Projects / Presentations / Tests

List of Recommended Reference Books:

R. Rajagopalan, R. (2005) ***Environmental Studies – From Crisis to Cure.*** Delhi: OUP

Additional reading:

- Guha Ramachandra Environmentalism: A global history (OUP) (2000)
- Movies:
- An Inconvenient Truth, Al Gore
- The 11th Hour, Leonardo DiCaprio
- The Age of Stupid. Franny Armstrong.
- Baraka, Ron Fricke.
- Climate change: An Untold Story [Climate's First Orphans; The Weeping Apple Tree; A Degree of Concern; A Green Agony], Discovery Channel.
- Liquid city--Mathew Gandy.
- Story of Stuff --Free Range Studios Tides Foundation.
- Story of bottled water---Free Range Studios Tides Foundation

RETM-103: Fundamentals of Electronics

Unit – 1

Electronics – Introduction- Applications-Current and Voltage Source-Physics of Semiconductor Materials –Structure of Atom-Energy band gap diagram of Conductors, Semiconductors and Insulators

Unit – 2

Semiconductor Diode: Types of semiconductors – P & N Types – charge carriers –P &N junction theory-VI characteristics –ideal diode-Rectifiers-types of rectifiers- Filters-C, LC and π – Regulators – Zener diode -voltage Regulator, Series voltage Regulator Different types of filters- clipping and clamping circuits –LED-7-segment –Photo diode-LDR

Unit – 3

Transistor-amplifying action-transistor configuration:-CB, CE, CC Configurations-comparison-thermal runway-heat sink- Transistor ratings -Transistor biasing and stabilization –selection of operating point-different biasing circuits

FET – introduction, Types, construction, operation, characteristics – FET Parameters– Comparison between FET and BJT– JFET, MOSFET – UJT Characteristics, features and Applications

Unit – 4

Storage Batteries

Introduction, Types of Batteries primary and Secondary Batteries-Classification of Secondary Batteries base on their Use-Classification of Lead Storage Batteries Battery life and DOD, Battery Charging, State of Charge, Effect of temperature, Battery for Photovoltaic applications, Battery aging, important guidelines

References

1. Basic Electronics and Linear Circuits, Bhargava, Kulshreshtra & Gupta Tata McGraw-Hill Publishing Ltd. 2007
2. Applied Electronics, R S Sedha, S. Chand and Company Ltd. 2008
3. Principles of Electronics, V.K. Mehta, S.Chand and Company Ltd.2005
4. Electronics Service Technology Vol-1. Saji A.G,Shyam Mohan , Ayodhya publications, 2007
5. Integrated Electronics, Jacob Millman and C. Halkias Mill, Tata McGraw-Hill Publishing Ltd. 2008
6. Science & Technology of Photovoltaics P Jayrama Reddy, BS Publications ,CRC Press 2010
7. Solar Electricity Handbook - 2012 Edition: A Simple Practical Guide to Solar Energy - Designing and Installing Photovoltaic Solar Electric Systems, Michael Boxwell, Greenstream Publishers, 2012
8. Photovoltaics: Design and Installation Manual, Solar Energy International, 2012
9. Solar Electric Handbook: Photovoltaic Fundamentals and Applications, Solar Energy International, 2012

RETM-104 AECC: BUSINESS COMMUNICATION - I

LEARNING OBJECTIVE:

The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions

- To enable students to have firm grounding in English to be able to use it effectively in professional as well as social contexts.
- To work towards strengthening the learning process of English language so that our graduates can find their feet in the fiercely competitive job market.

Unit-1 **Introducing Professional English** Total Lectures: 09

1. Theory of Communication, Types and modes of Communication
2. Oral communication in English

3. Monologue, Dialogue, Group Discussion, Effective Communication/ Mis-Communication
4. English phonology
5. Intonation patterns in English
6. Intra-personal, Inter-personal and Group communication

Unit-2 Current Usage of English Grammar Total Lectures: 18

1. auxiliaries
2. tense and aspect
3. interrogative and negative sentences
4. the positive
5. conditionals
6. Concord

Unit-3 Vocabulary Total Lectures: 09

1. Verbal and Non-verbal (Spoken and Written)Personal, Social and Business
2. Phrasal Verbs
3. Idioms
4. Collocations

Unit-4 Written Business Communication Total Lectures: 09

1. Email Etiquette
2. Professional Presentations
3. **Writing Skills:** Documenting, Report Writing, Making notes, Letter writing Writing a Resume, Writing- Memo, Cover Letter

Continuous Internal Assessment

Classroom Practice:

- Greeting and introducing.
- Practicing Short Dialogues.
- Group Discussions, Seminars/Paper-Presentations.
- Listening News/Conversations/Telephonic Conversation.

Recommended **Readings:**

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas
5. Department of Humanities and Social Sciences, Anna University, 'English for Engineers and Technologists', Vols. I & II (Combined Edition), Orient Longman Pvt. Ltd., 2006.
6. LALA, PUSHP and Sanjay Kumar. 'Communicate or collapse: a handbook of effective public speaking, group discussions and interviews'. PHI Learning Pvt. Ltd., 2007.
7. M.M.Prasad, 'How to prepare for Group Discussion and Interview'. Tata McGrawHill, 2008.
8. Career Press Editors, '101 Great Resumes', Jaico Publishing House,2003.

9. R.S. Aggarwal, 'A Modern Approach to Verbal & Non-Verbal Reasoning',S. Chand & Co, 2004.
10. Mishra Sunita and Muralikrishna, 'Communication Skills for Engineers', 1stEdition. Pearson Education, 2004.

Module RETM – 105: Energy Sources and Energy Scenario

Unit I

Introduction to Energy

Definition and units of energy and power, Conversion, Energy terms, calorific value, Forms of energy, Classification of energy sources Quality and concentration of energy sources,Energy and Thermodynamics, Energy parameters, Conservation of energy, Energy flow diagram to the earth. Origin of fossil fuels, Time scale of fossil fuels, Role of energy in economic development and social transformation, Energy security.

Unit II

Energy and Growing Economy

Commercial energy production, Final energy consumption, Energy needs of growing economy,Long term energy scenario, Energy pricing, Energy sector reforms, Energy conservation and its importance, Energy strategy for the future, Energy Conservation Act-2001 and its features.

Unit III

Global Energy Scene

Energy consumption in various sectors, projected energy consumption for the next century, exponential increase in energy consumption, energy resources, coal, oil, natural gas, nuclear power and hydroelectricity, impact of exponential rise in energy consumption on global economy, future energy options.

Unit IV

Indian Energy Scene

Commercial and non-commercial forms of energy, energy consumption pattern and its variation as a function of time, India's Power Scene, Gas-Based Generating Plants, Nuclear Power Programme, urban and rural energy consumption, energy as a factor limiting growth, need for use of new and renewable energy sources, Socio-economic impacts, Rural development, Poverty alleviation, Employment; Security of supply and use, Environmental and ethical concerns, Economical aspects of renewable energy systems vs large hydro and thermal power projects.

Text Books:

1. Bani P. Banerjee, Energy and the Environment in India, Oxford University Press, New Delhi.
2. G. D. Rai, Non- conventional Sources of Energy, Khanna Publishers, Delhi.
3. Gopal kumar, Energy Independence Vision of a Hybrid, Unbound Future, Deep and Deep Publications Pvt. Ltd., New Delhi.
4. D. K. Asthana, Meera Asthana, Environment Problems and Solutions, S. Chand and Company Ltd., New Delhi.
5. Abdul Mubeen, M. Emran Khan, M. Muzaffarul Hasan, Energy and Environment, Anamaya Publishers, New Delhi.
6. Upender Pandel, M. P. Poonia, Energy Technologies for Sustainable Development, Prime Publishing, Ghaziabad (UP).
7. Renewable Energy Sources and Emerging Technologies, Kothari D.P. and Singal K. C, New Arrivals - PHI; 2 edition (2011)

Module RETM – 106: Renewable Energy Sources and Technologies

Unit I

Introduction to Non-conventional energy sources, Solar energy, Wind energy/power, Energy from biomass and biogas, Ocean energy ,Wave energy, Tidal energy/power, Geothermal energy, Hydrogen energy, Thermo-electric power, Fuel cell, Magneto-Hydro-dynamic (MHD) generator

Unit II

Renewable and Non-renewable energy sources: Renewable (Non-conventional) energy sources, Non-renewable energy sources, Alternative energy sources, Energy Scenario in India context, Electricity Generation from Non-conventional energy sources, Impact on environment, Fuels, Classification of fuels, Solid fuels ,Liquid fuels, Gaseous fuels

Unit III

SOLAR THERMAL TECHNOLOGIES: Solar Thermal Energy Systems: Absorption and Radiation, Heat Gain and Loss, Solar Cooking Systems ,Principle of Cooking, Cooking by Boiling, Speed of Cooking, Energy Required for Cooking, Types of Solar Cooker, Solar Distillation System , Distillation: Natural Process for Purifying Water

Unit IV

WIND ENERGY: Wind Flow, Motion of Wind , Vertical Wind Speed Variation,Distribution of Wind Speeds, Power in the Wind, Conversion of Wind Power: Wind Turbine, Efficiency of Wind Power Conversion, Co, Types of Wind Turbines, Components of a Wind Turbine, Worldwide Wind Installations

Wind Turbine Sizing and systems Design , Energy Derived from a Wind Turbine

Text Books:

1. Renewable Energy Technologies: A Practical Guide for Beginners, Chetan Singh Solanki, PHI|School Books (2008)
2. Fundamentals of Renewable Energy Systems Paperback – D. Mukherjee, New Age International Publisher; First edition (2011)
3. Renewable Energy Sources and Emerging Technologies, Kothari D.P. and Singal K. C, New Arrivals - PHI; 2 edition (2011)
4. G. D. Rai, Non- conventional Sources of Energy, Khanna Publishers, Delhi.

Module RET – 107: Solar Photovoltaic Technologies

Unit-1

SOLAR RADIATION: Solar Spectrum, Extraterrestrial Radiation, Radiation on the Earth Surface, Global, Direct and Diffuse Solar Radiation, Solar Radiation at a Given Location, Annual Variation in Solar Radiation, Optimal Tilt for Solar Equipment, Monthly Averaged Global Radiation at Optimal Tilt

Unit-2 Fundamentals of Solar Cells : Characteristics of semiconductors, Differences between semiconductors, insulators and conductors Theory of p n junction, Principle of operation of p-n junction Solar Cell, I-V Characteristics Solar Cell parameters ,Voc, Isc, FF ,conversion efficiency and power output of solar cell ,Status of Photovoltaic Technologies.

Unit-3

SOLAR PHOTOVOLTAIC TECHNOLOGIES: Solar PV Technology: Advantages and Limitations, Brief History of the Technology, Basics of Technology, the Amount of Power Generated, the Rated Power and Actual Power from a Module, Generating More Power Using Solar PV, Protection of Solar Cells

Unit 4

Solar PV Systems and their applications : Solar PV Module Ratings and Cost, Battery Ratings and Cost , Inverter Ratings and Cost, Maximum Power Point Tracking (MPPT), Solar PV Lantern, Design and Costing, Stand-alone PV System: Home Lighting and Other Usage, Solar PV System Designing , Case Study, Cost Estimation of a PV System

References

1. Renewable Energy Technologies: A Practical Guide for Beginners, Chetan Singh Solanki, PHI|School Books (2008)
2. Solar Photovoltaics: Fundamentals, Technologies and Applications, Chetan Singh Solanki PHI; 3 edition 2015
3. Renewable Energy Sources and Emerging Technologies, Kothari D.P. and Singal K. C, New Arrivals - PHI; 2 edition (2011)
4. Solar Photovoltaic Technology and Systems: A Manual for Technicians, Trainers and Engineers, Chetan Singh Solanki PHI (1 January 2013)
5. Fundamentals of Renewable Energy Systems Paperback – D. Mukherjee, New Age International Publisher; First edition (2011)
6. Science & Technology of Photovoltaics P Jayrama Reddy, BS Publications ,CRC Press 2010

7. From Sunlight to Electricity: A Practical Handbook on Solar Photovoltaic Applications, Suneel Deambi, The Energy and Resources Institute, TERI (30 January 2009)

RETM-108 Waste to Energy Conversion Systems

Unit I

Introduction

Introduction to waste and waste processing, Definitions, sources, types and composition of various types of wastes; Characterization of Municipal Solid Waste (MSW) , Industrial waste and Biomedical Waste (BMW), Waste collection and transportation; Waste processing-size reduction, Separation; Waste management hierarchy, Waste minimization and recycling of MSW; Life Cycle Analysis (LCA), Material Recovery Facilities (MRF), Recycling processes of solid waste.

Unit II

Waste Treatment and Disposal

Aerobic composting, Incineration, different type of incineration; medical and pharmaceutical waste incinerations, Landfill classification, types, methods and sitting consideration, layout and preliminary design of landfills: composition, characteristics, generation, movement and control of landfill leachate and gases, environmental monitoring system for land fill gases, Rules related to the handling, treatment and disposal of MSW and BMW in India.

Unit III

Waste to Energy Conversion Technologies

Sources of energy generation, incineration, gasification of waste using gasifiers, briquetting, utilization and advantages of briquetting. Anaerobic digestion of sewage and municipal wastes, direct combustion of MSW-refuse derived solid fuel, industrial waste, agro residues, land fill gas generation and utilization.

Unit IV

Environmental and Commercial Aspects of Waste to Energy

Present status of technologies for conversion of waste into energy, design of waste to energy plants for cities, small townships and villages, Environmental and health impacts of incineration and other waste to energy conversion systems, case studies of commercial waste to energy plants, Strategies for reducing environmental impacts.

Text Books:

1. Gary C. Young, Municipal Solid Waste to Energy Conversion Processes: Economic, Technical, and Renewable Comparisons, ISBN: 9780470539675, John Wiley and Sons.

2. Velma I. Grover and Vaneeta Grover, Recovering Energy from Waste Various Aspects, ISBN 978-1-57808-200-1.

3. Shah, Kanti L., Basics of Solid and Hazardous Waste Management Technology, Prentice Hall.

4. Rich, Gerald et.al., Hazardous Waste Management Technology, Podvan Publishers.

5. Marc J. Rogoff, Waste-to-Energy, Elsiever.

6. Parker, Colin and Roberts, Energy from Waste - An Evaluation of Conversion Technologies, Elsevier Applied Science, London.

7. Manoj Datta, Waste Disposal in Engineered Landfills, Narosa Publishing House.

8. Bhide A. D., Sundaresan B. B., Solid Waste Management in Developing Countries, INSDOC, New Delhi.

Semester-I

RETM-109 LABORATORY –I (6 credits)

LAB A : Electronics Lab

PRACTICALS (*ELECTRONICS*)

1. Study of forward and reversed biased characteristics of PN Junction Diode
2. Study of breakdown characteristics and voltage regulation action of Zener diode.
3. Study of half wave & full wave rectifier
4. To study and observe waveform at the output of half wave rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.
5. Study of Capacitor input, L section and π section filter
6. Study of output characteristics of Bipolar Junction Transistor in CE mode.
7. Study of output and transfer characteristics JFET/ MOSFET.
8. Study of I-V characteristics of UJT and UJT based relaxation oscillator.
9. Study of I-V characteristics of SCR.
10. Design, build and test Low pass and High pass RC filters.
11. Study of Low voltage Half – wave, Full – wave and Bridge rectifier circuits.
12. Study of switching and amplification actions of BJT and JFET/ MOSFET
13. Study of potential divider biasing of BJT and its use in DC motor driving.

LAB B: Photovoltaic Laboratory

1. Identifying and Measuring the Parameters of Solar PV Module in the Field
2. Series and Parallel Connection of PV Modules
3. Estimating the Effect of sun Tracking on Energy Generation by Solar PV Modules
4. Efficiency Measurement of Standalone Solar PV System
5. Dark and Illumination Current-Voltage Characteristics of Solar Cell
6. Solar Cells Connected in series and in Parallel
7. Dependence of Solar Cell I-V Characteristics on Light Intensity and Temperature
8. Carrier Lifetime Measurements for a Solar Cell
9. Spectral Response Measurement
10. Solar Cell Simulation Using PC1D Simulator
11. SEQUEL: Using the GUI
12. Find the MPP manually by varying the resistive load across PV panel
13. Find the MPP by varying the duty cycle of the DC-DC converter
14. Observe the Vm, Im, Pm and duty cycle at which MPP occurs, with MPP algorithm Observe the response of Pm in the Plotter and compare with the Pm observed in the experiment

PT. RAVISHANKAR SHUKLA UNIVERSITY

Centre for Basic Sciences

Syllabus of

Integrated M. Sc. : Biology Stream

[Choice and Credit Based System]

Semester Examination

SESSION 2015-2020

Integrated M. Sc. : Biology Stream

[Choice and Credit Based System]

Scheme of Examination: Session 2015-20

(P: Physics, M: Mathematics, C: Chemistry, B: Biology, G: General, H: Humanities CB: Chemistry Biology, PCB: Physics Chemistry Biology, MB: Maths for Biology)

FIRST YEAR [July 2015 to June 2016]

SEMESTER-I

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 101	Biology I (Introductory Biology)	[2 +1]	3
C 101	Chemistry I (Structures & Bonding)	[2 +1]	3
P 101	Physics I (Classical Physics)	[2 +1]	3
MB101	Mathematics I	[2 +1]	3
G 101	Computer Basics	[2 +1]	3
H 101	Communication Skills	[2 +0]	2
		Contact hrs/per week Lab	**Credits**
BL101	Biology Laboratory	[4]	2
CL 101	Chemistry Laboratory	[4]	2
PL 101	Physics Laboratory	[4]	2
GL 101	Computer Laboratory	[4]	2
			25

SEMESTER-II

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 201	Biology II (Introduction to Macromolecules)	[2 +1]	3
C 201	Chemistry II (Chemical thermodynamics)	[2 +1]	3
P 201	Physics II (Electricity, Magnetism & Optics)	[2 +1]	3
MB101	Mathematics II (Linear Algebra, Calculus of several variables)	[2 +1]	3
G 201	Electronics & Instrumentation	[2 +1]	3
G 202	Glimpses of Contemporary Science	[2]	2
		Contact hrs/per week Lab	**Credits**
BL 201	Biology Laboratory	[4]	2
CL 201	Chemistry Laboratory	[4]	2
PL 201	Physics Laboratory	[4]	2
GL 201	Electronics Laboratory	[4]	2
			25

SECOND YEAR [July 2016 to June 2017]

SEMESTER-III

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
CB301	Essential Mathematics for Chemistry & Biology	[3 +1]	4
CB 302	Biochemistry – I	[3 +1]	4
B 301	Cell Biology – I	[3 +1]	4
CB 303	Organic Chemistry-I	[3 +1]	4
H 301	World Literature	[2 +0]	2
H302	History & Philosophy of Science	[2 +0]	2
		Contact hrs/per week Lab	**Credits**
BL 301	Biology Laboratory	6	3
GL 301	Applied electronics laboratory	4	2
			25

SEMESTER-IV

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 401	Cell Biology – II	[3 +1]	4
B 402	Biochemistry – II	[3 +1]	4
CB 401	Introductory Spectroscopy (UV-vis, fluorescence, IR, Raman, NMR)	[3 +1]	4
PCB 401	Physical & Chemical kinetics	[3 +1]	4
G 401	Statistical techniques and Applications	[3 +1]	4
		Contact hrs/per week Lab	**Credits**
BL 401	Biology Laboratory	6	3
GL 401	Computational laboratory and Numerical Methods	4	2
			25

THIRD YEAR [July 2017 to June 2018]

SEMESTER-V

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 501	Genetics	[3 +1]	4
B 502	Molecular Biology	[3 +1]	4
B 503	Biodiversity	[3 +1]	4
CB 501	Analytical Chemistry	[3 +1]	4
G 501	Earth Sciences and Energy & Environmental Sciences	[3 +1]	4
		Contact hrs/per week Lab	**Credits**
BL 501	Biology Laboratory	10	5
			25

SEMESTER-VI

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 601	Immunology	[3 +1]	4
B 602	Animal Physiology	[3 +1]	4
B 603	Plant Physiology	[3 +1]	4
B 604	Microbiology	[3 +1]	4
CB 601	Biophysical Chemistry	[3 + 0]	3
H601	Ethics of Science and IPR	[2 + 0]	2
		Contact hrs/per week Lab	**Credits**
BL 601	Biology Laboratory	8	4
			25

FOURTH YEAR [July 2018 to June 2019]

SEMESTER-VII

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 701	Neurobiology	[3 +1]	4
B 702	Immunology – II	[3 +1]	4
B 703	Developmental Biology	[3 +1]	4
B 704	Imaging technology in biological research	[3 +1]	4
BPr 701	Reading Project	-	4
		Contact hrs/per week Lab	**Credits**
BL 701	Advanced Biology Laboratory	[5 + 5]	5
			25

SEMESTER-VIII

Subject	Subject	Contact hrs/per week Theory + Tutorials	Credits
B 801	Virolog	[3 + 1]	4
B 802	Biotechnology – I	[3 + 1]	4
B 803	Bioinformatics	[3 + 1]	4
B 804	Biotechnology – II	[3 + 1]	4
		Contact hrs/per week Lab	**Credits**
BL 801	Advanced Biology Laboratory	[5 + 5]	5
BPr 800	Project	-	4
			25

FIFTH YEAR [July 2019 to June 2020]

SEMESTER-IX

Subject	Subject	Contact hrs/per week Lab	Credits
BPr 901	Project	-	20
			20

SEMESTER-X

Subject	Subject	Contact hrs/per week Lab	Credits
E 1001	Electives I	[3 + 2]	5
E 1002	Electives II	[3 + 2]	5
E 1003	Electives III	[3 + 2]	5
E 1004	Elective IV	[3 + 2]	5
			20

Total Credits: 240

Electives:

1. Toxicology and clinical research
2. Molecular modeling and drug design
3. Ethology
4. Parasitology
5. Reproductive biology
6. Occupational diseases (infectious incl)
7. Plant pathology
8. Plant communication
9. Animal migration
10. Commercial products from plants and animals
11. Biology of food industry
12. Transgenics
13. Ethical issues in biology and medicine
14. Physical biology
15. Astrobiology
16. Biology of traditional medicines
17. Translational biology
18. Science writing and communication
19. Forensic science
20. Epigenetics
21. On-line courses

FIRST YEAR

Semester – I [July- December 2015]

B 101: Biology I (Introductory to Biology)

Unit-I
Life: History and origin of life, Concepts of biological evolution, natural selection, speciation. Classification of living things: Classification and domains of life, Prokaryotes and Eukaryotes, Taxonomy of plants, animals and microorganisms.

Unit-II
Ecology & Ecosystem: Concept of ecology and ecosystem, ecological succession, ecosystem dynamics, flow of ecology and matter, biogeochemical cycling, ecosystem changes, biotic and biotic factors and stresses, food web, adaptation of individual organism to the environment through genetic changes.

Unit-III
Cell Biology: Discovery of cell, cell theory, classification of cell types, cell membrane, cell-cellinteractions, energy and metabolism, respiration, photosynthesis, sexual reproduction.

Unit-IV
Cell Division and System Development: cell cycle, mitosis, meiosis, mechanism of development (stem cells), formation of tissues.

Unit-V
Physiology- Body Systems: Digestive system, circulatory system, Lymphatic system, nervous system, respiratory system, sensory system, homeostasis.

Books Recommended:

S.No.	Author	Book
1	Neil A Campbell and JB Reece (2007)	Biology with Mastering Biology (8th Edition)
2	NA Campbell, JB Reece, MR Taylor and EJ Simon (2008)	Biology: Concepts & Connections with biology (6th Edition)
3	Charles Darwin (2008)	On the Origin of Species
4	B Alberts, D Bray, K Hopkin and AD Johnson (2009)	Essential Cell Biology
5	Rene Fester Kratz (2009)	Molecular and Cell Biology For Dummies
6	MJ Behe (2006)	Darwin's Black Box: The Biochemical Challenge to Evolution
7	SD Garber (2002)	Biology: A Self-Teaching Guide, (2nd Edition)

C 101: Chemistry –I [Structure & Bonding]

Unit-I
Atomic spectra, Bohr's theory of atomic structure, Sommerfeld's theory for complex electron spin and magnetic quantum number, Pauli exclusion principle, Hund's rule, electron configuration of elements, Sequence of energy levels and Periodic Table.

Size of atoms and ions, ionization energy, electron affinity, electronegativity – values by Pauling, Mulliken and Allred-Rochow, Metallic character, variable valence and oxidation states, horizontal, vertical and diagonal relationships in the periodic table.
Atomic Nucleus: Fundamental particles, classification of nuclides, nuclear stability, the neutron to proton ratio N/Z, nuclear potential, binding energy, exchange force. Radioactivity and radioactive elements, radioactive decay and decay kinetics.

Unit-II
The covalent bond - the Lewis theory, Octet rule and its limitations. Shapes of the molecules –Sidgwick – powel theory. Valence shell electron pair (VSEPR) theory, effect of lone pair and electronegativity, isoelectronic principle, examples to apply VSEPR theory. Valence bond theory. Hybridization. Bond length, bond angle & dihedral angle, d-orbital participation in molecular bonding, sigma and pi bonding. Molecular orbital method – Linear combination of atomic orbitals (LCAO), MO treatment for di- and tri-atomic molecules and involving delocalized pi-bonding. Conjugation & aromaticity.

Unit-III
Metallic and organometallic bonds – general properties. Coordinate bond- coordination complexes. Physical properties and molecular structures – polaizability and dipole moments, melting point, solubility and acid-base properties, Intermolecular forces (dipole-dipole interaction) Hydrogen bonding and vander Waals's forces.

Unit-IV
Inductive and field effects and bond dissociation energy. pπ-dπ bonding.
Delocalization –cross conjugation, resonance. Aromaticity and Huckel's rule – systems of 4n and 4n+2 electrons, antiaromaticity . Resonance and Hyperconjugation.
Reaction mechanism: Types of mechanisms, Arhenius theory, collision theory, types of reactions, redox reactions, displacement and addition reactions, thermodynamic and kinetic requirements.

Unit-V
Hammond postulate, Curtin-Hammett principle, transition states and intermediates, carbocations, carbanions, free radicals, methods of determining mechanisms, isotopic effects.
General concepts: Oxidation number and oxidation states, Oxidation – reduction reactions and the use of reduction potential, Bronsted acids and bases, gas phase vs. solution acidity, solvent levelling effects, hardness and softness, surface acidity.

Books Recommended:

S.No.	Author	Book
1	J.D.Lee	Concise Inorganic Chemistry, 4th Edition, ELBS, 1991
2	P.W.Atkins	Physical Chemistry, Oxford University Press, 7th Edition, 2006
3	G.M.Barrow	Physical Chemistry, 5th Edition, Tata McGraw-Hill, 1992
4	R. T. Morrison, R. N. Boyd, P. Sykes	Organic Chemistry, Prentice Hall of India
5	G.W. Castellan	Physical Chemistry, 3rd Ed. Addison - 1993

P 101 Physics- I (Classical Physics)

Unit-I
Concepts of energy and mass, Linear kinematics and dynamics. Concept of force: Conservative and non-conservative forces, Friction. Conservation of momentum, energy, and angular momentum. Work-energy theorem, Centre of mass, moment of inertia.

Unit-II
Rotational kinematics and dynamics, Rigid body motion. Impulse and collisions, Central forces, Kinetic theory of gases, Equipartition of energy.

Unit-III

Free oscillations in one, two, and many degrees of freedom. Linearity and superposition principle. Normal modes; Transverse and longitudinal modes

Unit-IV

General notion of a continuous string; Resonance; Coupled pendula and oscillators, Normal coordinates.

Unit-V

Probability (chance, fluctuations, random walk, probability distribution, uncertainty principle); Curvilinear Coordinates, Vector calculus (differentiation and integration, gradient, divergence, curl, Green's theorem, Gauss' theorem, Stokes' theorem); Fourier series (an introduction).

Books Recommended:

S.No.	Author	Book
1	R. P. Feynman, R. B. Leighton, M. Sands	The Feynman lectures in Physics" Volume-1
2	D. Kleppner and R. Kolenkow	An introduction to mechanics
3	C. Kittel, W. D. Knight and M. A. Ruderman	Mechanics [Berkeley Physics CourseVol. 1]
4	F. S. Crawford	Waves [Berkeley Physics Course Volume 3]

MB 101: Mathematics – 1

Unit-I

The idea of derivative of a function, polynomials, slope and tangent line, derivatives of trigonometric functions, product and quotient rules. Notion of limits and continuous functions. Elementary results pertaining to limits of functions: product and quotient rules. Higher order derivatives, examples. Maxima and minima, curve tracing, Conic sections: circle, ellipse, hyperbola and parabola; equations, focus, directrix, latus rectum. Generalised conic section equation, exponential and logarithmic functions and their derivatives.

Unit-II

Application of derivatives to root finding: Newton's method (to be supplemented by an introduction to iterative processes). Mean value theorem of differential calculus, Rolle's theorem, applications. l'Hôpital's rule. The chain rule of differentiation, Implicit differentiation, Inverse functions and their derivatives, Inverse trigonometric functions, Applications.

Concept of infinite series, Geometric series, convergence tests; Taylor series, Maclaurin series for elementary functions, power series, simple applications.

Unit-III

Notion of an integral, integral as limit of sums; anti-derivatives, area under a curve, definite integrals, indefinite integrals. Rules of integration: integration by parts, integration by substitution. Properties of definite integrals including mean value theorem for integral calculus. Fundamental theorem of integral calculus. Integrals involving polynomial, exponential, logarithmic, trigonometric, inverse trigonometric functions. Application of integrals to areas, length of a plane curve, volumes of solids of revolution.

Unit-IV

Complex numbers: real and imaginary parts, The complex plane, Complex algebra (complex conjugate, absolute value, complex equations, graphs, physical applications). Elementary functions of complex numbers, Euler’s formula, Powers and roots of complex numbers. The exponential and trigonometric functions, Hyperbolic functions, Logarithms, Complex roots and powers, Inverse trigonometric and hyperbolic functions, Some applications.

Unit-V

Separable equations, Linear first order equations, Other methods for first order equations, Second order linear equations with constant coefficients and both zero and non-zero right hand side, Other second order equations.

Books Recommended:

S.No.	Author	Book
1	Gilbert Strang (MIT Courseware)	Calculus
2	M. Weir, J. Hass and F. R. Giordano (Pearson Education)	Calculus

H 101: Communication Skills

Unit-I

An interactive session (with examples) on what is communication, communication in the natural and civilized worlds, types of human communication: visual / non-verbal / verbal, written / spoken, etc

Unit-II

An overview of mass media; a brief discussion of their types (with examples). The concepts of facilitating factors, barriers, and filters in communication; the seven C's of effective communication.

Unit-III

Verbal communication: How to speak / listen effectively (in interpersonal communication), types of public speaking, tips for effective public speaking, how to make effective presentations. The role of written text in communication,

Unit-IV

Types of writing (academic/creative/general; formal/informal etc.) with examples of good/bad writing and their analysis.Introduction to letter writing, with stress on formal correspondence; email do's and don'ts.

Unit-V

Academic writing- an overview; explanation of various terms used in academic writing; parts of a paper/thesis; aspects such as formal language, grammatical accuracy, etc. Common grammatical/punctuation errors and how to avoid them (example-based instruction)

G101: Computer Basics

Unit-I

Introducing LINUX: getting started;

Unit-II

FORTRAN programming

Unit-III

LaTeX introduction (sufficient to make small documents); gnuplot - graph plotting and data fitting; xfig - simple drafting tool; MATHEMATICA - algebraic computations.

Unit-IV

Projects on:

Some of the projects done by the students are listed below; Predator-prey problem; Harmonic oscillator with friction Coupled pendulum

Unit-V

Projects on:

Testing random number generator; Brownian motion as a random walk problem; Sorting function and its application to making ranked lists, SUDOKU solver

BL 101 Biology laboratory

1) Introduction to Biology laboratory
2) Taxonomy
3) Methods of Classification
   Dichotomous key; Hierarchical Classification; Phylogenetic Classification
4) Natural Selection
5) Natural Selection using Daphnia
6) Concept of pH & Buffers:
   Hydrogen ion concentration in solution; Inorganic ion concentration in solutions
   Inorganic Buffers and Biological fluids; Henderson-Hesselbach equation
7) Media Preparation:
   Preparing and inoculating solid and liquid nutrient media for culturing microorganisms
   Pouring nutrient agar plates and streaking bacterial culture on solid media Inoculating nutrient broth with bacterial culture Preparing nutrient media
8) Introduction to Research Laboratory
   Different kinds of microbial plates, liquid growth media for microbes, Laminar air flow system, stem cells laboratory, Centrifuges, Spectrophotometer, Sonicator, PCR and Real-time PCR, Gel Documentation system, *Chlamydomonas* and *Drosophila* incubation systems, Stereomicroscope and various Incubators
9) Growth Curve:
   Generating a bacterial growth curve under various pH and environmental conditions (steady and shaking); Calculations of Growth rate constant (μ); Calculation of generation time
10) Enzyme Kinetics: To study an enzyme catalyzed reaction using hydroquinone as a substrate and peroxidase extracted from cabbage.
11) Introduction to Light Microscopy: Observing cells in a leaf peel using a compound microscope and to study the morphological characteristics of *Saccharomyces cerevesiae.*
12) Dye exclusion method of differentiating dead v/s live cells: To use a vital stain to distinguish dead and live yeast cells.
13) Staining and Observing human cheek cells: To carry out staining of epithelial cells from the mouth using acetocarmine and methylene blue stains.
14) Staining human blood cells: To observe human blood cell types by differential staining.
15) Plant anatomy: Relationship between plant anatomy and habitat.
16) Micrometry: Measuring size of a microscopic specimen.
17) Haemocytometer
18) Gram Staining: To differentiate bacteria cells by Gram staining.

CL 101: Chemistry Laboratory

Calibrations of pipette, burette, standard flasks etc., acid base titrations, recrystallization, thin layer chromatography, identification of organic functional groups, complexometric titrations based on EDTA complexation with metals, Synthesis of benzoic acid, diazotization etc.

Books Recommended:

S.No.	Author/Book
1	Vogel's Textbook of Quantitative Chemical Analysis (5th Edition; Longmann)
2	Vogel's Qualitative Inorganic Analysis (7th Edition)
3	ACS Journal of Chemical Education

PL 101: Physics Laboratory -I

Introduction to experimental physics – conceptual and procedural understanding, planning of experiments; Plots (normal, semi-log, log-log); uncertainty / error in measurements and uncertainty / error analysis. Introduction to measuring instruments – concepts of standards and calibration; determination of time periods in simple pendulum and coupled strip oscillator system with emphasis on uncertainty in the measurements and accuracy requirements; study of projectile motion – understand the timing requirements; determination of surface tension of a liquid from the study of liquid drops formed under the surface of a glass surface; determination of Young's modulus of a strip of metal by double cantilever method (use of traveling microscope); study of combination of lenses and nodal points and correspondence to a thick lens; study of thermal expansion of metal – use of thermistor as a thermometer; measurement of small resistance of a wire using Carey-Fosterbridge and determine electrical resistivity of the wire; study of time dependence of charging and discharging of capacitor using digital multimeter –use of semi-log plot.

Books Recommended:

S.No.	Author	Book
1	Worsnop and Flint	Advanced Practical Physics for Students

GL 101 Computer Laboratory

History of computers; hardware basics. Concept of operating system; basic Unix/Linux commands; Office suite, including spreadsheets.
Flowcharts; computer arithmetic. Simple FORTRAN programming mathematical operators, input, output from keyboard, library functions.
Conditional statements - If-thenelse, Case, Go-to. Loops- Do loops, cycle, exit, nested loops. Arrays- 1 dimensional and multidimensional.
Formatting - input and output. Input and output from file.
Functions and Subroutines.; Creating HTML pages; Plotting utilities like GNU Plot.

Semester – II [January - June 2016]

B 201: Biology –II [Introduction to Macro Molecules]

Unit-I
Cell – Overview: Cellular organization, Biomembranes, Nucleus, Cytoplasmic organelles, Bacteriophages. Nucleic Acids, Genomes and Proteomics: Building blocks- nucleotides, DNA structure, RNA structure and function, chromatin structure, genome code, genes, repetitive DNA sequences.

Unit-II
Gene Transcription: Overview of gene expression, overview of transcription, gene's regulatory elements, transcription mechanisms in prokaryotes and eukaryotes (a comparison).

Unit-III
Protein Structure and Function: Building blocks- amino acids, peptides, secondary structure, three dimensional structure, membrane proteins, miscellaneous proteins, enzymes.

Unit-IV
Cell Signaling: Overview, signaling via hydrophobic molecules, signaling via ion channels, Signaling via G-protein coupled receptors, signaling via cell surface enzymes, intracellular signaling.

Unit-V
Biotechnology: DNA cloning, Uses of recombinant DNA technology, Polymerase chain reaction (PCR), Production of recombinant proteins and SDS-PAGE.

Books Recommended:

S.No.	Author	Book
1	B Alberts, A Johnson, J Lewis, and M Raff	Molecular Biology of the Cell
2	J D. Watson, T A. Baker, S P. Bell, & A Gann	Molecular Biology of the Gene (6th Edition)
3	John Wilson and Tim Hunt (2007)	Molecular Biology of the Cell: The Problems
4	Benjamin Lewin (2007)	Genes IX (Lewin, Genes XI)

C 201: Chemistry- II [Chemical Thermodynamics]

Unit-I

Classification of system, intensive and extensive properties, equilibrium and Heat, work and energy, irreversible and reversible expansion work of an ideal First law of thermodynamics, heat content or enthalpy of a system; Thermochemistry – Enthalpy of a reaction, exothermic and endothermic

Unit -II

Second law of thermodynamics, Carnot cycle, entropy, entropy change and Free energy functions and Maxwell's relations, Gibb's Helmholtz relations, nonequilibrium states, reversible and irreversible processes. gas, internal energy in a cyclic process. heat capacities, Joule- Thomson effect, Adiabatic expansion of an ideal gas and work done. reactions, thermochemical equation, Kirchoff's equation, heat of reaction and flame temperature, heat of combustion, heat of solution, heat of neutralization, heat of fusion, heat of vaporization, Bond energy and dissociation energy, Hess's law and its applications. irreversible processes and Clausius inequality, entropy and available work. criteria of spontaneity and conditions of equilibrium, Heat capacity relations (Cp/Cv and Cp – Cv), change of phase and Clapeyron equation, Trouton's rule.

Unit -III

Electrode potential and free energy, electrochemical series. Nernst heat Theorem and third law of thermodynamics, experimental Elements of statistical thermodynamics

Unit -IV

Chemical equilibrium and chemical potential (μ): chemical potential of an determination of entropy. ideal gas and gas mixture, Gibbs free energy and entropy of mixing, Chemical Phase equilibrium in simple systems: Equilibrium condition, stability of the Ideal solutions and colligative properties: ideal solutions, chemical potential equilibrium in a mixture of ideal gases and real gases, Equilibrium constants – Kx and Kc between ideal gases and pure condensed phase. Lechatelier principle and applications. phases of a pure substance, pressure dependence of μ vs. T curves, Clapeyron equatons.

Unit -V

Phase equilibrium: solid- liquid, liquid-gas, solid-gas, phase diagram – water, carbondioxide, sulphur, Effect of pressure on the vapour pressure, the phase rule. of a solute in a binary ideal solution – Gibbs-Duhem equation, Colligative properties – freezing pointing depression, solubility, elevation of boiling point, Osmotic pressure, Vant Hoff equation.

Books Recommended:

S.No.	Author	Book
1	P.W. Atkins	Physical Chemistry, Oxford University Press, 7th Edition, 2006
2	G.W. Castellan	Physical Chemistry, 3rd Ed. Addison - Wesley/Narosa Publishing House, 1993
3	G.N.Lewis and Randall	Thermodynamics, (Revised by K.S.Pitzer and L.Brewer), International Students Edition,
4	K. Denbigh	The principles of Chemical Equilibrium
5	B. G. Kyle	Chemical & Process Thermodynamics

P 201: Physics – II: [Electricity, Magnetism and Optics]

Unit-I
Electrostatics: Coulomb's law and Gauss' law; Electrostatic potential, uniqueness theorem, method of images; Electrostatic fields in matter; Conductors and insulators; Capacitors and capacitance; Electric current.

Unit-II
Magnetostatics: Biot – Savart law, Ampere's law; Electromagnetic induction; Mutual inductance and self inductance; Magnetic fields in matter.

Unit-III
Displacement current; Maxwell's equations; Alternating current circuits; Electric and magnetic properties of matter; Plane electromagnetic waves in vacuum; Polarisation;

Unit-IV
Energy and momentum in electromagnetic waves; electromagnetic radiation (qualitative); Dipole radiation formula; Larmor's formula for radiation due to accelerated charge (without proof); Synchrotron radiation (descriptive).

Unit-V
Optics Interference of two beams and involving multiple reflections; Young's experiment, Fresnel's biprism, Lloyd's mirror, Optical instruments; Telescope and microscopes; Magnifying power and resolving power.Sources of light and spectra; Dispersion, polarization, double refraction; Optical activity.

Books Recommended:

S.No.	Author	Book
1	Edward M. Purcell	Electricity and Magnetism Berkeley Vol. 2
2	Frank S. Crawford	Waves, Berkeley Vol. 3
3	Jenkins and White	Fundamentals of Optics
4	Feynman	Feynman Lectures Vol. 2

MB 201: Mathematics – II [Linear Algebra, Calculus of Several variables]

Unit I
Functions of several variables, partial derivatives, geometric interpretation, properties of partial derivatives, chain rule, applications. Elementary discussion on scalars and vectors, norm of a vector, dot product, projections. Linear equations and matrices, matrix operations. Concept of a determinant, its properties, evaluation of a determinant, cross product as a determinant, lines and planes. Elementary ideas of tensors.

Unit II
Vector functions. Gradient of a function, geometric interpretation, properties and applications; divergence and curl of a vector function, geometric interpretation, properties and applications; higher derivatives, Laplacian. Line integrals. Double and triple integrals, their properties and applications to areas, volumes, etc.

Unit III
Gradient theorem, Green's theorem, Stokes' theorem, divergence theorem, applications. Proofs of Stokes' and divergence theorems through physical examples (such as circulation in a 2 dimensional plane and accumulation of fluid in a given volume).

Unit IV
Curvilinear coordinate systems, spherical and cylindrical coordinates, area and volume elements, illustrations. Gradient, divergence and curl in curvilinear coordinate systems.

Unit V

Introduction to linear algebra. Vector spaces, linear dependence and independence, notion of basis, and dimension, subspaces. Examples. More on matrices: special kinds of matrices, their properties. Eignevalues and eigenvectors, secular determinant, characteristic polynomial. Eigenvalues and eigenvectors of a real symmetric matrix. Illustrative examples. Applications of linear algebra.

Books Recommended:

S.No.	Author	Book
1	Gilbert Strang (MIT Courseware)	Calculus
2	Thomas	Calculus
3	Howard Anton and Chris Rorres	Elementary Linear Algebra
4	Gilbert Strang (MIT Courseware)	Introduction to Linear Algebra
5	George B. Arfken and Hans J. Weber	Mathematical Methods for Scientists and Engineers

G201- Electronics & Instrumentation

Unit-1

Analog electronics: Introduction to passive electronic components -resistance, capacitance, inductance; Circuit theorems: Thevenin's theorem, Norton's theorem and Maximum power transfer theorem; basic concepts of semiconductor diode and transistor; application of Bipolar Junction Transistor (BJT) – biasing circuits: The CE configuration, fixed base bias, emitter bias, and potential-divider or voltage divider bias; CE amplifier, amplifier as a switch, concept of negative feedback.

Unit-2

Principle of DC power supply; half and full wave bridge rectifier, capacitor filter – ripple factor, concept of load and line regulation, concept of constant voltage source and constant current source; concept of short circuit protection and current limit protection; Zener regulator; concept of Switch Mode Power Supply (SMPS), power supply ICs, charge pump ICs for stepping up voltage and for bipolar supply.

Unit-3

Differential amplifier; Operational Amplifier (OPAMP): principle, basic characteristics and parameters relevant for general use; non-inverting and inverting amplifier, voltage follower, difference amplifier, summing amplifier, voltage controlled current source; OPAMP comparator, Schmidt trigger; Digital to Analog Converter (DAC) with weighted resistance and R-2R ladder network; Anlog to Digital Converter (ADC); filters: low pass, high pass; band pass; Butterworth filter.

Unit-4

Digital electronics: Review of basic logic gates; DeMorgan's theorem, Use of NAND / NOR as universal building blocks; arithmetic circuits; binary addition, half adder, full adder, binary subtraction - 1s and 2s complement, controlled inverter, adder / subtracter, parity checker; Flip-Flops (FF): RS-FF, D-FF, JK-FF; counters and shift registers: binary counter, ripple counter.

Unit-5

Basic concepts of instrumentation, generalized instrumentation systems block diagram representation; Sensing elements: electrodes and transducers. Electrode-electrolyte interface, stability of electrode potentials, circuit models, external and internal electrodes, pH, pO2 and pCO2 electrodes. Transducer, definition, types, displacement, velocity, acceleration, pressure, temperature vibration, ultrasound etc., calibration, sensitivity and resolution.

Books Recommended:

S.No.	Author	Book
1	R. L. Boylestad, L. Nashelsky, K. L. Kishore, Pearson	Electronic Devices and Circuit Theory
2	Malvino and Bates	Electronic Principles
3	Donald A. Neamen, Tata McGraw Hill	Electronic Circuit Analysis and Design
4	David A. Bell	Electronic Devices and Circuits
5	Leach, Malvino and Saha	Digital Principles and Applications
6	R.P. Jain	Modern Digital Electronics, Tata McGraw-Hill (2003)
7	M. Morris Mano, Michael D. Ciletti	Digital Design, Pearson Education Asia, (2007)
8	Thomas L. Floyd	Digital Fundamentals, Pearson Education Asia (1994)
9	DVS Murthy	Measurement & Instrumentation
10	A.K. Sawhney	Electrical Measurements & Electronic Measurements

G202- Glimpses of Contemporary Science

Unit-I

Physics in life systems: size and scale, diffusion, cell locomotion, force generated by actin growth and flagellum rotatory motion, ion channels, resting potential across the membrane, nerve conduction velocity, action potential, macromoleculaes of life, random walk model of polymer, single molecular experiments, optical tweezers, magnetic tweezers.

Unit-II

Complex systems: dynamical chaos, logistic map, bifurcation, Universality, Feigenbaum constants, Mechanical demonstrations of chaos, Nanomechanical oscillators, Patterns, Reaction-diffusion systems, Nodal patterns, thermodynamics and human population, Falling leaves, Smoke ring physics.

Unit-III

At the turn of 1900: Silver threads, Discovery of the electron, Rutherford's nuclear atom Wien's law, Blackbody radiation and Max Planck's action.

Unit-IV

Astrophysics, Astrochemistry and Astrobiology

Unit-V

Quantum mechanics, atoms : Entanglement Light-atom interaction, Bringing atoms to rest, Laser tweezers, How bright is laser, Quantum computing.

Books Recommended:

S.No.	Author	Book
1	Darcy Wentworth Thompson	Growth and Forms
2	Rob Phillips	Physical biology of the cell
3	Harward Berg	Random walks in biology
4	L. Cooper	Physics: Structure and Meaning
5	R. P. Feynman, R. B. Leighton, and M. Sands	The Feynman Lectures on Physics vol. 3
6	S. Chandrasekhar	Introduction to the study of stellar structure

BL 201: Biology Practical

1. Observing instruments to be used in semester II, their use and maintenance: (a) micro-pipettes, (b) tissue homogenizer, (c) electrophoresis apparatus, (d) centrifuges, (e) ultraviolet and visible (uv-vis) absorption spectrophotometer
2. Centrifugation of the cell contents at varying speeds such that the subcellular fractions separate out based on their density differences
3. Photosynthesis - floating leaf disc experiment under various conditions (light, dark & light - dark)
4. Visit to TIFR
5. Nucleic acid extraction - from plant & animal tissue using ethanol precipitation
6. Agarose gel electrophoresis
7. Analysis of DNA under various conditions – pH and Temperature
8. Protein extraction & separation using polyacrylamide gel electrophoresis (PAGE)
9. Carbohydrate extraction & estimation - extraction of sugars from grapes & estimation of the same by DNSA method
10. Protein extraction & estimation determination of total protein content in microorganisms by folin-ciocaltaeu method
11. Lipid extraction & separation - Extraction of total lipids from liver tissue & separation by thin layer chromatography
12. Separation of biomolecules using:
    Adsorption chromatography; Partitioning of indicators in various solvent systems. ;
    Separation of a mixture of solutes by partitioning; Separation of leaf pigments by paper chromatograhy
    Separation of flower pigments by paper chromatography ; Reverse phase thin layer chromatography (PRTLC) - Separation of photosynthetic pigments

CL 201: Chemistry Laboratory

Colorimetric titrations, Beer Lambert law, Estimation of concentration by colorimetric methods, conductometric methods, estimation of concentraion of acid base bt pH meter, identification of inorganic anions and cations, finding of pka values, short project of 2 weeks based on the experiments available in Journal of Chemical Education.

Books Recommended:

S.No.	Suggested text and references:
1	Vogel's Textbook of Quantitative Chemical Analysis (5th Edition; Longmann)
2	Vogel's Qualitative Inorganic Analysis (7th Edition)
3	ACS Journal of Chemical Education

PL 201- Physics Laboratory

Review of uncertainty / error analysis; least squares fit method; introduction to sensors / transducers; determination of ‘g’ (acceleration due to gravity) by free fall method; study of physical pendulum using a PC interfaced apparatus – study variation of effective ‘g ‘ with change of angle of plane of oscillation - investigation of effect of large angle of oscillation on the motion;

Study of Newton’s laws of motion using a PC interfaced apparatus; study of conservation of linear and angular momentum using ‘Maxwell’s Wheel’ apparatus; study of vibrations of soft massive spring; study of torsional oscillatory system; study of refraction in a prism - double refraction in calcite and quartz; study of equipotential surface using different electrode shapes in a minimal conducting liquid medium; determination of electrical inductance by vector method and study effect of ferromagnetic core and study the effect of non-linearity of inductance with current.

Books Recommended:

Worsnop and Flint Advanced Practical Physics for Students

GL 201 Electronics laboratory

1. To study the Half wave & Full wave rectifier and study the effect of C filter.
2. To design a Single Stage CE amplifier for a specific gain and bandwidth.
3. Study of Operational amplifier in inverting and non-inverting mode.
4. To verify and design AND, OR, NOT and XOR gates using NAND gates.
5. Measurement of pressure, strain and torque using strain gauge.

Second Year

Semester – III [July - December 2016]

CB 301- Essential Mathematics for Chemistry & Biology

Unit-I

Applications of Taylor series, Euler series

Unit-II

Review of first order ordinary differential equations, second order ODE's with constant coefficients, solutions by series expansion methods, introduction to partial differential equations,

Unit-III

Laplace's equation, separation of variables, Legendere differential equation and Legendere polynomials, important properties of Legendere poynomials, Hermite polynomials, Laguerre polynomials, Fourier series and simple applications, Laplace transforms and applications, convolution.

Unit-IV

The matrix Eigen value problems, Secular determinants, Characteristics polynomials, Eigen values and Eigen functions. Eigen values of real symmetric matrices; Eigen values and Eigen functions, important properties and examples.

Unit-V

Complex numbers, Analytic functions, Cauchy Riemann equations, Cauchy's integral formula, Residue theorem and simple applications.

Books Recommended:

S.No.	Author	Book
1	D.J.S. Robinson	A Course in Linear Algebra with Applications, World Scientific.
2	G. B. Thomas and R.L. Finney	Calculus and Analytic Geometry, 9th ed., Addison-Wesley/Narosa
3	J. Marsden, A. Tromba and A. Weinstein	Basic Multivariable Calculus, Springer
4	Inder K. Rana	Calculus@iitb, Concepts and Examples, Version 1.2

CB 302: Biochemistry-I

Unit-I

General biochemistry concepts: The concept of pH, dissociation and ionization of acids and bases, pKa, buffers and buffering mechanism, Henderson Hasselbalch equation, dissociation of amino acids and determination of pKa.

Unit-II

Chemical structure of Major: Carbohydrates, Lipids, Nucleic acids, Proteins: amino acid ; Chemical properties: molecular bond, covalent bond, ionic bond, hydrogen bond, ester, ; ethyl ; Molecular charge hydrophilic, hydrophobic, polar. pH : acid, alkaline, base. oxidation: reduction, hydrolysis Structural compounds:

In cells: flagellin, peptidoglycan, myelin, actin, myosin
In animals: chitin, keratin, collagen, silk
In plants: cellulose, lignin, cell wall

Unit-III

Enzymes and enzyme activity: enzyme kinetics , enzyme inhibition, proteolysis; ubiquitin – proteasome, kinase -- dehydrogenase

Unit-IV

Membranes : fluid mosaic model; diffusion, osmosis. Phospholipids, glycolipid, glycocalyx, antigen, isoprene ion channel; proton pump, electron transport , ion gradient, antiporter, symporter, quinine, riboflavin Lipids, Vitamins, Hormones

Unit-V

Protein structure and function: folding, modification, enzymes, enzyme kinetics, enzyme regulation and inhibition

Books Recommended:

S.No.	Author	Book
1	D. L. Nelson & M. M. Cox	Lehninger Principles of Biochemistry,
2	Stryer L (1995	Biochemistry, 4 th edition,
3	Starzak, Michael E.	Energy and Entropy equilibrium to stationary states
4	J. McMurry (1999)	Fundamentals of General Organic & Biological Chemistry

B 301: Cell Biology -I

Unit-I

Cell biology - An Overview: Universal features of cells, Diversity of their genomes, Overview of cell chemistry (important atoms and their properties, pH, acids, bases, and buffers in cells, formation and functions of proteins, DNA, sugars, and fats in cells, Visualization of cell; Basic principles of light microscopy, Different microscopic techniques for imaging cells.

Unit-II

Membrane system: The cell membrane and its structure, Models of the biomembrane: Charles Overton's "Lipid Membrane", Lipid monolayer model of Irwing Langmuir, Lipid bilayer model by Gorter and Grendel, Protein-containing lipid bilayer model of Daveson and Danielly, David Roertson's direct observation of the membrane, Fluid Mosaic model of Singer and Nicholson, Constituents and fluidity of plasma membrane, Transport across membrane, Ion channels.

Unit-III

Cellular organelles and their functions: Mitochondria: Structure of mitochondria, Different enzymes and their location, Electron transport complexes, ATP synthase, Mitochondrial DNA, Structure of chloroplast, Protein complexes and photosynthetic electron transport chain, DNA of the chloroplast, Bioenergetics, Structure and functions of the ribosomes, Endoplasmic reticulum, Golgi body, Lysosomes, and Nucleus. Protein sorting, Vesicular traffic inside the cells, targeting & degradation

Unit-IV

Cytoskeleton, cilia and flagella: Structure and functions of Microtubules, Actin, and Intermediate filaments. Interplay between different cytoskeletal components. Molecular motors. Cilia and flagella: structure and functions. Diseases associated with the cytoskeleton, cilia, and flagella.

Unit-V

Organization, Replication, and Maintenance of the genome: Complexity of eukaryotic genomes, Chromosomes and chromatin, DNA replication, DNA damage and repair, DNA rearrangements

Books Recommended:

S.No.	Author	Book
1	D. L. Nelson & M. M. Cox	Lehninger Principles of Biochemistry,
2	Stryer L (1995	Biochemistry,
3	Starzak, Michael E.	Energy and Entropy equilibrium to stationary states
4	J. McMurry (1999)	Fundamentals of General Organic and Biological Chemistry (Study Guide)

CB 303: Organic Chemistry –I

Unit-I

A. Basic concepts - Recapitulation

Hybridisation, formal charge, inductive and resonance effects and their effect on reactivity and acidity and basicity of organic compounds; polar & non polar covalent bonds; homolytic and heterolytic fission, types of reagents- electrophiles and nucleophiles; curly arrow notation; classification of organic reactions.

Unit -II

B. Chemistry of Aliphatic compounds

IUPAC nomenclature of aliphatic and substituted aliphatic compounds and alicyclic compounds

Preparation, structure, properties and reactions of the following classes of compounds.

Hydrocarbons - a) alkanes, Methods of formation Kolbe reaction, Wurtz reaction, Corey House reaction, decarboxylation of carboxylic acids; Mechanism of halogenation of alkanes, orientation, selectivity & reactivity, product ratio.

Cycloalkanes - Methods of formation and reactivity ; Baeyer's strain theory and its limitation; theory of strainless rings

Alkenes - Elimination reactions ; Saytzeff & Hoffman elimination; Reactions – halogenation reactionsfree radical and polar mechanisms. Markownikoff's rule, the peroxide effect, allylic halogenations using NBS; Ozonides/Ozonolysis. epoxidation; hydroboration-oxidation; oxymercuration-demercuration; Oxidation using KMnO4 & OsO4.; polymerization.

Dienes - Structure of butadiene and allene ; 1,2 vs 1,4 addition ; Diels Alder reaction.

Unit -III

Alkynes - Methods of formation; acidity of alkynes; electrophilic addition to alkynes; hydroboration oxidation ; metal ammonia reductions; hydrogenation using Lindlar's catalyst.

Alkyl halides - Preparation, properties and synthetic applications of alkyl halides ; SN1 & SN2 reactions (mechanism), E1 and E2 reactions(mechanism); Grignard reagent and its applications.

Alcohols - Methods of formation ; acidity ; H-Bonding ; reactions of mono; di & trihydric alcohols; Diols as protecting groups

Unit -IV

Ethers and epoxides - Formation & reactions of ethers and epoxides ; ring opening reactions of epoxides under acidic and basic consitions; reaction epoxides with Grignard & organolithium reagents Aldehdyes & ketones - Methods of formation of aldehdyes and ketones; Nucleophilic addition reactions with cyanide, ammonia and derivatives of ammonia; acetal formation; oxidation reduction reactions. Meerwin-Pondroff-Verley reduction, Clemmensen reduction, Wolf-Kishner reduction, Aldol condensation reaction, Cannizzaro reaction, Tischenko reaction, haloform reaction, Baeyer-Villiger oxidation, Wittig reaction; Mannich reaction

Unit -V

Carboxylic acids - Methods of formation of mono and di carboxylic acids; acidity and factors affecting acidity; reactions of carboxylic acids :
Carboxylic acid derivatives - Methods of formation of acid chlorides, amides, anhydrides and esters and their interconversions; relative stabilities of acid derivatives; Rosenmund reaction; Hoffmann rearrangement; saponification.
Nitrogen and sulphur compounds - Nitro alkanes

Books Recommended:

S.No.	Author	Book
1	I. L. Finar	Organic Chemistry, Vol. 1 & 2, ELBS.
2	R. T. Morrison and R. N. Boyd	Organic Chemistry, Prentice Hall of India
3	L. G. Wade,	Organic Chemistry, Pearson Education
4	G. Solomons and C. Fryhle,	Organic Chemistry, John Wiley & Sons
5	W.G. Solomons	Fundamentals of Organic Chemistry,
6	J. March	Advanced Organic Chemistry, 3rd Edn.
7	F.J. Carey and R.J. Sundburg	Advanced Organic Chemistry, Part A & Part B
8	D. D. Ebbing	General Chemistry, Houghton Miffin Co
9	M. J. Sienko and R. A. Plane	Chemical Principles and Applications,

H 301: World Literature

Unit-I

What is Literature? - a discussion; Introduction to literary terms, genres, and forms of various periods, countries, languages, etc. Comprehensive idea about Sanskrit literature in relation to scientific writing: Vedic and Classical literature

Unit-II

The Novel: Class study of 'Brave New World' by Aldous Huxley; Group discussions and student presentations on other genres such as the graphic novel, detective fiction, children's literature, etc.

Unit-III

Plays: Introduction to the history of theatre, class study of (mainly) two plays: 'Pygmalion' by G. B. Shaw and 'Fire and Rain' by Girish Karnad, the setting up of play –reading group through which the students can be introduced to several other plays.

Unit-IV

Poetry: Brief introduction; Study of poetic genres, forms, topics, figures of speech, poetic language etc. by analysing various poems from around the world

Unit-V

Short stories, essays and other types of writing by various authors. Screening of films based on literary works, such as Pygmalion (My Fair Lady), Fire and Rain (Agnivarsha), Persepolis (a graphic novel) and a few others.

H302: History and Philosophy of Science

Unit-I

Brief overview of the contemporary cultural development elsewhere in the world; Indus Civilisation: progress of art, architecture, science and technology, role of geometry in art and architecture; Study of ancient Indian linguistic techniques and their relation with modern programming languages; Overview of Paninian style and techniques; Precision of Sanskrit in expressing technical terms; History of number naming and writing in India; Sulbasutra and Vedanga Jyotisha – geometrical constructions and astronomical calculations; Jain literature on mathematics and astronomy; Linguistic techniques used in Aryabhatiya; Works of Brahmagupta in opposition of Aryabhata; Contribution of Kerala school of mathematics to development of mathematical ideas.

Unit-II

Genesis of systematic ideas: Science in ancient Greece; against mythological explanations to natural phenomena; Early atomism, mathematical atomism, against atomism. Introduction to epistemology; Possible criteria of demarcation between science and folklore; Non–science and metaphysics; Introduction to logical positivism and the "standard view"; Criticism of "standard view".

Unit-III

Method of analysis and synthesis; Beginning of mathematical sciences; multicultural origins of science. Renaissance and scientific revolution:

Unit-IV

Galilean ideas; mechanisation of world picture; From alchemy to chemistry, from natural history to evolutionary history, from natural numbers to complex numbers, from physiology to cell biology.

Unit-V

Rise of experimental science: Discussion of some of the crucial experiments with an emphasis on the analysis of conceptual changes rather than the technical details.

Books Recommended:

S.No.	Author	Book
1	Colin Ronan	Cambridge Illustrated History of Science
2	Rom Harre	Great Scientific Experiments: 20 Experiments that Changed our View of the World
3	T. A. Saraswati Amma	Geometry in Ancient and Medieval India
4	Kim Plofker	Mathematics in India (Princeton Univ. Press)
5	Samir Okasha	Philosophy of Science – A Very Short Introduction
6	Henry Collins and Trevor Pinch	The Golem – What Everyone should Know about Science by (Cambridge Uni. Press, 1996)
7	Alan Chalmers	What is this thing called Science?

BL 301: Biology Laboratory (Biochemistry + Cell Biology)

1. Biochemical calculation
2. Amino acid titration:
   Determine the pka value of the provided amino acid solutions using titration curve.
   Identify the amino acids using the reference table on the basis of pka values obtained
3. Carbohydrate identification & estimation by anthrone method
   Extraction of carbohydrates from various sources.
   Identification by dichotomous key & estimation by anthrone method
4. Estimation of total free amino acids
   Extraction of total free amino acids from plant sample estimation by ninhydrin reagent
5. Acid value - Acid number is a measure of the amount of carboxylic acid groups a fatty acid
6. Iodine number

Iodine numbers are often used to determine the amount of unsaturation in fatty acids

7. Saponification value
   Measure of the average molecular weight (or chain length) of all the fatty acids present
8. Peroxide value - Gives the evidence of rancidity in unsaturated fats and oils
9. Potato starch - isolation of starch
10. Enzyme kinetics
    Enzymatic reaction using potato starch and salivary amylase.
    Determine Vmax and Km for individuals salivary amylase.
11. pH and temperature effect on enzyme kinetics
    Effect of pH and temperature on salivary amylase action on starch
12. Effect of inhibitors on enzyme kinetics
13. Carbohydrate identification by thin layer chromatography
    Extraction of carbohydrates from various fruit sample and identification by separating using tlc
14. Chromatography:
    Paper chromatography, dimensional chromatography of a mixture of amino acids
    Circular chromatography, Separation utilizing gel filtration and ion-exchange chromatography, S. Russo and A. Radcliffe, *J.Chem. Educ.* **68**, 168-171 (1991).
    Isolation of lactoferrin by immobilized metal ion affinity chromatography (IMAC), A. Calvo and F. Batista-Viere, *Biochem. Educ.* **22**, 50-52 (1994).
    Rapid microscale isolation and purification of yeast alcohol dehydrogenase using Cibacron blue affinity chromatography, C. Morgan and N. Moir, *J.Chem. Educ.* **73**, 1040-1041 (1996).
    Chromatographic separation of two proteins, J. Szeberenyi, *Biochem. Mol. Biol. Educ.* **35**, 71-72 (2007).

15. Electrophoresis
    SDS-agarose gel electrophoresis in a simple procedure for determining high molecular weight protein oligomerization, M. Brownleader et al., *Biochem.Educ.* **22**, 155-158 (1994).
    Capillary electrophoresis: a fast and simple method for the determination of the amino acid composition of proteins, P. Weber and D. Buck, *J. Chem. Educ.* **71**, 609-611 (1994).
    Determination of the subunit molecular mass and composition of alcohol dehydrogenase by SDSPAGE, B. Nash, *J. Chem. Educ.* **84**, 1508-1511 (2007).
    Metal-catalyzed cleavage of tRNA-Phe, S. Kirk et al., *J. Chem. Educ.* **85**, 676-678 (2008).
    Introducing proteomics in the undergraduate curriculum: A simple 2D gel electrophoresis exercise with serum proteins, T. Kim and P. Craig, *Biochem. Mol. Biol. Educ.* **38**, 29-34 (2010).
16. Isolation and Characterization of Enzymes
    Testing the á-amylase inhibitor of the common bean, J. Moreno et al., *J. Chem. Educ.* 71, 350-352 (1994). A rapid and inexpensive procedure for the determination of amylase activity, V. Mulimani and J. Lalitha, *Biochem. Educ.* 24, 234-235 (1996).
    A rapid and inexpensive procedure for the determination of proteolytic activity, S. Castro and A. Cantera, *Biochem. Educ.* 23, 41-43 (1995).
    Zymography of extracellular matrix proteases, A. Quesada et al., *Biochem. Educ.* 24, 170-171 (1996).
    The thermodynamic stability and catalytic activity of yeast alcohol dehydrogenase at different pH values, R. Tabor and J. Ladwig, *Biochem. Educ.* 25, 169-170 (1997).
    The competitive inhibition of yeast alcohol dehydrogenase by 2,2,2-trifluoroethanol, R. Tabor, *Biochem. Educ.* 26, 239-242 (1998).
    From egg to crystal: a practical on purification, characterization, and crystallization of lysozyme for bachelor students, V. Olieric et al. *Biochem. Mol. Biol. Educ.* **35**, 280-286 (2007).
    Lactate dehydrogenase kinetics and inhibition using a microplate reader, J. Powers et al. *Biochem. Mol. Biol. Educ.* **35**, 287-292 (2007).

17. Cell biology

Cell staining – i (capsule, cell wall, lipid granules)
Cell staining – ii (metachromatic granules, endospores)
Cell motility
Subcellular fractionation of mouse liver tissue, page & wester blotting
Immunoflourescence of cytoskeleton & nuclear proteins
Meiosis using lily anthers

GL 301- Applied Electronics Lab

Experiments based on:

1- Norton's theorem and Maximum power transfer theorem; basic concepts of semiconductor diode and transistor;
2-Principle of DC power supply; half and full wave bridge rectifier, capacitor filter – ripple factor,
3-Zener regulator; concept of Switch Mode Power Supply (SMPS), power supply ICs,
4- Bipolar Junction Transistor (BJT) – biasing circuits:
5- Anlog to Digital Converter (ADC); filters: low pass, high pass; band pass; Butterworth filter
6- controlled inverter, adder / subtracter, parity checker; Flip-Flops (FF):
7- RS-FF, D-FF, JK-FF; counters and shift registers: binary counter, ripple counter.

Semester – IV [January - June 2017]

B401: Cell Biology - II

Unit-I

Cell Junctions, Cell Adhesion, and the Extracellular Matrix: Introduction, Cell Junctions, Cell-Cell Adhesion, The Extracellular Matrix of Animals, Extracellular Matrix Receptors on Animal Cells. Integrins, Selectins, and other proteins involved in intercellular contacts. The Plant Cell Wall

Unit-II

Cell signaling: 1. Introduction: Components involved in signaling, Types of signaling, Three Major Classes of Signaling Receptors: Ion Channel-linked, G protein-coupled receptors (GPRs), Enzyme-linked receptors: Tyrosine-Kinase Receptors, other enzyme-linked receptors, Second Messengers: cAMP, cGMP, IP3 and DAG, Ca+2, PIP3. Signaling Cascades. Cell signaling and cancer.

Unit-III

Cell cycle and Cell division: Mechanisms and regulations of cell division, Mitosis, Meiosis, and Germ cells, Cell renewal, Uncontrolled cell division and cancer.

Unit-IV

Types of cell death: Apoptosis, Necrosis, Anoikis, Oncosis

Unit-V

Techniques in Cell biology: Cell fractionation, DNA libraries, DNA transfer into eukaryotic cells and Mammalian embryos, Nucleic acid hybridization, Purification of nucleic acid, Isolation and fractionation of proteins.

Books Recommended:

S.No.	Author	Book
1	Alberts *et al*.	Molecular biology of the Cell
2	Alberts, Bray *et al*	Essential Cell Biology Garland, Publication New York 1997
3	James E. Darnell, Harvey F. Lodish, and David Baltimore	Molecular Cell Biology
4	Geoffrey M Cooper	The Cell, 2nd edition, A Molecular Approach
5	http://publications.nigms.nih.gov/insidethecell/index.html.	Inside the Cell, an internet-based study of cells (National Institute of General Medical Sciences)

B 402: Biochemistry-II

Unit-I

Metabolism and metabolic pathways: Glycolysis, TCA cycle, Oxidative Phosphorylation, Photophosphorylation

Unit-II

Biosynthesis of macromolecules: Carbohydrate biosynthesis (Pentose phosphate pathway), Fatty acid synthesis, Cholesterol of steroid biogenesis, Amino acid biosynthesis & degradation, Nucleotide biosynthesis & degradation, Fatty acid degradation

Unit-III

Pigments : chlorophyll , carotenoids, xanthophyll , cytochrome, phycobilin, Bacteriorhodopsin, hemoglobin, myoglobin, absorption spectrum, action spectrum, fluorescence

Unit-IV

Photosynthesis : light reaction -- dark reaction. Fermentation : Acetyl-CoA -- lactic acid
Cellular respiration : Adenosine triphosphate (ATP) - NADH - pyruvate - oxalate – citrate Chemosynthesis

Unit-V

Regulation hormones : auxin signal transduction -- growth factor -- transcription factor -- protein kinase -- SH3 domain Malfunctions : tumor -- oncogene -- tumor suppressor gene Receptors : Integrin -- transmembrane receptor -- ion channel

Books Recommended:

S.No.	Author	Book
1	D. L. Nelson , M. Cox	Lehninger Principles of Biochemistry,
2	Stryer L	Biochemistry.
3	Starzak Michael E.	Energy and Entropy equilibrium to stationary states
4	J McMurry	Fundamentals of General Organic and Biological Chemistry (Study Guide)

CB 401: Introductory Spectroscopy [UV-Vis, Florescence, IR, Raman, NMR]

Unit-I

The electromagnetic spectrum: Nature of electromagnetic radiation. The electromagnetic spectrum and its regions. Frequency, waveno and wavelength: units and conversions. Absorption of electromagnetic radiation. Molecular energy states and quantisation of internal energy. Boltzmann distribution. Spectroscopic Processes: Absorption, emission, and scattering of light. Beer-Lambert Law - Quantitative absorption measurements, Jablonski diagram Fourier transformation: A mathematical tool to our advantage, basic principle and its relevance in spectroscopy.

Unit -II

UV-VIS Absorption Spectroscopy: Principles and instrumentation of spectrophotometers. UV-vis spectroscopy to determine conjugation. UV-visible spectroscopy and electronic transitions. Electronic ground states and excited states in organic molecules: pi-star and pi to pi-star transitions. band position and band intensities. Fluorescence Spectroscopy: Principles and instrumentation of fluorimeters. Advantage of fluorimetry compared to absorption spectrophotometry. Luminescence and the fate of excited states: timescale of fluorescence and phosphorescence.Qualitative and Quantitative Fluorimetry.

Unit -III

IR - Principles and instrumentation of Infrared spectroscopy. nfrared spectroscopy and molecular vibrational transitions. Simple dispersive IR spectrometer and ovewrview of modern instrumentation. Transmittance and absorbance. Vibrational modes and selection rules. Factors governing the position and intensity of IR bands: effects of variation in reduced mass and force constant. Group frequency and fingerprint regions: use of IR for identification by presence/absence of absorptions characteristic of specific bonds/bond groupings.

Interpretation of IR spectra.
Raman Spectroscopy: Raman Effect and molecular polarizability. Technique and instrumentation. Pure rotational Raman spectra, vibrational Rama spectra. Structure determination from Raman and IR.

Unit -IV

Nuclear Magnetic Resonance (NMR): Introduction to Nuclear Magnetic Resonance (NMR) spectroscopy. number of signals, integration, chemical shift, splitting of signals. Principles and instrumentation of NMR spectroscopy. Nuclear spin and nuclear magnetism. Energies of nuclear spin states in a magnetic field. Boltzmann population of nuclear spin states and the origin of NMR signals.. Information from: chemical shifts and delta values, peak areas and integration, splitting patterns and spin-spin coupling constants. (n+1) rule and Pascal's triangle. Interpretation of NMR spectra using

Unit -V

Examples of organic compounds. Short introduction about application of NMR for proteins.
Mass spectrometry: Introduction to mass spectroscopy (molecular mass, accurate mass and isotopes) Principles, ionisation methods (including EI, MALDI, ESI). Molecular ions and fragmentation processes under EI. Mass spectrometry for determining the molecular weight/formula of organic compounds and identify the presence of isotopes. Introduction of MS application in protein analysis.

Books Recommended:

S.No.	Author	Book
1	K Wilson and John Walker	Practical Biochemistry: Principles & Techniques
2	GR Chatwal and SK Anand	Instrumental methods of Chemical Analysis
3	S. K. Sawhney	Introductory Practical Biochemistry
4	RF Boyer	Biochemistry Laboratory: Modern Theory & Techniques
5	S Carson, H Miller and D Scott	Molecular Biology Techniques: A Classroom Laboratory Manual
6	T C Ford and J M Graham	An Introduction to Centrifugation
7	TS Work and E Work	Density Gradient Centrifugation, Vol. 6
8	David Rickwood	Centrifugation Techniques
9	A Braithwaite and FG Smith	Chromatographic Methods
10	LR Snyder, JJ Kirkland & JW Dolan	Introduction to Modern Liquid Chromatography
11	S J Pennycook and PD Nellist	Scanning Transmission Electron Microscopy
12	DJ Rawlins	Light microscopy
13	M Hoppert	Microscopic Techniques in Biotechnology
14	M Hoppert and A Holzenburg	Electron microscopy in microbiology
15	T Peng, D L Horrocks and E L Alpen	Liquid Scintillation Counting: Recent Applications and Development, Volume I
16	R Baserga and D Malamud	Autoradiography: techniques and application
17	T Chard	An Introduction to Radioimmunoassay and Related Techniques , Volume 6
18	MD Bruch	NMR Spectroscopy Techniques
19	B A Wallace and R. William	Modern Techniques for Circular Dichroism and Synchrotron Radiation ..., Volume 1

PCB 401: Physical & Chemical Kinetics

Unit -I

Basic Concepts: Rate, order and molecularity of a reaction, First, second and third order reactions – effect of concentration on reaction rate, rate expressions and integrated form, pseudo-unimolecular and second order autocatalytic reactions, nth order reaction of a single component, effect of temperature on reaction rate – Arrhenius equation and activation energy.

Complex Reactions: parallel first order reactions, series first order reactions – determination of rate constants by graphical method and the time ratio method. The stationary state, radioactive decay, general first order series and parallel reactions. Competitive, consecutive second order reactions, reversible reactions, equilibrium from the kinetic view point, complex mechanisms involving equilibria.

Unit -II

Kinetic Measurements: Experimental determination of reaction rates and order of reactions –correlation of physical properties with concentrations, reactions in the phase, reactions at constant pressure, fractional-life period method, initial rate as a function of initial concentrations.

Reactions in Solutions: General Properties, Phenomenological theory of reaction rates, Diffusion limited rate constant, Slow reactions, Effect of ionic strength on reactions between ions, Linear free energy relationships, Relaxation methods for fast reactions.

Unit -III

Catalysis: Homogeneous catalysis in gas phase, in solution, basis of catalytic action, catalysis and the equilibrium constant, acid base catalysis, The Bronsted catalysis law, linear free energy changes, general and specific catalysis. Heterogeneous catalysis. Negative catalysis and inhibition, Surface reactions – effect of temperature and nature of surface. Industrial catalysis.

Chain reactions: general treatment, activation energy, chain length, chain transfer reactions, inhibition.

Unit -4

Bond dissociation energies, branching chain reactions.

The collision theory: Dynamics of bimolecular collisions and rate and rate constant of bimolecular reaction, factors determining effectiveness of collisions, Termolecular reactions, unimolecular reactions. Relation between cross section and rate coefficients.

Potential Energy Surfaces: Long range, empirical intermolecular and molecular binding potentials, Internal coordinates and normal modes of vibration, Potential energy surfaces, ab-initio calculation of potential energy surface, experimental determination of potential energy surfaces, Details of the reactionpath, potential energy surface for electronically excited molecule. Molecular beam scattering, Stateresolved spectroscopic technique, molecular dynamics of H2 + H reaction, state-to-state kinetics of F +H2 reaction.

Unit -V

Transition State Theory (TST): Motion on the potential energy surface, Basic postulates and derivation of TST, dynamical derivation of TST, Quantum mechanical effects on TST, Thermodynamic formulation of TST, Application of TST, Microcannonical TST, Variational TST, Experimental observation of TST.

Books Recommended:

S.No.	Author	Book
1	K.A. Connors	Chemical Kinetics: A Study of Reaction Rates in Solution,
2	J.I. Steinfeld, J.S. Francisco & W.L. Hase	Chemical Kinetics and Dynamics,
3	K. J. Laidler	Chemical Kinetics,
4	R. D. Levine and R. B. Bernstein	Molecular Reaction Dynamics & Chemical Reactivity
5	J.W. Moore and R.G. Pearson	Pearson, Kinetics and Mechanisms,
6	Sanjay K. Upadhay	Chemical kinetics and Reaction Dynamics,

G 401: Statistical Techniques and Applications

Unit-I

Purpose of Statistics, Events and Probabilities, Assignments of probabilities to events, Random events and variables, Probability Axioms and Theorems. Probability distributions and properties: Discrete, Continuous and Empirical distributions.

Unit-II

Expected values: Mean, Variance, Skewness, Kurtosis, Moments and Characteristics Functions. Types of probability distributions: Binomial, Poisson, Normal, Gamma, Exponential, Chi-squared, Log-Normal, Student's t, F distributions, Central Limit Theorem

Unit-III

Monte Carlo techniques: Methods of generating statistical distributions: Pseudorandom numbers from computers and from probability distributions, Applications. Parameter inference: Given prior discrete hypotheses and continuous parameters, Maximum likelihood method for parameter inference.

Unit-IV

Error Analysis: Statistical and Systematic Errors, Reporting and using uncertainties, Propagation of errors, Statistical analysis of random uncertainties, Averaging Correlated/ Uncorrelated Measurements. Deconvolution methods, Deconvolution of histograms, binning-free methods. Least-squares fitting: Linear, Polynomial, arbitrary functions: with descriptions of specific methods; Fitting composite curves.

Unit-V

Hypothesis tests: Single and composite hypothesis, Goodness of fit tests, P-values, Chi-squared test, Likelihood Ratio, Kolmogorov-Smirnov test, Confidence Interval. Covariance and Correlation, Analysis of Variance and Covariance. Illustration of statistical techniques through hands-on use of computer programs.

Books Recommended:

S.No.	Author	Book
1	R.J. Barlow	Statistics: A Guide to the Use of Statistical Methods in the Physical Sciences
2	John Mandel, Dover	The Statistical Analysis of Experimental Data
3	Philip Bevington and Keith Robinson	Data Reduction and Error Analysis for the Physical Sciences, 3rd Edition

BL401: Biology Laboratory (Biochemistry + Cell Biology)

1. Ligand Binding

a) The binding of coomassie brilliant blue to bovine serum albumin, J. Sohl and A. Splittgerber, *J. Chem. Educ.* **68**, 262-264 (1991).

b) Evaluation of the Hill coefficient from Scatchard and Klotz plots, A. Sabouri and A. Moosavi-Movahedi, *Biochem. Educ.* **22**, 48-49 (1994).

c) The shapes of Scatchard plots for systems with two sets of binding sites, A. Bordbar et al.,*Biochem. Educ.* **24**, 172-175 (1996).

2. Spectroscopy

d) Fluorescence quenching of albumin. A spectrofluorimetric experiment, M. Montero et al, *Biochem Educ.* **18**, 99-101 (1990).

e) Lactate dehydrogenase kinetics and inhibition using a microplate reader, J. Powers et al., *Biochem. Mol. Biol. Educ.* **35**, 287-292 (2007).

3. Isolation and Analysis of Biomolecules - Amino acids/peptides/proteins/antibodies

f) Application of gel filtration for fractionation and molecular weight determination of proteins, O. Malhotra and A. Kumar, *Biochem. Educ.* 17, 148-150 (1989).

g) Protein structure and chromatographic behavior: The separation and characterization of four proteins using gel filtration and ion-exchange chromatography and gel electrophoresis, M. Chakravarthy, L. Snyder, T. Vanyo, J. Holbrook, and H. Jakubowski, *J. Chem. Educ.* 73, 268-272 (1996).

4. Isolation and Analysis of Biomolecules - Carbohydrates

h) Changes in carbohydrate content during fruit ripening-a new approach of teaching carbohydrate chemistry in biochemistry course, P. Chaimanee and O. Suntornwat, *Biochem. Educ.* 22, 101-102 (1994).

i) Carbohydrate Analysis: Can we control the ripening of bananas?, S. Deal, C. Farmer, and P. Cerpovicz, *J. Chem. Educ.* **79**, 479-480 (2002).

5. Isolation and Analysis of Biomolecules - Lipids

j) Isolation and spectrophotometric characterization of photosynthetic pigments, R. Boyer, *Biochem. Educ.* **18**, 203-206 (1990), and *Modern Experimental Biochemistry,*3rd ed., p. 333-344, (2000) Benjamin Cummings. (San Francisco).

k) An improved method for the extraction and thin-layer chromatography of chlorophyll a and b from spinach. H. Quach, R. Steeper, and G. Griffin, *J. Chem. Educ.* **81**, 385-387 (2004).

6. Metabolism/Regulation/Transport

l) The energetics of aerobic versus anaerobic respiration, T. Champion and R. Schwenz, *J. Chem. Educ.* 67, 528-530 (1990).

m) Use of DCPIP in a colorimetric method to investigate electron transport in crude heart mitochondrial extracts, A. Myers, *Journal of Biol. Educ.* 24, 123-126 (1990).

n) Mitochondria from rat liver: method for rapid preparation and study, C. Heisler, *Biochem. Educ.* 19, 35-38 (1991).

o) An experiment on glycogen biosynthesis in *E. coli,* A. Lodeiro et al, *Biochem. Educ.* 22, 213-214 (1994).

p) An experiment illustrating catabolite repression in yeast, W. Baker, *Biochem Educ.* 23, 216-217 (1995).

q) A simple experiment demonstrating the allosteric regulation of yeast pyruvate kinase, R. Taber, A. Campbell, and S. Spencer, *Biochem. Educ.* **26**, 73-76 (1998).

r) A simple laboratory exercise illustrating active transport in yeast cells, B. Stambuk, *Biochem. Mol. Biol. Educ.* **28**, 313-317 (2000).

s) The pentose phosphate pathway in the yeasts *Saccharomyces cerevisiae*and *Kloeckera apiculata,*an exercise in comparative metabolism for food and wine science students, C. Steel, P. Grbin, and A. Nichol, *Biochem. Mol. Biol. Educ.* **29**, 245-249 (2001).

t) Kinetic analysis of glucose-6-phosphatase: an investigative approach to carbohydrate metabolism, M. Wallert, J. Foster, D. Scholnick, A. Olmschenk, B. Kuehn, and J. Provost, *Biochem. Mol. Biol. Educ.***29**, 199-203 (2001).

u) Nitrate reductase: A model system for the investigation of enzyme induction in eukaryotes, C. Pike, W. Cohen, and J. Monroe, *Biochem. Mol. Biol. Educ.* **30**, 111-116 (2002).

CELL BIOLOGY

v) Programmed Cell Death DNA Laddering and Cell death assay (quantification by Evans Blue)

w) Post-translational modification of proteins

x) Introducing undergraduate students to real-time PCR, D. Hancock et al., *Biochem. Mol. Biol. Educ.***38**, 309-316 (2010).

y) Caenorhabditis elegans as an undergraduate educational tool for teaching RNAi, J. Andersen et al., *Biochem. Mol. Biol. Educ.* **36**, 417-427 (2008).

GL 401: Computational Laboratory and Numerical Methods

This course is primarily a lab course introducing computational techniques used for solving mathematics problems numerically. Vast amount of software for solving these problems exists and has been put together in general purpose packages such as MATHEMATICA, MAXIMA, MAPLE and so on.

Computing special functions (using recurrence relations, Attn: loss of accuracy and its effects), making subroutines/functions for these. Computing derivatives numerically (accuracy issues). Zeros (roots) of functions (single variable, multivariable, complex functions poles as zeros of inverse function). Solving differential equations (single variable, any order), Euler and Runge-Kutta, initial and boundary value problems. Eigenvalue problems as boundary value problems.

Numerical integration: trapizoidal and Simpson rules, Gaussian quadrature rules. Linear equations, inverse of a matrix, determinant using Gauss elimination. Matrix eigenvalue problems, Euler rotations, relaxation methods. Data fitting, χ methods, some simulations minimization. Random number generators, Monte-Carlo methods, some simulations.

Third Year

Semester – V [July - December 2017]

B501: Genetics

Unit-I

Introduction and overview of genetics: Information transfer DNA-RNA-Protein/genotype & phenotype, Eukaryotic & Prokaryotic genes, Pseudogenes. Gene regulation: λ phage, Bacterial gene regulation, Eukaryotic gene regulation, Epigenesis, Reverse genetics, genomes and genomics.

Unit-II

Mendelian inheritance (in details): *basics would have been taught*, Cell division- mitosis & meiosis *(revise: would have been taught)*, Deviation from mendelian inheritance, Linkage & Sex-linked inheritance Model genetic systems.

Unit-III

Human genome and genetics: Elements of human genetics & genetic disorders, Examples from *Drosophila*, yeast, maize and mouse, Immunogenetics.

Unit-IV

Genes and Evolution: The law of DNA constancy and C-value paradox: Numerical and structural changes in chromosomes; Molecular basis of spontaneous and induced mutations and their role in evolution; Environmental mutagenesis and toxicity testing; Population genetics.

Unit-V

Biostatistics: Principles and practice of statistical methods in biological research; samples and populations; Basic statistics – average, statistics of dispersion, coefficient of variation; Standard error; Confidence limits; Probability distributions binomial, Poisson and normal; Tests of statistical significance; Simple correlation of regression; Analysis of variance, Population genetics.

Books Recommended:

S.No.	Author	Book
1	E. J. Gardner, D.P Snustad and M. J. Simmons	Principles of Genetics
2	Leland Hartwell, Leroy Hood, Michael Goldberg, Ann Reynolds, Lee Silver, Ruth Veres.	Genetics: From genes to genomes
3	Anthony J. F. Griffiths. 2010	Introduction to genetic analysis
4	Harvey Motulsky, 2010	Intuitive Biostatistics: A Nonmathematical Guide to Statistical Thinking
5	Marcello Pagano, 2000	Principles of Biostatistics
6	Genetics for Dummies, 2005	T. R. Robinson

B 502: Molecular Biology

Unit-I
Molecular biology an overview: Concept and definition of the gene, complexity of the eukaryotic gene. Structural organization of the DNA in the nuclear material- General properties of histones, nucleosomes and solenoid structure, RNAs and their structure & function.

Unit-II
DNA synthesis: The enzymes of DNA replication in prokaryotes and eukaryotes, mechanism of replication in bacteria and viruses, reverse transcriptase, salient features of eukaryotic nuclear and mitochondrial DNA replication.
RNA synthesis: The enzymes of transcription in prokaryotes and eukaryotes, mechanism of transcription in bacteria, heteronuclear RNA, post transcriptional processing of RNA, role of ribozymes.

Unit-III
Protein synthesis: Concept of the genetic code, structure of t-RNA and t-RNA, enzymes of translation in prokaryotes and eukaryotes, mechanism of protein synthesis, post translational processing of proteins.

Unit-IV
Gene expression and its characterization: Regulation of gene expression in prokaryotes and eukaryotes, structure and mechanism of different operons, Gene regulation during development, Gene function and phenotype loss of function & gain of function, Gene interaction, suppressors & enhancers redundancy & epistasis.

Unit-V
Mutations and their consequences: Definition of mutation, mutagenesis & mutant selection, Alleles, Complementation, Recombination, recombination mapping and mechanism of recombination, Repair of DNA, Transposons & retroposons, Genomic & evolution of diversity.

Books Recommended:

S.No.	Author	Book
1	Stryer L	Biochemistry, 4 th edition,
2	Watson J. D., Hopkins, N. H., Roberts, J. W., Steitz, J. A. and Weiner, A. M.	Molecular biology of the gene, 4th edition, The Benjamin/Cummings publishing companies,
3	Benjamin Lewin	Genes VII, oxford University Press, Oxford
4	Weaver R. F.	Molecular biology,
5	Brown T A	Essential molecular biology, vol. I, A practical approach, IRL press, Oxford.28
6	Cox Lynne S	Molecular Themes in DNA Replication
7	Cantor, C. R., and Schimmel, P. R.	Biophysical Chemistry.

B 503: Biodiversity of plants/animals/microbes

Unit-I
Principles of taxonomy: Concept of species and hierarchical taxa, Biological nomenclature, Taxonomical structure**,** Outline classification of animals**,** important criteria used for classification in each Taxon.**,** Classification of animals Levels of Structural organizations: Larval forms and their evolutionary significance, Unicellular, colonial, and multicellular forms**,** Levels of organization of tissues, organs, and systems**,** Comparative anatomy

Unit-II
Classical and quantitative methods in taxonomy: Biosystematics, Interrelationship among major invertebrate phyla and minor invertebrate phyla; Evolutionary relationship among taxa, Natural History of

Indian subcontinent: Major habitat types, Geographical origin and migration of species , Common Indian mammals and birds, Seasonality and Phenology of Indian subcontinent
Deriving Solutions: Examine the concepts, benefits, and limitations of the different strategies for conserving biodiversity. a. Conservation Strategies, b. Laws and Legal Actions, c. Grassroots Action Program

Unit-III
Taxonomy of plants: Plant identification, nomenclature, collecting and documentation, plant phylogeny and systematics.
Comparative anatomy and morphology of angiosperms and gymnosperms. Angiosperms: Characteristic features, outline classification, vascular anatomy, leaves, flower, fruits and seeds. Gymnosperms: Characteristic features, outline classification, morphology and anatomy of ovules and female gametophyte, microspore and male gametophyte, seeds, stem and leaves.

Unit-IV
Concepts and characteristics of biodiversity: The concepts of biodiversity, Comparison of historical and current rate of species extinction, How genetic diversity may change between generations and within population of species, Complexity and functions of ecosystems; predictable and non-predictable features of ecosystem, Importance of preserving biodiversity, Genetic diversity

Unit-V
Causes and consequences of biodiversity loss: Address the major threats to biodiversity. The biggest threat is from habitat loss and alteration followed by the introduction of exotic species that become invasive. Chemical alteration of the environment also has a major impact on both natural and managed ecosystems.

a. Habitat Loss & Alteration b. Exotic Species c. Chemical Pollutants d. Loss of Genetic Diversity in Crops

Books Recommended:

S.No.	Author	Book
1	Cecie Starr, Ralph Taggart, Christine Evers, and Lisa Starr	Biology: The Unity and Diversity of Life
2	Hawksworth, D. L. & Bull Alan T.	Plant Conservation and Biodiversity. Series: Topics in Biodiversity and Conservation, Vol. 6 (Eds.) Reprinted from Biodiversity and Conservation, 16:6, 2007, VIII, 424 p.
3	M P Singh	Plant Biodiversity & Taxonomy
4	E.O.Wilson, *Editor.* Frances M. Peter	Biodiversity
5	Peter H. Raven, Ray F. Evert, and Susan E. Eichhorn	Biology of Plants

CB 501- Analytical Chemistry

Unit-I
Statistics in chemical analysis: Methods of sampling and associated errors, Classification of errors, Propagation of errors, treatment of errors, Normal distribution, Tests of Significance and Confidence Limits.

Unit -II
Separation techniques:

a. Solvent Extraction Technique: Conventional, Liquid Membranes – Bulk, Supported and Emulsified, Solid Phase Extraction (SPE).
b. Ion Exchange: Conventional, Membranes.
c. Chromatography: Gas chromatography (GC), High Performance Liquid Chromatography (HPLC), Ion chromatography (IC).

Unit -III

Mass Spectrometry: Mass Analysers – Magnetic, Quadrupole, Time of Flight (TOF), Ion Cyclotron Resonance, Features – Resolution, Dispersion, Abundance, Sensitivity , Detectors – Faraday Cup, Channeltron, Daly, Ion Sources –Thermal Ionisation (TI), Electron Impact, ICP, GD, Laser Ablation (LAICP), Secondary Ionisation (SI), Resonance Ionisation (RI), Matrix Assisted Laser Desorption and Ionisation (MALDI), Hyphenated Technique – IC-MS, HPLC-MS, GC-MS.

Unit -IV

Thermal Methods: Thermogravimetric Analysis (TGA), Derivative Thermogravimetric Analysis (DTG), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC), Evolved Gas Analysis (EGA).

Unit -V

Electrochemical Methods: Introduction, Potentiometry , Ion Selective Electrodes (ISE), Voltammetry & Polarography , Cyclic, Pulse and Stripping Voltammetry, Coulometry and Amperometry, AC Electrochemical Techniques, Scanning Electrochemical Microscopy.

Books Recommended:

S.No.	Author	Book
1	RA Meyers	Encyclopaedia of Analytical Chemistry: Applications, Theory and Instrumentation
2	DA Skoog, DM West, FJ Holler and SR Crouch	Fundamentals of Analytical Chemistry, 8th Edition
3	DA Skoog, FJ Holler and TA Niemann	Principles of Instrumental Analysis, 5th Edition, Saunders College Publishing (1998)
4	GH Jeffery, J Bassett, Mendham and RC Denney	A text book of Quantitative Analysis, 5th Edition Revised
5	AK De and SM Khopkar	Chalmers, Solvent Extraction of Metals, Van Nostrand, Reinhold
6	F Helfferich	Ion Exchangers, McGraw Hill
7	LR Snyder and JJ Kirkland	Introduction to Modern Liquid Chromatography, 2nd Edition, Wiley
8	Editors JA Marinsky, Y Marcus, Marcel Dekker	Ion Exchange and Solvent Extraction: A Series of Advances
9	ED Katz Chichester	High Performance Liquid Chromatography : Principles and Methods in Biotechnology;
10	A Metcalfe	Atomic Absorption and Emission Spectroscopy,
11	K Jose and AC Broekaert	Analytical Atomic Spectrometry with flames and Plasmas, Wiley-VCH
12	lJ Sneddon	Advances in Atomic Spectroscopy, Jai Press
13	M John Roboz	Introduction to Mass Spectrometry: Instrumentation and Techniques, Interscience
14	Steve J Hill	Inductively Coupled Plasma Spectrometry and its Application, Sheffield Academic Press
15	WW Wendlandt	Thermal Methods of Analysis, 2nd Edition, Wiley
16	T Daniels, Kogan Page	Thermal Analysis
17	AJ Bard and LR Faulkner	Electrochemical Methods, 2nd Edition, Wiley
18	SP Kruger	Principles of Activation Analysis, Wiley Interscience
19	LC Feldman and JW Meyer	Fundamentals of Surface and Thin Film Analysis, North Holland
20	JC Miller and JN Miller	Statistics for Analytical Chemistry, 2nd Edition, Wiley

G 501: Earth Science and Energy & Environmental Sciences

Unit –I

Origin of the earth, type of rocks in different layers, their physical and chemical properties.
Mechanism of their formation and destruction. Radioactivity and its role in geochronology, Plate tectonics and geodynamics and the role of mantle plumes in sustaining these processes.
Gravity, electrical, seismic and magnetic properties of the different layers in the earth.
Their variations in different geological terrains. Instrumentation, field procedures used in these studies.
Response of the earth to the elastic (Seismic) and electromagnetic waves, use of this phenomena to study the earth's interior.

Unit-II

Geodynamo and the internal magnetic field of the earth.
Paleomagnetic studies, Polar wandering and reversal, possible theoretical arguments for understanding the phenomena.
Seismology and its use in understanding of the different layers in the earth's interior.
Utility of the different geophysical techniques (discussed above) in exploration for academic as well as for harnessing resources.

Unit-III

Introduction to Environmental Science. Natural Environments: Ecosystems and ecology, biodiversity.
Socio-cultural environments: demography, population density, human organizations.
Land use and its planning.
Global climate change and effects on environment.
Carbon cycle from human activity, calculation of carbon budgets.

Unit-IV

Water harvesting, storage and treatment.
Natural calamities, hazards, and effects of human activity: Chemical and other technological hazards.
Introduction to energy Sources - evolution of energy sources with time. Power production, per capita consumption in the world, and relation to development index. Energy scenario in India:
Various issues related to consumption and demands -energy crisis issues in India.
Renewable and non-renewable energy sources - technology and commercialization of energy sources, local (decentralized) versus centralized energy production, constraints and opportunities of renewable energy (hydrocarbon and coal based energy sources).

Unit-V

Energy conservation – calculation of energy requirements for typical and home and industrial applications.
Alternative to fossil fuels - solar, wind, tidal, geothermal.
Bio-based fuels. Hydrogen as a fuel.
Energy transport and storages, comparison of energy sources - passage from source to delivery (source, production, transport, delivery) - efficiencies, losses and wastes.
Nuclear energy: Power production: Components of a reactor and its working, types of reactors and comparison. India's three stage nuclear program. Nuclear fuel cycle. Thorium based reactors. Regulations on nuclear energy.

Books Recommended:

S.No.	Author	Book
1	Merill RT, McElhinny MW and McFadden PL	The magnetic field of the Earth: International Geophysical Series
2	Edward J, Tarbuck EJ and Lutgens FK	Earth Science
3	HR Sheehan *et al.,*	Introduction to Applied Geophysics: Exploring the Shallow Subsurface Burger
4	Condie KC	Mantle Plumes and Their Record in Earth History; Cambridge University Press, Cambridge, UK

5	WM Telford, Robert E Sheriff and LP Geldart	Applied Geophysics (Paperback)
6	JB Marion	Energy in Perspective, University of Maryland, Academic Press
7	Robert A Ristinen and Jack J Kraushaar	Energy and Environment, , 2nd Edn., John Wiley and Sons, Inc.
8	Boyle Godfrey	Renewable Energy, Oxford University Press
9	D.K.Asthana and Meera Asthana	Environment, Problems and Solutions, S. Chand and Company
10	Balaram Pani IK	Text Book on Environmental Chemistry, International Publishing House

BL 501: Biology Laboratory (Molecular Biology + Biodiversity + Genetics)

1. BACTERIAL GENETICS

a) *E. coli* Transformation
b) *E. coli* Conjugation
c) *E. coli* Transduction
d) Phage Titration
e) Transposition
f) α- Complementation

2. EUKARYOTIC GENETICS

g) To Study the model organism, *Drosophila Melanogaster*
h) Concept of Crossing: - Monohybrid and Dihybrid crosses using *Drosophila Melanogaster*
i) Drosophila Genetics:
To Observe & Study the Mutants of *Drosophila Melanogaster*
Concept of Mutation - Lethal Mutations
j) Karyotyping

3. BIODIVERSITY

k) Setting up biodiversity niches in the lab & Hospital :fish-tank & Winogradsky column
l) Biodiversity in soil, air & Winogradsky's Column – Plating , Colony Characterization & Gram Staining
m) Field Trips - SEWRI MUD FLATS – ½ DAY, COLABA WOODS - ½ DAY, THANE BUTTERFLY PARK - ½ DAY, KARNALA BIRD SANCTUARY - ½ DAY, MAHIM NATURE PARK - ½ DAY

4. MOLECULAR BIOLOGY

n) General Laboratory Procedures
Pouring Nutrient Agar Plates; Preparation of Solutions;
Bacterial Culturing Techniqueso) Designing of Primers for PCR procedure
p) Extraction and Isolation of genomic DNA Using Kit method
By conventional Ethanol Precipitation method
q) Detection of Nucleic acids (AGE)
r) Polymerase Chain Reaction (PCR) & Detection of the PCR product and its purification
s) Blunt-end cloning (after Ligation)
t) Preparation of competent cells & Transformation of E. coli cells with plasmid
u) Plasmid Purification, RE Digestion & Detection of the RE-digested product
v) Overexpression & Detection by PAGE
w) Using restriction mapping to teach basic skills in the molecular biology lab, L. Walsh et al., *Biochem. Mol. Biol. Educ.* **35**, 199-205 (2007).
x) Western blot analysis to illustrate relative control levels of the *lac* and *ara* promoters in *E. coli*, B. Nielsen et al., *Biochem. Mol. Biol. Educ.* **35**, 133- 137 (2007).

B601: Immunology

Unit-I

Overview of the Immune system: Types of immunity, innate, acquired, passive and active, self vs nonself discrimination, Adaptive immune response, Autoimmunity

Unit-II

Cells and organs of the immune system: T cell receptors, T cell receptor genes & gene rearrangements, T cell maturation, activation & differentiation, B cell generation, activation & development

Unit-III

Antigens and Antibodies: Immunoglobulins- structure and function, Immunoglobulin genes- Organization and rearrangement, Antibody diversity, Antigen antibody reactions, MHC (antigens and genes), Antigen processing & presentation

Unit-IV

Immune response: Self Non-self discrimination (mechanism), Clonal selection theory & idiotypic network hypothesis, Cytokines, The complement system, Cell mediated effector response, Leukocyte migration and inflammation, Hypersensitive reactions, Immune regulation, Immune response to infectious organisms, Vaccines, Immunodeficiency diseases (AIDS)

Unit-V

Immunology & applications: Transplantation immunology, Tumour immunology, Immunotechnology, Animal models. Plant immunity

Books Recommended:

S.No.	Author	Book
1	Goldsby, Kindt, and Osborne	Immunology
2	Janice Kuby	Immunology
3	Ivan Roitt	Essential Immunology, 8th Edition
4	Cellular and Molecular Immunology	Kathyrn Austyn
5	David	Biology of Immunological Diseases
6	Richard Burry	Immunocytochemistry: A practical guide for Biomedical Research

B 602: Animal Physiology

Unit-I

Cell Structure & Metabolism: Homeostasis, Mechanisms of Cellular Control, Membrane Transport, Membrane Potentials (a review). Body Control: Hypothalamic/Pituitary Axis, Mystic Rhythms

Unit-II

Neurons and the Nervous system: Synapses, Sense Perception, Special Senses, CNS Design: Autonomic Nervous System, Action Potential, - Basic structures of neurons and glia, Neurotransmission: Ion channels, Membrane potentials, Resting potential – Depolarization, repolarization and hyperpolarization. Electrotonic and Action potential, Mechanism of neurotransmission. Membrane channels –voltage gated, ligand gated, mechanically gated. Basics of a synapse (electrical and chemical). Introduction to central nervous system design: Structural and functional outline of the brain and the spinal cord, Hypothalamus: Osmoregulation, temperature control, and role in neuroendocrine system: Hypothalamo-hypophyseal portal system, Autonomic Nervous System (sympathetic and parasympathetic pathways). Reflex action.

Unit-III

Muscular system: Skeletal Muscle, Muscle Characteristics, Muscle Control, Muscle Exercise, Smooth Muscle. Cardiovascular Systems: Cardiac Muscle, Heartbeat , Cardiac Control, Blood: Hemostasis, Temperature Control, Vessels, Tissue Exchange, EKGs and Blood Pressure. Digestion: Absorption

Unit-IV

Respiratory Systems: Respiration, Respiratory Control. Energy Balance and Metabolism: Fuel Metabolism (both plants and Animals)

Unit-V

Processes: Excretion Control Salt & Water Balance, An example of a process going wrong. Diabetes. Comparative Physiology

Books Recommended:

S.No.	Author	Book
1	Linda S. Costanzo	Physiology: Board Review Series
2	William Ganong	Review of Medical Physiology (Lange Basic Science)
3	Guyton and Hall	Physiology Review
4	Appleton and Lange	Review of Physiology
5	Linardakis	Illustrated review of Physiology
6	C Guyton	Textbook of Medical Physiology

B 603: Plant Physiology

Unit-I

Plant Cells - Model Organisms, The Plant Kingdom, Flower Structure and the Angiosperm Life Cycle, Plant Tissue Systems: Dermal, Ground, and Vascular
The Structures of Chloroplast Glycosylglycerides
A Model for the Structure of Nuclear Pores
The Proteins Involved in Nuclear Import and Export
Protein Signals Used to Sort Proteins to their Destinations
SNAREs, Rabs, and Coat Proteins Mediate Vesicle Formation, Fission, and Fusion
ER Exit Sites (ERES) and Golgi Bodies Are Interconnected
Specialized Vacuoles in Plant Cells
Actin-Binding Proteins Regulate Microfilament Growth
Kinesins Are Associated with Other Microtubules and Chromatin
Water and Plant Cells
Calculating Capillary Rise, Calculating Half-Times of Diffusion
Alternative Conventions for Components of Water Potential
Temperature and Water Potential, Can Negative Turgor Pressures Exist in Living Cells?
Measuring Water Potential, The Matric Potential, Wilting and Plasmolysis
Understanding Hydraulic Conductivity
Water Balance of Plants
Irrigation, Physical Properties of Soils, Leaf Transpiration and Water Vapor Gradients
Calculating Velocities of Water Movement in the Xylem and in Living Cells
Mineral Nutrition
Symptoms of Deficiency in Essential Minerals - Wade Berry, UCLA
Observing Roots below Ground
Solute Transport
Relating the Membrane Potential to the Distribution of Several Ions across the Membrane: The Goldman Equation, Patch Clamp Studies in Plant Cells, Chemiosmosis in Action
Kinetic Analysis of Multiple Transporter Systems, ABC Transporters in Plants
Transport Studies with Isolated Vacuoles and Membrane Vesicles

Unit-II

Photosynthesis: The Light Reactions
Principles of Spectrophotometry, Quantum Yield
The Distribution of Chlorophylls and Other Photosynthetic Pigments
Antagonistic Effects of Light on Cytochrome Oxidation
Structures of Two Bacterial Reaction Centers
Midpoint Potentials and Redox Reactions
Oxygen Evolution, Photosystem I, ATP Synthase
Mode of Action of Some Herbicides, Chlorophyll Biosynthesis

Photosynthesis: The Carbon Reactions

Inorganic Carbon-Concentrating Mechanisms: CO2 and HCO3 – Pumps
How the Calvin–Benson Cycle Was Elucidated
Rubisco: A Model Enzyme for Studying Structure and Function
Energy Demands for Photosynthesis in Land Plants
Rubisco Activase, Thioredoxins, Operation of the C2 Oxidative Photosynthetic Carbon Cycle
Carbon Dioxide: Some Important Physicochemical Properties
Three Variations of C4 Metabolism
Single-Cell C4 Photosynthesis, Photorespiration in CAM plants
Glossary of Carbohydrate Biochemistry, Starch Architecture
Fructans, Chloroplast Phosphate Translocators

Photosynthesis: Physiological and Ecological Considerations

Working with Light, Heat Dissipation from Leaves: The Bowen Ratio
The Geographic Distributions of C3 and C4 Plants
Calculating Important Parameters in Leaf Gas Exchange
Prehistoric Changes in Atmospheric CO2
Projected Future Increases in Atmospheric CO2
Using Carbon Isotopes to Detect Adulteration in Foods
Reconstruction of the Expansion of C4 Taxa

Translocation in the Phloem

Sieve Elements as the Transport Cells between Sources and Sinks
An Additional Mechanism for Blocking Wounded Sieve Elements in the Legume Family
Sampling Phloem Sap, Nitrogen Transport in the Phloem
Monitoring Traffic on the Sugar Freeway: Sugar Transport Rates in the Phloem
Alternative Views of Pressure Gradient in Sieve Elements: Large or Small Gradients?
Experiments on Phloem Loading, Experiments on Phloem Unloading
Allocation in Source Leaves: The Balance between Starch and Sucrose Synthesis
Partitioning: The Role of Sucrose-Metabolizing Enzymes in Sinks
Possible Mechanisms Linking Sink Demand and Photosynthetic Rate in Starch Storers
Proteins and RNAs: Signal Molecules in the Phloem

Unit-III

Respiration and Lipid Metabolism
The Q-Cycle Explains How Complex III Pumps Protons across the Inner Mitochondrial Membrane, Multiple Energy Conservation Bypasses in Oxidative Phosphorylation of Plant Mitochondria, FoF1-ATP Synthases: The World's Smallest Rotary Motors
Transport Into and Out of Plant Mitochondria, The Genetic System in Plant Mitochondria Has Several Special Features, Does Respiration Reduce Crop Yields?
The Lipid Composition of Membranes Affects the Cell Biology and Physiology of Plants
Utilization of Oil Reserves in Cotyledons

Assimilation of Mineral Nutrients
Development of a Root Nodule, Measurement of Nitrogen Fixation
The Synthesis of Methionine, Oxygenases

Secondary Metabolites and Plant Defense

Cutin, Waxes, and Suberin, Structure of Various Triterpenes
The Shikimic Acid Pathway, Detailed Chemical Structure of a Portion of a Lignin Molecules

Cell Walls: Structure, Biogenesis, and Expansion
Plant Cell Walls Play a Major Role in Carbon Flow through Ecosystems
Terminology for Polysaccharide Chemistry
Molecular Model for the Synthesis of Cellulose and Other Wall Polysaccharides That Consist of a Disaccharide Repeat, Matrix Components of the Cell Wall
The Mechanical Properties of Cell Walls: Studies With *Nitella*
Wall Degradation and Plant Defense, Structure of Biologically Active Oligosaccharins
Glucanases and Other Hydrolytic Enzymes May Modify the Matrix

Unit-IV
Growth and Development
Embryonic Dormancy, Rice Embryogenesis
Polarity of *Fucus* Zygotes, *Azolla* Root Development
Class III HD-Zip Transcription Factors Promote Adaxial Development through a micro RNASensitive Mechanism
During Senescence Photoactive Chlorophyllide Is Converted into a Colorless Chlorophyll Catabolite
Phytochrome and Light Control of Plant Development
Mougeotia: A Chloroplast with a Twist, Phytochrome and High-Irradiance Responses
The Origins of Phytochrome as a Bacterial Two-Component Receptor
Profiling Gene Expression in Plants, Two-Hybrid Screens and Co-immunoprecipitation
Phytochrome Effects on Ion Fluxes, Microarray Analysis of Shade Avoidance
Blue-Light Responses: Morphogenesis and Stomatal Movements
Blue-Light Sensing and Light Gradients, Guard Cell Osmoregulation and a Blue Light-Activated Metabolic Switch
The Coleoptile Chloroplast, Phytochrome-Mediated Responses in Stomata
Gibberellins: Regulators of Plant Height and Seed Germination
Structures of Some Important Gibberellins and Their Precursors, Derivatives, and Inhibitors of Gibberellin Biosynthesis
Commercial Uses of Gibberellins, Gibberellin Biosynthesis
Environmental Control of Gibberellin Biosynthesis, Auxin Can Regulate Gibberellin Biosynthesis
Negative Regulators of GA Response, Effects of GAs on Flowering
DELLA Proteins as Integrators of Multiple Signals
Cytokinins: Regulators of Cell Division
Cultured Cells Can Acquire the Ability to Synthesize Cytokinins
Structures of Some Naturally Occurring Cytokinins
Various Methods Are Used to Detect and Identify Cytokinins
The Biologically Active Form of Cytokinin Is the Free Base
Cytokinins Are Also Present in Some tRNAs in Animal and Plant Cells
The Structures of Opines, The Ti Plasmid and Plant Genetic Engineering
Phylogenetic Tree of *IPT* genes
A Root-Derived Hormone, Strigolactone, Is Involved in the Suppression of Branching in Shoots
Cytokinin Can Promote Light-Mediated Development
Cytokinins Promote Cell Expansion and Greening in Cotyledons
Cytokinins Interact with Elements of the Circadian Clock
Ethylene: The Gaseous Hormone
Ethylene in the Environment Arises Biotically and Abiotically
Ethylene Readily Undergoes Oxidation
Ethylene Can Be Measured by Gas Chromatography
Cloning of the Gene That Encodes ACC Synthase
Cloning of the Gene That Encodes ACC Oxidase
Ethylene Binding to ETR1 and Seedling Response to Ethylene
Conservation of Ethylene Signaling Components in Other Plant Species
ACC Synthase Gene Expression and Biotechnology
The *hookless* Mutation Alters the Pattern of Auxin Gene Expression
Ethylene Inhibits the Formation of Nitrogen-Fixing Root Nodules in Legumes

Ethylene Biosynthesis Can Be Blocked with Anti-Sense DNA
Abscission and the Dawn of Agriculture
Specific Inhibitors of Ethylene Biosynthesis Are Used Commercially to Preserve Cut Flowers
Abscisic Acid: A Seed Maturation and Stress-Response Hormone
The Structure of Lunularic Acid from Liverworts
ABA May Be an Ancient Stress Signal
Structural Requirements for Biological Activity of Abscisic Acid, The Bioassay of ABA
Evidence for Both Extracellular and Intracellular ABA Receptors
The Existence of G Protein-Coupled ABA Receptors Is Still Unresolved
The Yeast Two-Hybrid System
Yellow Cameleon: A Noninvasive Tool for Measuring Intracellular Calcium
Phosphatidic Acid May Stimulate Sphingosine-1-Phosphate Production
The ABA Signal Transduction Pathway Includes Several Protein Kinases
The *ERA*1 and *ABH* Genes Code for Negative Regulators of the The ABA Response
Promoter Elements That Regulate ABA Induction of Gene Expression
Regulatory Proteins Implicated in ABA-Stimulated Gene Transcription
ABA Gene Expression Can Also Be Regulated by mRNA Processing and Stability
ABA May Play a Role in Plant Pathogen Responses
Proteins Required for Desiccation Tolerance, The Types of Coat-Imposed Seed Dormancy
Types of Seed Dormancy and the Roles of Environmental Factors
The Longevity of Seeds, Genetic Mapping Of Dormancy: Quantitative Trait Locus (QTL)
Scoring of Vegetative Dormancy Combined with a Candidate Gene Approach
ABA-Induced Senescence and Ethylene

Unit-V

The Control of Flowering
Contrasting the Characteristics of Juvenile and Adult Phases of English Ivy (*Hedera helix*) and Maize (*Zea mays*), Regulation of Juvenility by the *TEOPOD* (*TP*) Genes in Maize
Flowering of Juvenile Meristems Grafted to Adult Plants
Characteristics of the Phase-Shifting Response in Circadian Rhythms
Support for the Role of Blue-Light Regulation of Circadian Rhythms
Genes That Control Flowering Time, Regulation of Flowering in Canterbury Bells by Both Photoperiod and Vernalization, The Self-Propagating Nature of the Floral Stimulus
Examples of Floral Induction by Gibberellins in Plants with Different Environmental Requirements for Flowering, The Effects of Two Different Gibberellins on Flowering (Spike Length) and Elongation (Stem Length), The Contrasting Effects of Phytochromes A and B on Flowering
A Gene That Regulates the Floral Stimulus in Maize
Responses and Adaptations to Abiotic Stress
Stomatal Conductance and Yields of Irrigated Crops, Membrane Lipids and Low Temperatures
Ice Formation in Higher-Plant Cells, Water-Deficit-Regulated ABA Signaling and Stomatal Closure, Genetic and Physiological Adaptations Required for Zinc Hyperaccumulation
Cellular and Whole Plant Responses to Salinity Stress
Signaling during Cold Acclimation Regulates Genes That Are Expressed in Response to Low Temperature and Enhances Freezing Tolerance

Books Recommended:

S.No.	Author	Book
1	Hans Mohr, Peter Schopfer	Plant Physiology; Springer, 629 pages
2	Taiz and Zeiger	Plant Physiology; 4th Edition. Sinauer
3	Hopkins WG	Introduction to Plant Physiology. 2nd or 3rd Edition
4	Stern KR	Introductory Plant Biology. 7th Ed. Wm C Brown Publishers
5	Fosket	Plant Growth and Development: A molecular approach. Acad. Press. More details on how plants grow and develop.
6	Buchanan R, Gruissem W and	Biochemistry and Molecular Biology of

	Jones R	Plants
7	Chrispeels MJ and DE Sadava	Plants, Genes and Crop Biotechnology. 2nd Ed. Jones and
8	Bartlett	Understanding plant biology and the potential of agricultural biotechnology

B 604: Microbiology

Unit-I

General Microbiology - Introduction to Microscopy, Prokaryotic Structure & Function, Microbial Nutrition, Microbial Growth, Control of Microbes, From Taxonomy through the *Archaea*: Gram Negative Bacteria, Gram Positive Bacteria, metabolism, microbial genetics, and the role of microorganisms in disease, immunity, and other selected applied areas.

Fundamentals of General Microbiology - Isolation of a broad range of nonpathogenic bacteria from natural sources, using selective and enrichment techniques, with microscopic, biochemical, and molecular identification. Related exercises include genetics, physiology, quantitation, and growth energetics. Survey of the microbial world, metabolism, biosynthesis, regulation, growth, structure, and function.

Unit-II

Microbes and Society Focuses on activities of bacteria, viruses, and other microorganisms, and their influence on humans. Microbe-related topics include disease, bioterrorism, food, biotechnology, and ecology. Examine the nature of scientific inquiry, along with major biological concepts.

Bacterial Genetics - Molecular genetics: description of fundamental genetic processes such as mutation, repair, genetic exchange, recombination, and gene expression. Use of genetic strategies to analyze complex biological processes. Focuses on prokaryotic organisms. Signal transduction in bacteria

Unit-III

Evolution of Prokaryotic Diversity - Evolution, diversity, and genomics of prokaryotic microorganisms, Enrichment, isolation, and molecular phylogenetic characterization of selected prokaryotic organisms. Prokaryotic Diversity - Structure, biochemical properties, and genetics of the major groups of prokaryotes.

Microbial Ecology - Consideration of the various roles that microorganisms, particularly bacteria and cyanobacteria, play in environmental processes. The interrelationships among microorganisms and the effects of the physical, chemical, and biological properties of their environment are discussed and assessed. Microbial ecology; food, industrial and medical microbiology Symbiosis Aquatic Ecology, Terrestrial Ecology, Industrial Microbiology, Food Microbiology

Unit-IV

Medical Bacteriology - Medically important bacterial pathogens in terms of the clinical, therapeutic, and epidemiological aspects of diseases caused by them, molecular mechanisms of pathogenesis and their identification in the clinical laboratory, procedures for isolation and identification of pathogenic bacteria, testing their susceptibility to antibiotics. Bacterial Pathogenesis: Introduction, Genetic tools used for bacterial pathogenesis study; Bacterial cell-cell communications and biofilm formation, Bacterial genomics, lateral transfer, phage, Vertebrate microbial communities in health and disease, Strategies for bacterial adhesion and invasion

Medical Mycology and Parasitology - Consideration of medically important fungi and parasites, with emphasis on their biology in relation to disease and its laboratory diagnosis.

Unit-V

Molecular Mechanisms of Bacterial Pathogenesis Mechanisms of bacterial pathogenesis explored at the molecular, genetic, and cellular levels through selected models as presented in the current scientific literature. Molecular and Medical Microbiology recent advances in molecular biology of microbial pathogenesis or the current research of the participants is presented and discussed critically.

Protozoan infections: Introduction to protozoa, A survey of the major protozoan infections of humans including a brief description of the parasite life cycles and a brief discussion of the clinical diseases seen during these infections.

Biology and pathogenesis of Plasmodium. life cycle Plasmodium parasites and pathology of human malaria, biochemical and cell biological similarities and differences with other apicomplexa (Babesia, Cryptosporidium, Toxoplasma, etc.), and implications for therapeutic development. Biology and pathogenesis of Toxoplasma, Leishmania, Trypanosoma.

Books Recommended:

S.No.	Author	Book
1	Thomas D Brock	Brock's Biology of Microorganisms
2	Patrick R Murray	Medical Microbiology: with STUDENT CONSULT Access
3	John M Barry	The Great Influenza: The Story of the Deadliest Pandemic in History
4	Alfred E Brown	Benson's Microbiological Applications: Laboratory Manual in General Microbiology (Spiral-bound)
5	Ananthanarayan and Paniker Orient Blackswan	Textbook of Microbiology: Medical microbiology

CB601: Biophysical Chemistry

Unit-I

Physical properties of water: Structure, water as solvent, The hydrophobic effect, osmosis and Diffusion. Introduction to Biomolecules: Nucleic Acid, Protein - Polymer Description of Macromolecular Structure, Intermolecular and Intramolecular forces, Non Covalent Interaction

Unit -II

Hydrodynamic properties: Diffusion and sedimentation, determination of molecular weight from sedimentation and diffusion; Introduction of Ultra Centrifugation, Dynamic Light Scattering and Electrophoresis.
Spectroscopic properties of proteins and nucleic acid: UV/Vis, Intrinsic fluorescence, Circular Dichroism

Unit -III

The concept and application of Chemical and Physical equilibria in Biological system, The equilibrium constant and Standard Gibbs Free energies of reactants and products, Temperature dependence of the equilibrium constant, Double Strand formation in nucleic acid, Ligand-protein binding, Protein denaturation and stability, Introduction of DSC and ITC

Unit -IV

Protein folding kinetics and Biophysical methods, Misfolding and aggregation ; Physical basis of conformation diseases, Therapeutic approaches to protein misfolding diseases**.**

Unit -V

Introduction to basic principles of protein X-ray crystallography, protein NMR, Small Angle X-ray scattering (SAXS), and Electron microscopy (EM).

Books Recommended:

S.No.	Author	Book
1	Tinoco, Sauer, Wang & Puglisi	Physical Chemistry: Principles and Applications in the Biological Sciences
2	Peter Atkins and Julio de Paula	Physical Chemistry for the Life Sciences

H 601 Ethics of Science and IPR

Unit-I

Introduction – causes of unethical acts, ignorance of laws, codes, policies and Procedures, recognition, friendship, personal gains; Bioethics: Definition – moral, values, ethics; Role and importance of ethics in biology; Professional ethics – professional conduct

Ethical decision making, ethical dilemmas; Teaching ethical values to scientists, good laboratory practices, good manufacturing practices, laboratory

Basic Approaches to Ethics; Posthumanism and Anti-Posthumanism;

Bioethics: legal and regulatory issues;

Unit-II

Bioethics in healthcare, agriculture, modern biology, biotechnology, animal welfare & right / animals in research, wildlife conservation and management, commercialism in scientific research

Bioethics and cross-cultural bioethics – Autonomy, Rights, Beneficience, Do No Harm, Justice, Confidentiality, Animal Rights, Environmental ethics, Decision-Making Perceptions of Ethical Biotechnology 'Moral' is not the same as Ethical, Mixed Perception of Benefit & Risk, Reasoning behind Acceptance or Rejection of Genetic Manipulation, Concerns about Consuming products of GMOs.

Past and Present 'Bioethical Conflicts' in Biotechnology- Interference with Nature , Fear of Unknown, Regulatory Concerns, Human Misuse Future 'Bioethical Conflicts' in Biotechnology - Changing perception of Nature, Human Genetic Engineering

Unit-III

Ethical issues related to Synthetic bilogy:

Engineering DNA-based biological circuits, including but not limited to standardized biological parts;

Defining a minimal genome/minimal life (top-down); Constructing protocells, i.e. living cells, from scratch (bottom-up), Creating orthogonal biological systems based on a biochemistry, e.g. non-ATGC DNA bases or non-DNA non-RNA nucleic acids, so called XNA

Unit-IV

Introduction to IPR; Types of Intellectual property – Patents, Trademarks

Copyrights and related rights; Traditional vs. Novelty; Importance of intellectual property rights in the modern global economic environment, Importance of intellectual property rights in India; IPR and its relevance in biology and environmental sciences;

Case studies and agreements - Evolution of GATT and WTO and IPR provisions under TRIPS;

Madrid agreement; Hague agreement; WIPO treaties; Budapest treaty; Indian Patent Act (1970)

Unit-V

Patents: Definition, patentable and non patentable inventions; types of patent application – Ordinary, Conventional, PCT, Divisional, and Patent of addition; Concept of Prior Art; Precautions while patenting disclosure / nondisclosure; Time frame and cost; Patent databases, Searching International databases; Patent licensing and agreement; Patent infringement – meaning, scope, litigation, case studies. Patenting rules – European Scenario, US Scenario, Australia Scenario, Indian Scenario, Non Patentable IP and Patentable IP in Indian Patent Act

Rights of patents – Infringement of patent rights Remedies for infringement of patent rights; Patentability and emerging issues

Books Recommended:

S.No.	Author	Book
1	Lesk	Introduction to Bio Informatics, OUP
2	Cynthia Gibas and Per Jambeck,	Developing Bioinformatics Computer Skills
3	Atwood, Pearson Education	Introduction to Bioinformatics
4	Tisdall, SPD	Beginning Perl for Bio-informatics
5	Smith, D.W., 1994	Biocomputing: Informatics and Genome Project
6	Baxevanis, A.D., Quellette, B.F.F.,	Bioinformatics: A practical Guide to the Analysis of Genes and Proteins

BL 601: Biology Laboratory
(Animal Physiology + Plant Physiology +Immunology + Microbiology+ Bioinformatics)

1. ANIMAL PHYSIOLOGY

a) Animal cell culture and microscopy
b) Gross anatomy of the animal brain & Staining of mouse brain sections
c) Wound Healing Assay

2. IMMUNOLOGY

d) Isolations of monocytes/macrophages- properties; Isolation of Lymphocytes- T and B cell identification & Lymphocyte Activity.
e) Separation of WBC & RBC; counting by Haemocytometer
f) Serum Electrophoresis
g) ELISA - direct & indirect
h) Ag detection & Ab detection
i) Widal – Tube & Slide
j) VDRL
k) Blood typing & Pregnancy hCG Ag
l) Double diffusion
m) Immunoelectrophoresis
n) Radial Immunodiffusion

3. PLANT PHYSIOLOGY

p) *Arabidopsis thaliana* - model organism and its development
q) *Funaria hygrometrica* - differentiation from chloronema to caulonema to bud formation
r) Callus formation from carrot cells

4. Bioinformatics:

DNA sequence analysis using BLAST; sequence pattern, motifs and profiles.
Prediction of secondary structure of proteins
Prediction of tertiary structure of (fold recognition, homology search)
Molecular modeling and dynamics: using small oligonucleofides and small protein with known crystal structure (available from data bank)
Drug designing – using available data Applications of bio informatics – open ended / small project.

FOURTH YEAR

Semester – VII [July – December 2018]

B 701: Neurobiology

Unit-I

The glial system: Generation of Astrocytes, Oligodendrocytes, and Schwan cells. Function of glia in normal brain and in neuroprotection.
Chemical composition of the brain: metabolism (utilization and uptake of glucose and amino acids). Blood-Brain barrier.

Unit-II

Neurotransmitters: Synthesis, storage, release, uptake, degradation and action of neurotransmitters, Acetyl choline, GABA, Serotonin, Dopamine, Glutamate, Nitrous oxide, etc. Receptors: different subtypes (cholinergic, dopaminergic, adrenergic, and glutamatergic), mechanism of action, Agonists and Antagonists – their mode of action and effects. Exocytosis of neurotransmitter – Role of synapsins, synaptogamins, SNAP, SNARE and other proteins in docking, exocytosis and recycling of vesicles.

Unit-III

Sleep and Learning and memory: Mechanism of short-term memory and Long-term memory (longterm potentiation). Role of sleep in memory consolidation. Electroencephalogram. Role of second messenger pathways in learning and memory process. Role of synaptic plasticity.

Unit-IV

Sensory organs:
Vision: Biochemistry of vision: Rod and cone cells, mechanism and regulation of vision, color vision, visual field, visual acuity. Visual pathway and topographic mapping.
Audition: functional anatomy of the middle and inner ear. Amplification of sound. Functional anatomy and mechanism of detection of specific sound frequency in the inner ear. Mechanism of action of the mechanosensory receptors in the inner ear.

Unit-V

Chemical senses:
Olfaction: The olfactory pathway, mechanism and the combinatorial code of detecting a smell.
Taste: Mechanism of taste perception.
Touch/pain: The touch/pain/temperature pathway (ascending and descending). Higher order integration in the brain.
Pathologies of the nervous system: Molecular basis of Parkinson's disease, Alzheimer's disease, Schizophrenia, Myasthenia gravis and Multiple sclerosis, stress and antidepressants.

Books Recommended:

S.No.	Author	Book
1	Ferdinand Hucho	Neurochemistry
2	MP Spiegel	Basic Neurochemistry
3	Koenig and Edward	Cell Biology of the Axon, Series: Results & Problems in Cell Differentiation, Vol. 48
4	Eric Kendel, JH Schwartz, T Jessel	Principles of neural Sciences
5	A Guyton and J Hall	Textbook of medical Medical physiology

B 702: Immunology-II (Immunity and Disease)

Unit-I

Host-Pathogen relationship
Diseases caused by Viruses and the immune response to them- HIV and AIDS-immune responses

Unit-II

Bacterial diseases – and the immune response to bacteria
Vaccines- mechanisms, types of vaccines

Unit-III

Parasites – protozoan parasites, parasitic worms and the immune response to them- eg malaria, leishmaniasis, worm infestations

Unit-IV

Immediate Hypersensitivity and allergy, anaphylaxis
Hypersensitivity and chronic inflammatory diseases- tuberculosis and leprosy
Cancer immunology

Unit-V

Autoimmune diseases- generalized- SLE, Rheumatoid arthritis; localized- multiple sclerosis
Diseases due to immune cross reactivity- Rh incompatibility, transfusion, transplantation
Inherited immune diseases

Books Recommended:

S.No.	Author	Book
1	Charles A Janeway, JP Travers, Mark Walport and Mark J Shlomchik	Immunobiology, 5th edition; The Immune System in Health and Disease
2	Baron S, Galveston	Medical Microbiology; 4th Edition; University of Texas Medical Branch at Galveston
3	RA Goldsby *et al.*	Kuby's Immunology
4	E Benjamini, R Coico and G Sunshine	Immunology- A short Course
5	Roitt, Brostoff and Male	Immunology
6	William Paul	Fundamentals of Immunology
7	Tizard	Immunology
8	Abbas *et al*.	Immunology

B 703: Developmental Biology

Unit-I

Basic concepts of molecular regulation of development: Transcription factors in differential gene expression; morphogens and axis formation; autocrine and paracrine regulation. How cell proliferation, apoptosis, and fate specification determine developmental processes.
Fertilization: Structure of oocytes and spermatocytes. The process of fertilization.

Unit-II

Comparative study of early embryonic development: (*Caenorhabditis elegans*, amphibians, birds, and mammals), Cleavage formation, Gastrulation
Axis formation: Signaling cascades and molecular understanding of anteroposterior, mediolateral, and dorsoventral axes development.

Unit-III

Organogenesis in vertebrates: Germ layer formation. Regulation of formation of the somites, heart, kidney, blood vessels, and limb. Changes in circulation pattern between fetus and newborn.
Metamorphosis and regeneration process: Hormonal control of metamorphosis in amphibians and insects; wing imaginal disc formation in *drosophila*. Regeneration in planeria and that of vertebrate limb.

Unit-IV

Stem cells: Concepts of totipotent, pluripotent, and multipotent cells. Factors regulating "stemness" of a cell. Embryonic vs. adult stem cells. Sources of stem cells in vertebrates and their applications.
Developmental disorders and aging: Regulatory role of genetic and environmental factors. Role of carcinogens and teratogens.

Unit-V

Development processes in plants: How are the mechanisms different from that of animal development? Gametogenesis, pollination, and fertilization processes in angiosperms. Hormonal regulation of seed dormancy and the process of germination. Root and shoot development mechanisms. Reproductive phase: photoperiod sensitivity and molecular regulation of flowering process.
Epigenetic and environmental control of development: Sexual dimorphism, sex determination, X inactivation. Environ-elicited phenotypic changes. Defense mechanism-related changes.

Books Recommended:

S. No.	Author	Book
1	Alberts *et al*.	Molecular Biology of the Cell
2	SF Gilbert	Developmental Biology
3	Lewin Benjamin	Gene VIII

4	PO Moody	Introduction to Evolution, 1970,
5	Dobzhansky et al.	Evolution, W. H. Freeman. New York
6	SW Fox and K Dose	Molecular Evolution and the Origin of Life,
7	FJ Ayala and JW Valentine	Evolving: The theory and processes of Organic evolution
8	EO Dodson	Evolution: Process and Product
9	MW Strickberger	Evolution, 1979, James and Barlett International

B 704: Imaging Technology in Biological Research

Unit-I

The power of ten (understanding how small cells and the sub-cellular contents are)
An introduction to light and optics, exploring with lenses (what are lenses, looking through them, understanding the concept of magnification, mirrors, angles of reflection, refraction, prisms and colors)

Unit-II

Fundamentals of illumination (ray diagrams, types of light sources, LEDs, power levels, coherence of light, elliptical reflectors)
Exploring microscopes (short history, magnifying glass, simple and compound microscopes, electron Microscopes, stereomicroscope)

Unit-III

Fluorescence microscopy (Understanding fluorescence, Fluorescence protein technology, GFP, YFP)
two-photon fluorescence microscopy, matrix-assisted laser desorption/ionization mass spectrometry (MALDI-MS) imaging

Unit-IV

Live cell imaging (confocal microscopes), Differential interference contrast (DIC) images
Comparing Confocal and Widefield Fluorescence Micro scopy
Atomic force microscopy and optical tweezers force spectroscopy

Unit-V

NMR Imaging

Spatially nonresolved NMR spectroscopy; low-field NMR instruments; ^{1}H-nuclear magnetic resonance (NMR) microimaging ; ^{1}H-magic angle spinning NMR spectroscopy; MAS-^{13}C NMR spectroscopy
Spectral-resolution enhancement using magic angle spinning

Books Recommended:

S.No.	Author	Book
1	Ulf Grenander, Y Chow and Daniel M Keenan	Hands: A Pattern Theoretic Study of Biological Shapes (Research Notes in Neural Computing) (Volume-2)
2	Valery V Tuchin, Lihong Wang and Dmitry A Zimnyakov	Optical Polarization in Biomedical Applications (Biological and Medical Physics, Biomedical Engineering)
3	RM Lambrecht	Biological Models in Radiopharmaceutical Development (Developments in Nuclear Medicine)
4	Michael D Powers and Janet Poland	Asperger Syndrome and Your Child: A Parent's Guide
5	Philippe Sansonetti	Bacterial Virulence: Basic Principles, Models and Global Approaches (Infection Biology (VCH)
6	Richard Nuccitelli, Leslie Wilson and Paul T Matsudaira	A Practical Guide to the Study of Calcium in Living Cells, Volume 40 (Methods in Cell Biology)
7	Warren CW Chan	Bio-Applications of Nanoparticles (Advances in Experimental Medicine and Biology)
8	Bertram Manz, Kerstin Mu¨ ller,	Water Uptake and Distribution in Germinating

	Birgit Kucera, Frank Volke, and Gerhard Leubner-Metzger	Tobacco Seeds Investigated in Vivo by Nuclear Magnetic Resonance Imaging. Plant Physiology, July 2005, Vol. 138, pp. 1538–1551

Semester – VIII [January – June 2019]

B 801: Virology

Unit-I
Introduction to Virology: definition, properties and origin of viruses
Virus architecture and nomenclature
Virus replication cycle
Basic virological methods
Basics of virus entry, spread and transmission

Unit-II
Host resistance to viral infection: immune responses
Vaccines and antiviral chemotherapy: the prevention and treatment of viral diseases
Epidemiology
Exploiting viruses as gene therapy and vaccine vectors

Unit-III
Viruses and cancer: oncoviruses and oncolytic viruses
Polioviruses and other single-stranded positive-strand RNA viruses
Rabies and other single-stranded nonsegmented negative-strand
Influenza viruse and ther single-stranded segmented negative-strand RNA viruses.

Unit-IV
Evolution of viruses: new and reemerging viruses
Herpesviruses (nuclear large double-stranded DNA viruses)
Poxviruses (cytoplasmic large double-stranded DNA viruses)
HIV and other retroviruses

Unit-V
Hepatitis B virus (reverse-transcribing DNA virus) and other viruses causing hepatitis
Prion diseases
Plant viruses
Bacteriophages

Books Recommended:

S.No.	Author	Book
1	L Collier, J Oxford and Paul Kellam	Human Virology (4th edition),
2	SJ Flint, LW Enquist, VR Racaniello and AM Skalka	Principles of Virology (3rd edition) 2009
3	AJ Cann	Principles of Molecular Virology,
4	Teri Shors, Jones and Bartlett	Understanding Viruses
5	NJ Dimmock, A Easton, K Leppard	Introduction to Modern Virology 6th edition,
6	David M Knipe, Peter M Howley, MD Diane E Griffin, Robert A Lamb, Malcolm A Martin, Bernard Roizman, Stephen E Straus	Field's Virology. 6th edition

7	AJ Zuckerman, JE Banatvala, P Griffiths, B Schoub and P Mortimer	Principles and Practice of Clinical Virology (6th edition)
8	G Kudesia and T Wreghitt: Cambridge Clinical Guide	Clinical and Diagnostic Virology
9	L. Sompayrac	How Pathogenic Viruses Work;

B 802: Biotechnology-I

Unit-I

Basic principles of genetic engineering:
Methods of creating recombinant DNA molecule, splicing, properties of restriction endonucleases and their mode of action. Cloning vectors (lambda phage plasmid, M-13 phage, cosmid, shuttle vectors, yeast and viral vectors, expression vectors), construction of DNA library, Subtraction cDNA cloning, genomic vs cDNA library - Expression libraries and vectors for protein synthesis, protein purification, protein solubilization, protein export, RNA probes, BACs, PACs and cosmid vectors, Yeast vectors and YACs

Unit-II

Transgenic animals [Selectable markers for animal cells eg HAT, methotrexate Reporter genes for promoter analysis (Lac Z, GFP) vectors (Baculoviruses) microinjection, retroviruses, Embryonic stem cells), Transgenic mouse / Super mouse – (MT promoter fused to human growth hormone) (isolation of cloned proteins from goat milk). Viruses as gene-transfer Methods for production of transgenic mice (Pronuclear Transgenic Goats Whole animal cloning eg Dolly, Knock-out, knock-down, knock-in technology, Site-specific recombination using Cre-recombinase LOX system, Gene therapy eg SCID]

Unit-III

Transgenic plants [Agrobacterium mediated transformation, Ti plamid, Transgenic tobacco expressing luciferase gene, Bt Cotton, Herbicide-resistant plants, Plant viruses as vectors (eg CaMV virus)]. Application of genetic engineering in medicine and agriculture, vaccine production.

Unit-IV

Chemical synthesis of gene and engineering artificial life . Selection/screening: Analysis of genomic DNA by Southern hybridization, Northern and Western blotting techniques, Restriction mapping: Restriction fragment length polymorphism (RFLP). DNA sequencing and analyses techniques: plus and minus, dideoxynucleotide, Maxam and Gilbert, deep sequencing and next gen sequencing, microarray technology and hybridisations.

Unit-V

DNA manipulation techniques:
Preparation of radiolabelled and synthetic probes, Amplification of DNA by polymerase chain reaction (PCR), Site directed mutagenesis, Gene transfer methods for animals and plants; Agrobacterium mediated gene transfer, electroporation and particle gun. Cell and tissue culture in plants and animals: Primary culture; Cell line; Cell clones; Callus cultures; Somaclonal variation; Micropropagation; Somatic embryogenesis; Haploidy; Protoplast fusion and somatic hydridization; Cybrides; Gene transfer methods in plants and in animals; Transgenic biology; Allopheny; Artificial seeds; Hybridoma technology.

B 804: Biotechnology-II

Unit-I

Principles of plant breeding: Important conventional methods of breeding self and cross pollinated and vegetatively propagated crops; Non-conventional methods; Polyploidy: Genetic variability; Plant diseases and defensive mechanisms. Ethics of GM crops and animal cloning . Model organisms - S. cereviceae, Dictostylium, Caenorhabditis elegans, Arabidopsis, Zebra Fish, Mouse, Drosophila

Unit-II

Industrial Biotechnology-I

Bioprocess Technology [basics of bioreactor kinetics and mathematical equations regarding bioreactors, scale-up and aeration of bioreactors in detail, Kinetics of microbial growth, substrate utilization and product formation: Batch, Fed- Batch and continuous processes, Scale up concepts with respect to fermenter design and product formation, Gas exchange and mass transfer: O2 transfer, critical oxygen concentration, determining the oxygen uptake rate, Solid state fermentation. Common examples: Biopolymers: Xanthan , melanin , adhesive proteins , rubber, poly hydroxyl alkaloids

Unit-III

Industrial Biotechnology-II

Downstream Processing - Flocculation and floatation, Filtration, Centrifugation, Cell disruption, Liquid extraction, Precipitation, Adsorption, Dialysis, Reverse osmosis, Chromatography, Crystallization and drying, Biodegradation of xenobiotic compounds:Remediation and Biotechnology - Priority pollutants and their health effects, Microbial basis of biodegradation, Bioremediation (phyto and metal), Environmental and industrial pollution control, Biopesticides, Microbial plastics, Solid waste management

Unit-IV

Medical Biotechnology -

a. Small Biological Molecules: - ascorbic acid, indigo, amino acids, lycopene, succinic acid production, Antibiotics, Tissue Engineering - Growth Factors and morphogens: signals for tissue engineering and whole organ development, extracellular Matrix: structure, function and applications to tissue engineering, Cell adhesion and migration, Inflammatory and Immune responses to tissue engineered devices

b. Biomaterials - Polymeric scaffolds, Calcium Phosphate Ceramics for bone tissue engineering, Bio mimetic materials, Nanocomposite scaffolds

Unit-V

Nanotechnology-

a. Introduction to nanotechnology and nano-biotechnology, Nanomaterials and their uses.

b. Nanoparticles derived from biological molecules, Synthesis of nanoparticles: strategies, biological methods, general properties and characterization methods

c. Applications of nanotechnology: Nanosensors, Carbon nanotubes and their applications in biology

d. Environmental and safety issues with nanoparticles.

Books Recommended:

S.No.	Author	Book
1	Benjamin Lewin	Gene VII, Oxford Publishers
2	T A Brown	Genome, Second edition,
3	Old and Primrose	Principles of Gene Manipulation;
4	Simmons and Gardner	Principles of genetics;
5	Donald Voet and Judith Voet	Biochemistry 3rd Edition,
6	T D.Watson and others	Molecular Biology of the Gene , 6th Edition
7	GM Cooper	The Cell: A molecular approach: Library of Congress cataloging in publication data.
8	Griffiths A and Miller J	An introduction to genetic analysis; Freeman
9	Lodish H and Berk	A Molecular cell biology;
10	Sambrook J, Russell	Molecular cloning:- Vol I, II , III; CSHL Press
11	TA Brown	Gene cloning and DNA analysis;
12	B Glick, J Pasternak & C Patten	Molecular Biotechnology- principles and applications of Recombinant DNA, 4th
13	K. Deb and Satish Totey	Stem Cells Basics and Applications;
14	Gary Stein and Maria B et al.	Human Stem Cell Technology and Biology;

15	R. Ian Freshney, Glyn N. Stacey, Jonathan M. Auerbach	Culture of Human Stem Cells. John Wiley & Sons
16	Bernard R Glick, Jack J Pasternak, Cheryl L Patten	Molecular Biotechnology: Principles and Applications of Recombinant DNA. ASM Press
17	Robert Lanza, Robert Langer, Joseph P Vacanti	Principles of Tissue Engineering
18	Inderbir Singh and GP Pal	Human Embryology; MacMillan Publishers
19	Thomas W Sadler	Langman's Medical Embryology;
20	F Gilbert	Developmental Biology; 6th Edition;
21	Gordana Vunjak-Novakovic, R Ian Freshney	Culture of Cells for Tissue Engineering;
22	SB Primrose and Twyman	Principles of gene manipulation
23	RW Old and SB Primrose	Principles of gene manipulation
24	Watson	Recombinant DNA
25	TA Brown	Gene cloning and DNA analysis
26	SC Rastogi *et al.,*	Bioinformatics-Methods and Applications
27	A Caldwell et al.,	Integrated Genomics; Wiley Publishers
29	D Clark, N Pazdernik	Bioprocess Technology- Biotechnology- Applying the genetics to revolution
30	Wulf Crueger and Anneliese Crueger	Biotechnology: A Textbook of Industrial Microbiology; Panima Publishers, New Delhi
31	Michael L Shuler, Fikret Kargi	Bioprocess Engineering: Basic concepts
32	Stanbury PF, Whitaker A, Hall SJ	Principles of Fermentation Technology; Butterworth-Heinemann
33	Glazer AN and Nikaido H	Microbial Biotechnology: Fundamentals of Applied Microbiology
34	Sulabha Kulkarni	Nanotechnology principles and practices;
35	David S Goodsell	Bionanotechnology: Lessons from Nature;
36	James A Schwarz, Cristian I Contescu and Karol Putyera	Dekker Encyclopaedia of Nanoscience and nanotechnology;

B 803: Bioinformatics

Unit-I

Computer related introductory topics: History of development of computers, Basic components of computers, Hardware; CPU, input, output, storage devices. Software; operating systems, Programming languages (Machine, Assembly and Higher level)

Application software: Introduction to MSEXCEL-Use of worksheet to enter data, edit data, copy data, move data. Use of in-built statistical functions for computations of Mean, S.D., Correlation, regression coefficients etc. Use of bar diagram, histogram, scatter plots, etc. graphical tools in EXCEL for presentation of data. Introduction to MSWORD word process or editing, copying, moving, formatting, Table insertion, drawing flow charts etc.

Unit-II

Bioinformatics core topics: Introduction to Internet and use of the same for communication, searching of database, literature, references etc. Introduction to Bioinformatics, Databank search- Data mining, Data management and interpretation, BLAST, Multiple sequence alignment, Protein Modeling, Protein structure Analysis, Docking, Ligplot interactions, Genes, Primer designing, Phylogenetic Analysis, Genomics and Proteomics.

Unit-III

Biological databases**:** Introduction to variety of data sources. Population, sample, Classification and modeling of Data. Quality of data, Private and public data sources.

Example Databases:
(a) Nucleic acid databases (NCBI, DDBJ, and EMBL). (b) Protein databases (Primary, Composite, and Secondary) (c) Specialized Genome databases: (SGD, TIGR, and ACeDB) (d) Structure databases (CATH, SCOP, & PDBsum)

Unit-IV

Alignment: Basics and techniques, Local alignment and Global alignment Pairwise sequence alignment: NEEDLEMAN and Wunsch algorithm, Smith and Waterman algorithm, The Dot Plot, Dynamic Programming Algorithm. Multiple Sequence Alignment (MSA): Definition, Objective, Consensus, Methods for MSA: Heuristic approach, Dynamic programming approach and their combinations. Complexity analysis. Phylogenetic Analysis: Molecular-Phylogenetics, Phylogenetic-trees, Terminology of tree-reconstruction, rooted and un-rooted trees, gene vs species trees and their properties. Algorithms /methods of phylogenetic analysis: UPGMA, Neighbor-Joining Method.

Unit-V

Protein structure analysis and prediction: Identification/assignment of secondary structural elements from the knowledge of 3-D structure of macromolecule using DSSP and STRIDE methods , Prediction of secondary structure: PHD and PSI-PRED method Tertiary (3-D) Structure prediction: Fundamentals of the methods for 3D structure prediction (sequence similarity/identity of target proteins of known structure, fundamental principles of protein folding etc.) Homology Modeling, fold recognition, threading approaches, and ab-initio structure prediction methods. Genomics: Basic concepts on identification of disease genes, role of bioinformatics-OMIM database, reference genome sequence, integrated genomic maps, gene expression profiling; identification of SNPs, SNP
database (DbSNP). Role of SNP in Pharmacogenomics, SNP arrays
Drug discovery and Development : - Introduction to Drug Design and Development, Drug targets, Lead Identification and Modification, Computer-Aided Drug Design, Drug Delivery, Pre-clinical and Clinical Testing Applications of Bioinformatics: Pharmaceutical industries, immunology, agriculture, forestry; Legal, ethical and commercial ramifications of bioinformatics; Bio-sensing

Books Recommended:

S.No.	Author	Book
1	E Wayne W Daniel	Biostatistics: A foundation for Analysis in the Health Sciences
2	Prem S Mann	Introductory Statistics. 5th Edition;
3	Olive Jean Dunn	Basic Statistics: A primer for Biomedical Sciences
4	Auram Gold Stein	Biostatistics: An introductory text
5	Taro Yamane	Statistics: An Introductory Analysis;
6	C Stan Tsai	Computational Biochemistry;

FIFTH YEAR

Semester – IX [July – December 2019]

BPr 901 Research Project*

Note: Project Work**

The project has to be carried out in recognized national laboratories or UGC-recognized universities. No student will be allowed to carry out project work in private laboratories/ college/ institutions, excluding the colleges recognized as research centers by the RDC of Pt. Ravishankar Shukla University, Raipur.

Semester – X [January – June 2020]

E 1001	**Elective I**
E 1002	**Elective II**
E 1003	**Elective III**
E 1004	**Elective IV**

Electives:

1. Toxicology and clinical research
2. Molecular modeling and drug design
3. Ethology
4. Parasitology
5. Reproductive biology
6. Occupational diseases (infectious incl)
7. Plant pathology
8. Plant communication
9. Animal migration
10. Commercial products from plants and animals
11. Biology of food industry
12. Transgenics
13. Ethical issues in biology and medicine
14. Physical biology
15. Astrobiology
16. Biology of traditional medicines
17. Translational biology
18. Science writing and communication
19. Forensic science
20. Epigenetics
21. On-line courses

Total Pages : 1-11

Center for Basic Sciences
(CBS)
SCHEME OF EXAMINATION
&
COURSE STRUCTURE
Of
SEMESTER IX and X

M.Sc. Integrated (Biology Stream)

UNDER

FACULTY OF LIFE SCIENCE

EFFECTIVE FROM JANUARY 2020

Center of Basic Science
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Bio Science
Pt. Ravishankar Shukla University, Raipur (C.G.)

CENTER FOR BASIC SCIENCES
Pt. Ravishankar Shukla University, Raipur

5-Year Integrated M.Sc. Biology
Under
Faculty of Life Science

SEMESTER-IX (Biology Stream)

Project (BPr901) Evaluation Scheme

20 Credits

		Marks
1.	Project Report/Dissertation (Certified by the Supervisor of the Institute)	150
2.	Seminar based on Project	150
3.	Viva-Voce based on Project report and Seminar	100
	Total Marks	400

CENTER FOR BASIC SCIENCES
Pt. Ravishankar Shukla University, Raipur

5-Year Integrated M.Sc. Biology
Under
Faculty of Life Science

SEMESTER-X (Biology Stream)

Subject		Subject Contact hrs/per week Theory+Tutorial	Credits
BE 1001	Electives I	[4 + 1]	5
BE 1002	Electives II	[4 + 1]	5
BE 1003	Electives III	[4 + 1]	5
BE 1004	Elective IV	[4 + 1]	5
		Total	20

Min. 20
(Total 240 credits)

*Any four papers out of the available seven papers (as mentioned in the next pages) shall be in operation on availability of the instructors with more than 50% of students opting for them.

17.1.20 17/01/2020 17/1/2020 17/1/20

17/1/20 17/01/2020 17.1.20

Electives for X Semester-Biology Stream

1. Proteomics and Genomics

Unit-I

Introduction and scope of proteomics; Protein separation techniques: ion exchange, size-exclusion and affinity chromatography techniques; Polyacrylamide gel electrophoresis; Isoelectric focusing (IEF); Two dimensional PAGE for proteome analysis; Image analysis of 2D gels.

Unit-II

Introduction to mass spectrometry; Strategies for protein identification; Protein sequencing; Protein modifications and proteomics; Applications of proteome analysis to drug.

Unit-III

Protein-protein interaction (Two hybrid interaction screening); Protein engineering; Protein chips and functional proteomics; Clinical and biomedical application of proteomics; Proteome database; Proteomics industry.

Unit-IV

Introduction and Classification of genomics; Methods of preparing genomic DNA; Genome sequencing methods (next-generation sequencing); Databases of genomes; Genetic mapping; Mapping of human genome; Human genome project; HapMap Project, The 1000 genome project, and The ENCODE Project.

Unit-V

Gene variation and Single Nucleotide Polymorphisms (SNPs); Expressed sequenced tags (ESTs); Gene disease association; DNA fingerprinting; Microarray based techniques for RNA analysis; metagenomics.

Suggested readings:

1. Cantor and Smith, Genomics. John Wiley & Sons, 1999.
2. Introduction to Genomics - Arthur M Lesk, Oxford University Press, 2007.
3. R.M.Twyman, Principles of Proteomics, BIOS Scientific Publishers, 2004.
4. P.Michael Conn, Handbook of Proteomic Method. Humana Press, Totowa, New Jersay, USA, 2003.
5. L.Stryer, Biochemistry, W. H. Freeman and Co., New York, 2007.

2. Nanobiotechnology

Unit-I

The nanoscale dimension and paradigm, Various definitions and Concept of Nano-biotechnology, Historical background, Development. Fundamental sciences and broad areas of Nanobiotechnology.

Unit-II

Nanomaterial in biotechnology - nanoparticles, quantum dots, nanotubes and nanowires etc. Cell – Nanostructure interactions. Protein-based Nanostructures, Cell as Nanobio-machine,

DNA-Protein Nanostructures-Overview and introduction, DNA-Protein conjugates in microarray technology.

Unit-III

Biosensors; molecular recognition elements, transducing elements. Applications of molecular recognition elements in nanosensing of different analytes, Application of various transducing elements as part of nanobiosensors.

Unit-IV

Miniaturized devices in nanobiotechnology - types and applications, lab on a chip concept. Biological nanoparticles production - plants and microbial, methods, Properties, Characterization and applications.

Unit-V

Nanobiotechnological applications in health and disease - infectious and chronic. Nanobiotechnological applications in Environment and food - detection and mitigation.

Suggested readings:

1. Nanobiotechnology: Concepts,Applications and Perspectives (2004), Christof M.Niemeyer (Editor), Chad A. Mirkin (Editor), Wiley VCH.
2. Nanobiotechnology - II more concepts and applications. (2007) - Chad A Mirkin and Christof M. Niemeyer (Eds), Wiley VCH.
3. Nanotechnology in Biology and Medicine: Methods, Devices, and Applications.

3. Plants for Human Welfare

Unit-I

A general overview of economically important plants and their role in human welfare as food, oil, drugs, nutraceuticals, fuel. Food crops: Cereals; Spices and condiments; Alcoholic and non-alcoholic beverages.

Unit-II

Medicinal: Traditional plants as source of drugs against several diseases such as cancer, diabetes, malaria, dengue, psoriasis,etc. Plant secondary metabolites; classification, knowledge of extraction, isolation, characterization and elicitation of bioactive metabolites.

Unit-III

Nutraceuticals and functional foods; Important plants such as Aloe vera, Piper, Withania, Ginseng, Amaranthus etc. yielding antioxidants and nutraceutical compounds. Edible and non-edible oils: Oil yielding plants, transgenic approaches and constraints for improvement in different oils. Essential oils.

Unit-IV

Plant-based biofuels e.g., Difference between first and 2nd generation biofuels, Jatropha, Pongamia, Zea mays, Madhuca, etc. Extraction and economic viability; application as alternate source of diesels, Bioelectricity.

Unit-V

17.1.20 27/01/2020 17/1/2020 12/01/2020 17/1/20

Plants as a source of timber: e.g., Tectona grandis, Salix sp., Dalbergia sisso, Fibre yielding plants: Cotton (Gossypium sp.), Jute (Corchorus sp.) with special reference to their improvement through breeding and genetic transformation e.g., Bt cotton.

Suggested readings:

1. Glossary of Indian medicinal plants, R.N.Chopra, S.L.Nayar and I.C.Chopra, 1956. C.S.I.R, New Delhi.
2. The indigenous drugs of India, Kanny, Lall, Dey and Raj Bahadur, 1984. International Book Distributors.
3. Herbal plants and Drugs Agnes Arber, 1999. Mangal Deep Publications.
4. Acharya, Deepak; Anshu, Shrivastava (2008). Indigenous Herbal Medicines: Tribal Formulations and Traditional Herbal Practices. Jaipur, India: Aavishkar Publishers
5. Raven, Peter H.; Evert, Ray F.; Eichhorn, Susan E. (2005). Biology of Plants (7th ed.). New York: W. H. Freeman and Company

4. Plant Genetic Engineering

Unit-I

Plant transformation vectors and methods: T-DNA and viral vectors; Selectable marker and reporter genes, Plant transformation by Agrobacterium sp., Molecular mechanism of T-DNA transfer; in planta transformation; Direct gene transfer methods in plants.

Unit-II

Genetic engineering for increasing crop productivity by manipulation of Photosynthesis, Nitrogen fixation, Nutrient uptake efficiency. Genetic engineering for biotic stress tolerance (Insects, fungi, bacteria, viruses, weeds). Genetic engineering for abiotic stress (drought, flooding, salt, metal and temperature)

Unit-III

Genetic engineering for quality improvement of Protein, lipids, carbohydrates, vitamins & mineral nutrients, Plants as bioreactor, Marker-assisted selection of qualitative and quantitative traits. Concept of gene synteny, Concept of map-based cloning and their use in transgenics.

Unit-IV

Chloroplast transformation; Transgene analysis, silencing and targeting; Marker-free and novel selection strategies; Multigene engineering; Gene knock-down by ribozymes, antisense RNA and RNA interference.

Unit-V

Plant Metabolic Engineering. The concept of secondary metabolites, Historical and current views, Importance of secondary metabolites in medicine and agriculture, Introduction to various pathways, Flavanoid pathway, Terpenoid pathway, Polyketoid pathway, Plant vaccine.

Suggested readings:

1. Plant Tissue Culture: Theory and Practice Bhojwani S. S. & Razdan M. K. Elsevier
2. Plant Biotechnology: The Genetic Manipulation of Plants Slater A. Scott N. & Fowler M. Oxford University Press Inc.

3. Plants, Genes and Crop Biotechnology Chrispeels M. J. & Sadava D. E. Jones and Barlett Publishers
4 Principles of Gene Manipulation and Genomics Primrose S. B. & Twyman R. M. Blackwell Publishing.
5. Plant Cell, Tissue and Organ Culture: Fundamental Methods. (Eds). Gamborg O. L & Phillips G. C. Springer-Verlag.

5. Evolutionary Biology

Unit- I

Origin of life: Historical theories and background information, Experimental approaches. Chemogeny, Biogeny, RNA and DNA world, evolution of proteins, origin of photosynthesis, evolution of eukaryotes. Lamarckism, Darwinism, pre-Darwinian and post-Darwinian period, Neo-Darwinism. Theories of organic evolution. Evidences of Evolution.

Unit- II

Sources of variations: Heritable variations and their role in evolution. Natural selection: types of natural selection (Directional, stabilizing and disruptive) and examples (Industrial melanism, Australian rabbits, resistant to pestiscides, heavy metal resistance in plants), Sexual selection, group and kin selection.

Unit- III

Polpulation genetics and evolution: Hardy-Weinberg Law (statement and derivation of equation, application of law to human Population); Evolutionary forces upsetting H-W equilibrium. Genetic Drift (mechanism, founder's effect, bottleneck phenomenon); Role of Migration and Mutation in changing allele frequencies.

Unit-IV

Evolution above species level: Adaptation, adaptive radiation, microevolution, macroevolution, megaevolution, punctured equilibria and related phenomenon. Isolation: Introduction and types of isolation. Speciation: species concept, modes of speciation: allopatric, sympatric

Unit-V

Origin and evolution of man, Unique hominin characteristics contrasted with primate characteristics, primate phylogeny from Dryopithecus leading to Homo sapiens, Phylogenetic trees, Multiple sequence alignment, construction of phylogenetic trees.

Suggested readings:

1. S. Freeman and J. C. Herron, *Evolutionary Analysis*, 4th Edn., Benjamin-Cummings (2007).
2. D. J. Futuyma, *Evolution*, 2nd Edn., Sinauer Associates Inc. (2009)

6. Plant-Microbe Interaction

Unit-I

History of Plant pathology and recent developments: Significance of plant diseases, and pathology, types of plant-microbe associations (pathogenic– bacteria, virus, fungi, and symbiotic).

17.1.20 17/1/2020 17/1/20 17/1/20 17/1/20

Unit-II

Beneficial Plant - Microbe interactions (molecular aspects): a. Nitrogen fixing bacteria and blue green algae b. Mycorrhizal association c. Phytohormones and Biocontrol antibiotics

Unit-III

Parasitism and disease development: Pathogenecity, host range of pathogens, disease cycle and epidemics.

Unit-IV

Molecular biology of pathogenicity: Mechanisms of variability in pathogens, pathogenicity genes and mechanisms in pathogenic bacteria, biotrophic and necrotrophic fungi, Virus and Viroid genes involved in pathogenicity, Agrobacterium and plant interaction-a model system.

Unit-V

Molecular genetics of plant disease susceptibility and resistance: Types of plant resistance to pathogens (R gene resistance, quantitative and monogenic), basal and induced defense mechanisms, pre-formed inhibitors of pathogens, gene for gene interaction in plant defense, Systemic Acquired Resistance (SAR) and Induced Systemic Resistance (ISR), Recognition mechanism and signal transduction during plant - pathogen interaction.

Suggested readings:

1. Plant Pathology Agrios G. N. Academic Press
2. Molecular Plant pathology Dickinson M. BIOS Scientific Press
3. Plant Pathogenesis and Resistance: Biochemistry and Physiology of Plant-Microbe Interactions Jeng-Sheng H. T Kluwer Academic Pubs.T Gen 904(ii)- MEDICA

7.Animal Tissue Culture

Unit-I

Introduction and significance of Animal cell culture, historical background of cell culture. Types of cell culture: Primary and secondary cell culture.

Laboratory requirements for animal cell culture: Sterile handling area. Sterilization of different materials used in animal cell culture, Aseptic concepts. Instrumentation and equipments for animal cell culture.

Unit-II

Culture requirements and reagents: Culture media, properties of media, Types of cell culture media, Ingredients of media, Physiochemical properties, Antibiotics, growth supplements, Foetal bovine serum; Serum free media, Trypsin solution, Selection of medium and serum, Conditioned media, Other cell culture reagents, Preparation and sterilization of cell culture media, different types of serum and other reagents.

Unit-III

Types of cell culture: Different types of cell cultures, Trypsinization, Cell separation,Continuous cell lines, Suspension culture, Organ culture.

Cell lines: Introduction, development of cell lines, Characterization and maintenance of cell lines, stem cells, Cryopreservation, Common cell culture contaminants.

Unit-IV

17.1.20 17/01/2020 17/1/2020 17/1/20 17/1/20

PT. RAVISHANKAR SHUKLA UNIVERSITY

Centre for Basic Sciences

Syllabus of

Integrated M. Sc.: Chemistry Stream

[Choice and Credit Based System]

Semester Examination
SESSION 2015-2020

Center for Basic Sciences
Pt. Ravishankar Shukla University, Raipur

Course structure for the M. Sc. (Integrated) Chemistry stream
1st July, 2015

(B: **B**iology, C: **C**hemistry, M: **M**athematics, P: **P**hysics, G: **G**eneral, H: **H**umanities,
BL: **B**iology **L**aboratory, CL: **C**hemistry **L**aboratory, PL: **P**hysics **L**aboratory,
GL: **G**eneral **L**aboratory, PE: **P**hysics **E**lective, PPr: **P**hysics **Pr**oject)

FIRST YEAR
SEMESTER –I

Subject Code	Subject	Contact Hours / Week Theory +Tutorials	Credits
B101	Biology – I	[2 + 1]	3
C101	Chemistry – I	[2 + 1]	3
M100/101	Mathematics – I	[2 + 1]	3
P101	Physics – I	[2 + 1]	3
G101	Computer Basics	[2 + 1]	3
H101	Communication Skills	[2 + 1]	3
		Contact Hours / Week Laboratory	
PL101	Physics Laboratory – I	[4]	2
CL101	Chemistry Laboratory – I	[4]	2
BL101	Biology Laboratory – I	[4]	2
GL101	Computer Laboratory	[4]	2
			26

(26 of 240 credits)

C 101: Chemistry-I
UNIT-I **(30 + 15 = 45 hrs.)**

Structure and Properties of atoms: Revisited **(4 + 2 = 6 hrs.)**
(i) Atomic spectra, Bohr's theory of atomic structure, Sommerfield's theory for complex electron spin and magnetic quantum number, Pauli exclusion principle, Hund's rule, electron configuration of elements, Sequence of energy levels and Periodic Table.
(ii) Size of atoms and ions, ionization energy, electron affinity, electronegativity – values by Pauling, Mulliken and Allred-Rochow, Metallic character, variable valency and oxidation states, horizontal, vertical and diagonal relationships in the periodic table.

(iii) Atomic Nucleus: Fundamental particles, classification of nuclides, nuclear stability, the neutron to proton ratio N/Z, nuclear potential, binding energy, exchange force. Radioactivity and radioactive elements, radioactive decay and decay kinetics.

UNIT-II

Types of Chemical Bonds (14+ 7 = 18 hrs.)

(i) The covalent bond - the Lewis theory, Octet rule and its limitations. Shapes of the molecules – Sidgwick – powel theory. Valence shell electron pair (VSEPR) theory, effect of lone pair and electronegativity, isoelectronic principle, examples to apply VSEPR theory. Valence bond theory. Hybridization. Bond length, bond angle & dihedral angle, d-orbital participation in molecular bonding, sigma and pi bonding. Molecular orbital method – Linear combination of atomic orbitals (LCAO), MO treatment for di- and tri-atomic molecules and involving delocalized pi-bonding. Conjugation & aromaticity.

UNIT-III

(ii) Metallic and organometallic bonds – general properties.

(iii) Coordinate bond- coordination complexes.

(iv) Physical properties and molecular structures – polaizability and dipole moments, melting point, solubility and acid-base properties, Intermolecular forces (dipole-dipole interaction) Hydrogen bonding and vander Waals's forces.

UNIT-IV

Reactivity & Mechanism: (12 + 6= 18 hrs)

(i) Inductive and field effects and bond dissociation energy. p□-d□ bonding. Delocalization – cross conjugation, resonance. Aromaticity and Huckel's rule – systems of 4n and 4n+2 electrons, antiaromaticity . Resonance and Hyperconjugation.

(ii) Reaction mechanism: Types of mechanisms, Arhenius theory, collision theory, types of reactions, redox reactions, displacement and addition reactions, thermodynamic and kinetic requirements.

UNIT-V

Hammond postulate, Curtin-Hammett principle, transition states and intermediates, carbocations, carbanions, free radicals, methods of determining mechanisms, isotopic effects.

(iii) General concepts: Oxidation number and oxidation states, Oxidation – reduction reactions and the use of reduction potential, Bronsted acids and bases, gas phase vs. solution acidity, solvent levelling effects, hardness and softness, surface acidity.

Suggested texts and References:

(1) J.D.Lee, Concise Inorganic Chemistry, 4th Edition, ELBS, 1991.
(2) P.W.Atkins, Physical Chemistry, Oxford University Press, 7th Edition, 2006.
(3) G.M.Barrow, Physical Chemistry, 5th Edition, Tata McGraw-Hill, New Delhi, 1992.
(4)R. T. Morrison and R. N. Boyd, Organic Chemistry, Prentice Hall of India.
(5)G.W. Castellan, Physical Chemistry, 3rd Ed. Addison - Wesley/Narosa Publishing House, 1993.

CL 101: Chemistry Laboratory

Calibrations of pipette, burette, standard flasks etc., acid base titrations, recystallization, thin layer chromatography, identification of organic functional groups, complexometric titrations based on EDTA complexation with metals, Synthesis of benzoic acid, diazotization etc.

Suggested text and references:
(1) Vogel's Textbook of Quantitative Chemical Analysis (5th Edition; Longmann)
(2) Vogel's Qualitative Inorganic Analysis (7th Edition)
(3) ACS Journal of Chemical Education

SEMESTER –II

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
B201	Biology – II	[2 + 1]	3
C201	Chemistry – II	[2 + 1]	3
M200/201	Mathematics – II	[2 + 1]	3
P201	Physics – II	[2 + 1]	3
G201	Electronics and Instrumentation	[2 + 1]	3
G202	Glimpses of Contemporary Science	[2 + 1]	3
		Contact Hours / Week Laboratory	
PL201	Physics Laboratory – II	[4]	2
CL201	Chemistry Laboratory – II	[4]	2
BL201	Physics Laboratory – II	[4]	2
GL201	Electronics Laboratory	[4]	2
			26
			(52 of 240 credits)

C 201: Chemistry II **(30 + 15 = 45 hrs.)**

UNIT-I

(1) Thermochemistry: Enthalpy, heat of fusion and heat of vapourisation, enthalpy of a chemical reaction (heat of combustion, heat of solution, heat of neutralization), enthalpy of formation, standard reaction enthalpy, Hess's law, Kirchhoff's law, bond energy, dissociation energy. Entropy formulation of Second law, entropy change in a phase transition, Trouton's Rule, calculation of absolute (Third law) entropy, entropy change in a chemical reaction.

UNIT-II

(2) Free energy functions, criteria for spontaneity and equilibrium of closed systems, variation of Gibbs free energy with pressure and temperature, Gibbs Helmholtz equation, the concept of chemical potential, partial molar quantity, Gibbs Duhem relation.

UNIT-III
(3) Phase equilibrium in simple systems: Solid – liquid, liquid – vapour, vapour – solid, phase diagrams – water, carbon dioxide, sulphur, phase equilibrium condition, Gibbs phase rule, Clapeyron equations, Clausius – Clapeyron equation.

UNIT-IV
(4) Ideal Solutions, chemical potential of a solute in a binary ideal solution, Raoult's Law, entropy and Gibbs energy of mixing, Colligative properties – freezing point depression, boiling point elevation, osmotic pressure, van't Hoff equation.

UNIT-V
(5) Chemical equilibrium: Gibbs energy change of a reaction, standard reaction Gibbs energy, the condition for chemical equilibrium, equilibrium constant, reactions involving gases and pure substances, the Principle of Le Chatelier and applications.
(6) Chemical potential of a charged species, electrochemical cell (galvanic and electrolytic), examples of electrochemical cells, half cell potential (electrode potential), Nernst equation.

Suggested texts and References:
(1) P.W.Atkins, Physical Chemistry, Oxford University Press, 7th Edition, 2006.
(2) G.W. Castellan, Physical Chemistry, 3rd Ed.Wesley/Narosa Publishing House, 1993.
(3) G.N.Lewis and Randall, Thermodynamics, (Revised by K.S.Pitzer and L.Brewer), International Students Edition, McGraw Hill, 1961.
(4) K. Denbigh, The principles of Chemical Equilibrium.
(5) B. G. Kyle , Chemical & Process Thermodynamics.

CL 201: Chemistry Laboratory
Colorimetric titrations, Beer Lambert law, Estimation of concentration by colorimetric methods, conductometric methods, estimation of 5oncentration of acid base bt pH meter, identification of inorganic anions and cations, finding of pka values, short project of 2 weeks based on the experiments available in Journal of Chemical Education.

Suggested text and references:
(1) Vogel's Textbook of Quantitative Chemical Analysis (5^{th} Edition; Longmann)
(2) Vogel's Qualitative Inorganic Analysis (7^{th} Edition)
(3) ACS Journal of Chemical Education

SECOND YEAR
SEMESTER –III

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
CB301	Essential mathematics for Chemistry and Biology	[3 + 1]	4
CB302	Biochemistry-I	[3+ 1]	4
CB303	Organic Chemistry-I	[3 + 1]	4
C301	Inorganic Chemistry-I	[3 + 1]	4
H301	World Literature	[2 + 0]	2
H302	History and Philosophy of Science	[2 + 0]	2
		Contact Hours / Week Laboratory	
CL301	Chemistry Laboratory	[6]	3
GL301	Applied Electronics Laboratory	[4]	2
			25

(77 of 240 credits)

CB 303: Organic Chemistry –I **(45 +15 = 60 hrs.)**

UNIT-I

A. Basic concepts - Recapitulation

Hybridisation, formal charge, inductive and resonance effects and their effect on reactivity and acidity and basicity of organic compounds; polar & non polar covalent bonds; homolytic and heterolytic fission, types of reagents- electrophiles and nucleophiles; curly arrow notation; classification of organic reactions.

UNIT-II

B. Chemistry of Aliphatic compounds

IUPAC nomenclature of aliphatic and substituted aliphatic compounds and alicyclic compounds

Preparation, structure, properties and reactions of the following classes of compounds.

i) Hydrocarbons: a) alkanes, Methods of formation Kolbe reaction, Wurtz reaction, Corey House reaction, decarboxylation of carboxylic acids; Mechanism of halogenation of alkanes, orientation, selectivity & reactivity, product ratio. b) **Cycloalkanes** : Methods of formation and reactivity ; Baeyer's strain theory and its limitation; theory of strainless rings c**) Alkenes:**

Elimination reactions ; Saytzeff & Hoffman elimination; Reactions – halogenation reactions-free radical and polar mechanisms. Markownikoff's rule, the peroxide effect, allylic halogenations using NBS; Ozonides/Ozonolysis. epoxidation; hydroboration-oxidation; oxymercuration-demercuration; Oxidation using KMnO4 & OsO4.; polymerization. d**) Dienes:** Structure of butadiene and allene ; 1,2 vs 1,4 addition ; Diels Alder reaction.

UNIT-III

e) Alkynes: Methods of formation; acidity of alkynes; electrophilic addition to alkynes; hydroboration oxidation ; metal ammonia reductions; hydrogenation using Lindlar's catalyst.

ii) Alkyl halides Preparation, properties and synthetic applications of alkyl halides; S_N1 & S_N2 reactions (mechanism), E1 and E2 reactions(mechanism); Grignard reagent and its applications.

iii) Alcohols: Methods of formation; acidity; H-Bonding; reactions of mono; di & trihydric alcohols; Diols as protecting groups.

UNIT-IV

iv) Ethers and epoxides: Formation & reactions of ethers and epoxides ; ring opening reactions of epoxides under acidic and basic consitions; reaction epoxides with Grignard & organolithium reagents

v) Aldehdyes & ketones: Methods of formation of aldehdyes and ketones; Nucleophilic addition reactions with cyanide, ammonia and derivatives of ammonia; acetal formation; oxidation reduction reactions. Meerwin-Pondroff-Verley reduction, Clemmensen reduction, Wolf-Kishner reduction, Aldol condensation reaction, Cannizzaro reaction, Tischenko reaction, haloform reaction, Baeyer-Villiger oxidation, Wittig reaction; Mannich reaction

vi) Carboxylic acids : Methods of formation of mono and di carboxylic acids; acidity and factors affecting acidity; reactions of carboxylic acids :

vii) Carboxylic acid derivatives: Methods of formation of acid chlorides, amides, anhydrides and esters and their interconversions; relative stabilities of acid derivatives; Rosenmund reaction; Hoffmann rearrangement; saponification.

viii) Nitrogen and sulphur compounds. a) Nitro alkanes: methods of formation and reactions of aliphatic and aromatic nitro compounds b) Amines: methods of formation; basicity and factors affecting basicity ; reactions of aliphatic amines. c) Sulfonic acids : Methods of formation & reactions of aliphatic sulfonic acids.

ix) Applications of phosphorous and boron in organic synthesis :

Wittig reaction (with mechanism) ; hydroboration-oxidation (with mechanism); reduction using 9-BBN.

UNIT-V

C. Chemistry of aromatic compounds

IUPAC Nomenclature of benzene, naphthalene and anthracene derivatives

i) Aromaticity: Structure and stability of benzene, Huckel's rule, MO picture, polycyclic aromatic hydrocarbons.

ii) Aromatic electrophilic substitution: General mechanism. Effect of substituents on rate and orientation to aromatic electrophilic substitution in substituted benzenes, ortho-para ratio.

iii) Hydrocarbons: Alkylarenes, preparation via Friedel Crafts reaction. Reactions- oxidation, nuclear and side chain halogenation.

iv) Haloarenes: Preparation, aromatic nucleophilic substitution, elimination-addition and addition-elimination mechanisms, hydrolysis and amination of nitrohaloarenes.
v) Phenols: Preparation from sulfonic acids, haloarenes, alkylbenzenes, Acidity, O-alkylation, O-acylation, Fries rearrangement, Claisen rearrangement, Reimer- Tiemann reaction, Hauben Hoesch reaction, Lederer Manasse reaction.
vi) Aromatic aldehydes and ketones: Preparation via Gattermann, Gattermann-Koch, Vilsmeyer-Haack, Rosenmund and Friedel Crafts acylation reactions, Reactions: Claisen-Schmidt, Knovenagel, Perkin, Benzoin condensation and Cannizaro reactions,
vii) Aromatic carboxylic acids: Preparation, acidity, preparation and interconversion of acid derivatives.
viii) Aromatic sulfonic acids: Preparation, acidity, preparation and interconversion of sulfonic acid derivatives.
ix) Aromatic nitrogen compounds: Nitro and nitroso compounds - preparation and reduction, Amino compounds – preparation, basicity, Aromatic electrophilic substitution, N-alkylation, N-acylation, Diazotisation, Synthetic uses of diazonium salts, azo coupling

Suggested texts and References:

(1) I. L. Finar, Organic Chemistry, Vol. 1 & 2, ELBS.
(2) R. T. Morrison and R. N. Boyd, Organic Chemistry, Prentice Hall of India.
(3) J. McMurry, Organic Chemistry, Asian Books Pvt. Ptd.
(4) L. G. Wade, Organic Chemistry, Pearson Education
(5) G. Solomons and C. Fryhle, Organic Chemistry, John Wiley & Sons (Asia) Pte Ltd.
(6) J. March, Advanced Organic Chemistry, 3rd Edn. McGraw Hill,1991.
(7) S.H.Pine, Organic Chemistry, 5th Edn., McGraw Hill, 1987.

C 301: Inorganic Chemistry I

UNIT-I **(45 + 15 = 60 hrs.)**
(i) Hydrogen: Preparation of hydrogen, Isotopes, ortho and para hydrogen, hydrides.
(ii) Rare gases: Occurrence and recovery of the elements, physical and chemical properties, Clathrate compounds, chemistry of Xenon and xenon fluoride complexes.

UNIT-II
(iii) Chemistry of s-block elements: a) alkali and alkaline earth metals: Extraction, general physical properties, flame colours ans spectra, Reaction with water, air and nitrogen, oxides, hydroxides, peroxides and superoxides, sulphides, oxysalts, halides and hydrides, oraganic and organometallic compounds. b) Group IIB elements: Zn, Cd, Hg.

UNIT-III
(iv) Chemistry of p-block elements: a) Group IIIA elements: Boron, aluminium, gallium indium and thalium – physical properties, oxidation states and type of bonds, Reactions with other elements, compounds of boron with oxygen and hydrogen. b) Group IVA elements: carbon, silicon, germanium, tin and lead – physical properties, allotropes of carbon, graphite compounds, carbaides, carbonates, carbon cycle, silicates, organosilicons, hydrides, halides and cyanides, cluster compounds.

UNIT-IV

c) Group VA elements: Nitrogen, phosphorous, Arsenic, antimony and bismuth – general properties, hydrides, azides, oxides and oxyacids, sulphides and organometallics, fertilizers. d) Group VIA elements: oxygen, sulphur, selenium, tellurium and polonium – general properties, structure and allotropy of the elements, chemistry of ozone, oxides, oxyacids, oxohalides, hydrides and halides, organo derivatives.

UNIT-V

e) Group VIIA elements: Fluorine, chlorine, bromine, iodine and Astatine- general properties, oxidizing power, hydrogen halides, ionic and molecular halides, bridging halides, halogen oxides, oxoacids, interhalogen compounds, polyhalides, pseudohalogens and pseudohalides.

Suggested texts and References:

(1) J. E. Huheey, 'Inorganic Chemistry - Principles of Structure and Reactivity' Harper & Row, 1988.
(2) F. A. Cotton and G. Wilkinson, 'Advanced Inorganic Chemistry', John Wiley, 1995.
(3) D. F. Shriver, P.W. Atkins and C.H. Langford, 'Inorganic Chemistry', OxfordUniversity Press, 1991.
(4) F. A.Cotton and G. Wilkinson, Basic Inorganic Chemistry, Wiley Easter, 1978.
(5) J. D. Lee, Concise Inorganic Chemistry, Van Nostrand Reinhold, 1977.

CL 301: Chemistry Laboratory

Experiments of inorganic chemistry: Synthesis of coordination complexes, gravimetric analysis etc

SEMESTER –IV

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
PCB401	Physical and Chemical kinetics	[3 + 1]	4
CB401	Introductory Spectroscopy (UV-vis, fluorescence, IR, Raman, NMR)	[3+ 1]	4
C401	Properties of Matter	[3 + 1]	4
C402	Group theory	[3 + 1]	4
G401	Statistical Techniques and Applications	[2 + 0]	2
		Lab hrs	**Credits**
CL401	Chemistry Laboratory	[6]	3
GL401	Computational Laboratory and Numerical Methods	[4]	2
			25

(102 of 240 credits)

PCB 401: Physical and Chemical Kinetics: (45 + 15 = 60 hrs.)

UNIT-I

(i) Basic Concepts: Rate, order and molecularity of a reaction, First, second and third order reactions – effect of concentration on reaction rate, rate expressions and integrated form, pseudo-unimolecular and second order autocatalytic reactions, nth order reaction of a single component, effect of temperature on reaction rate – Arrhenius equation and activation energy.

UNIT-II

(ii) Complex Reactions: parallel first order reactions, series first order reactions – determination of rate constants by graphical method and the time ratio method. The stationary state, radioactive decay, general first order series and parallel reactions. Competitive, consecutive second order reactions, reversible reactions, equilibrium from the kinetic view point, complex mechanisms involving equilibria.

UNIT-III

(iii) Kinetic Measurements: Experimental determination of reaction rates and order of reactions – correlation of physical properties with concentrations, reactions in the phase, reactions at constant pressure, fractional-life period method, initial rate as a function of initial concentrations.

UNIT-IV

(iv) Reactions in Solutions: General Properties, Phenomenological theory of reaction rates, Diffusion limited rate constant, Slow reactions, Effect of ionic strength on reactions between ions, Linear free energy relationships, Relaxation methods for fast reactions.

UNIT-V

(v) Catalysis: Homogeneous catalysis in gas phase, in solution, basis of catalytic action, catalysis and the equilibrium constant, acid base catalysis, The Bronsted catalysis law, linear free energy changes, general and specific catalysis. Heterogeneous catalysis. Negative catalysis and inhibition, Surface reactions – effect of temperature and nature of surface. Industrial catalysis.

Suggested texts and References:

(i) K.A. Connors, Chemical Kinetics : A Study of Reaction Rates in Solution, V.C.H. Publications 1990. **(ii)**J.I. Steinfeld, J.S. Francisco and W.L. Hase, Chemical Kinetics and Dynamics, Prentice Hall 1989. **(iii)** Paul L. Houston, Chemical Kinetics and reaction dynamics.
(iv) K.J.Laidler, Chemical Kinetics, 3rd ed. Harper and Row, 1987.
(v) J.W. Moore and R.G. Pearson, Kinetics and Mechanisms, John Wiley and Sons, 1981.
(vi) A. A. Forst and R. G. Pearson, Kinetics and Mechanism, Wiley International Edition.
(vii) Sanjay K. Upadhay, Chemical kinetics and Reaction Dynamics, Springer, 2006

CB401: Introductory Spectroscopy (45 + 15 = 60 hrs)

UNIT-I

(i) The electromagnetic spectrum: Nature of electromagnetic radiation. The electromagnetic spectrum and its regions. Frequency, waveno and wavelength: units and conversions. Absorption of electromagnetic radiation. Molecular energy states and quantisation of internal energy. Boltzmann distribution.

(ii) Spectroscopic Processes: Absorption, emission, and scattering of light. Beer-Lambert Law - Quantitative absorption measurements, Jablonski diagram
(iii) Fourier transformation: A mathematical tool to our advantage, basic principle and its relevance in spectroscopy.

UNIT-II

(iv) UV-VIS Absorption Spectroscopy: Principles and instrumentation of spectrophotometers. UV-vis spectroscopy to determine conjugation. UV-visible spectroscopy and electronic transitions. Electronic ground states and excited states in organic molecules: n to pi-star and pi to pi-star transitions. band position and band intensities.
(v) Fluorescence Spectroscopy: Principles and instrumentation of fluorimeters. Advantage of fluorimetry compared to absorption spectrophotometry. Luminescence and the fate of excited states: timescale of fluorescence and phosphorescence.Qualitative and Quantitative Fluorimetry.
UNIT-III

(vi) IR - Principles and instrumentation of Infrared spectroscopy. nfrared spectroscopy and molecular vibrational transitions. Simple dispersive IR spectrometer and ovewrview of modern instrumentation. Transmittance and absorbance. Vibrational modes and selection rules. Factors governing the position and intensity of IR bands: effects of variation in reduced mass and force constant. Group frequency and fingerprint regions: use of IR for identification by presence/absence of absorptions characteristic of specific bonds/bond groupings. Interpretation of IR spectra.
(vii) Raman Spectroscopy: Raman Effect and molecular polarizability. Technique and instrumentation. Pure rotational Raman spectra, vibrational Rama spectra. Structure determination from Raman and IR.

UNIT-IV
(viii) Nuclear Magnetic Resonance (NMR): Introduction to Nuclear Magnetic Resonance (NMR) spectroscopy. 1H and 13C NMR, number of signals, integration, chemical shift, splitting of signals. Principles and instrumentation of NMR spectroscopy. Nuclear spin and nuclear magnetism. Energies of nuclear spin states in a magnetic field. Boltzmann population of nuclear spin states and the origin of NMR signals. Applications: Interpretation of simple 1H NMR spectra. Information from: chemical shifts and delta values, peak areas and integration, splitting patterns and spin-spin coupling constants. (n+1) rule and Pascal's triangle. 13C NMR spectra and sensitivity issues. Interpretation of NMR spectra using examples of organic compounds. Short introduction about application of NMR for proteins.

UNIT-V

(ix) Mass spectrometry: Introduction to mass spectroscopy (molecular mass, accurate mass and isotopes) Principles, ionisation methods (including EI, MALDI, ESI). Molecular ions and fragmentation processes under EI. Mass spectrometry for determining the molecular weight/formula of organic compounds and identify the presence of isotopes. Introduction of MS application in protein analysis.

C 401: Properties of Matter **(45 + 15 = 60 hrs.)**

UNIT-I

(i) Gaseous State a). Perfect gases and gas laws, law of partial pressures and partial volumes, Graham's law of effusion, critical state and determination of the critical constants, continuity of state, coefficient of expansion and compressibility. b). The kinetic theory of gases, pressure and temperature of a gas, derivation of the gas laws from the kinetic theory, The Boltzmann constant, Maxwell's law of distribution of molecular velocities, experimental verification of Maxwell's law. c). Ideal and real gases, deviations of the real gases from the ideal gas laws, collision diameter, van der Waals equation, reduced equation of state, The Dieterici equation, The Berthelot's equation, The equation of Kammerling-Onnes, Virial Theorem and equation of state, compressibility factors, The heat capacity of gases, The principle of equipartition of energy, gas density and vapour density. d). Collision number and mean free path, transport properties: viscosity, thermal conductivity and diffusivity of gases.

UNIT-II

(ii) The Liquid State: a) Intermolecular forces – dipole-dipole London forces, hydrogen bonding. b) Vapour pressure, determination of vapour pressure, external and internal pressure, boiling point and vapour pressure. c) Surface tension, angle of contact and wetting of surface pressure on a curved surface, rise of liquid in a capillary tube, measurement of surface tension. Surface tension and vapour pressure, surface tension and temperature – Eootvos-Ramsay-Shields relation, Macleod's equation, parachor. d) Viscosity, measurement of relative and absolute viscosity, viscosity and temperature, molecular weight from viscosity. e) refractive index, specific rotation, molar refraction and chemical constitution, optical activity and specific rotation.

UNIT-III

(iii) The Solid State: Crystalline and amorphous solids, Crystals – Steno's law, Hauy's law, Laws of symmetry. Crystals systems and lattices, Crystals and X-rays, Bragg's method of crystal analysis. Different kinds of crystal structures, methods of crystal analysis, electron diffraction, Isomorphism, Heat capacity of solids, Debye's equation. Liquid crystals, magnetic properties - diamagnetic and paramagnetic materials. Ionic, covalent, metallic and coordinate bonds. (ii) Ionic Bond - characteristics of ionic compounds and crystal structures, radius ratio rules and coordination number, close packing. Classification of ionic structures – AX, AX2 and AX3 groups. Lattice Energy, Stoichiometric defects – Schottky and Frenkel. Non-stoichiometric defects – metal excess and metal deficiency. Semiconductors and transistors.

UNIT-IV

(iv) Colloids: The colloidal system, preparation of colloidal systems, classification. Lyophobic sols - optical and electrical properties, effect of addition of electrolytes and applied electric field. Determination of zeta potential by electrophoresis and electroosmotic methods. Origin of charge and the mechanism of flocculation – stability of sols. Properties of Lyophilic sols – viscosity and protective action.

UNIT-V

Kinetic properties of sols and Brownian motion. Determination of Avogadro's number from vertical distribution of sol particles and by diffusion method. Macromolecules – viscosity and

molecular weight of polymers, osmotic pressure, The Donnan equilibrium. Sedimentation and ultracentrifuge, scattering of light. Protein sols, association colloids and emulsions, Ideal solution and colligative properties.

Suggested texts and References:

(1) P.W.Atkins, Physical Chemistry, Oxford University Press, 7th Edition, 2006.
(2) G.M.Barrow, Physical Chemistry, 5th Edition, Tata McGraw-Hill, New Delhi, 1992.
(3) D.A.McQuarrie and J.D. Simon, Physical Chemistry - a molecular approach, Viva Books Pvt. Ltd. (1998).
(4) D.K.Chakrabarty, Adsorption and catalysis by solids, Wiley Eastern, 1990.
(5) F.P.Kane and G.B.Larrabee (Eds.),Characterisation of solid surfaces, Plenum, 1978.
(6) A.W.Adamson, Physical Chemistry of Surfaces, 3rd Edn.,Wiley Interscience, 1976.

C 402: Group theory **(45 + 15 = 60 hrs)**

UNIT-I

(i) Symmetry Elements and Operations, Pure Rotations (C_nRotations), Improper Rotations, Rotation-Reflection (S_n) & Rotation-Inversion (n-bar) Axes.

UNIT-II

(ii) Point Groups: Low Symmetry Point Groups (C1 ,Ci , Cs), Simple Axial Point groups (c., S4n, Cnv' Cnh), Dihedral Groups (Dn, , Dnd, Dnh)

UNIT-III

Platonic Solids & the "Cubic" Groups (Td, 0h , Ih), Derived High Symmetry Groups (T, Th , 0, I), The "Infinite Groups" (C∞v and D∞h), Points Groups & Chirality, Point Groups & Dipole Moment.

UNIT-IV

(iii) Multiplication Tables (i.e., operation 1 followed by operation 2) for point groups. Similarity Transforms, Classes of Symmetry Elements. Naming Representations (Mulliken Symbols), Subgroups and Supergroups., Non Commutative Operations.

UNIT-V

(iv) Representations of Groups., Irreducible Representations., Character Tables. Their derivations and use of their contents. Matrix Representation of Symmetry Operations. The "Full Form" of the Character Table.

Suggested texts and References:

1. F. A. Cotton, "Chemical Applications of Group Theory", 3rd Edition, John Wiley (1990).

G 401: statistical techniques and its applications

CL 401: Chemistry Laboratory

Acetylation of primary amine, synthesis of cyclohexanone oximes, nitration of phenols, bromination of acetanilide, photoreduction of benzophenone to benzopinacole, pinacole pinacolone rearrangements, benzil- benzilic acid rearrangement, aldol condensation, coenzyme catalysed benzoin condensation, separation of organic mixtures(solid-solid, solid -liquid and liquid-liquid), characterization of all the synthesized compounds using FTIR, UV-vis spectroscopy and 1H-NMR**.**

3rd Year

SEMESTER –V

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
CB501	Analytical Chemistry	[3 + 1]	4
C501	Quantum Chemistry	[3+ 1]	4
C502	Inorganic Chemistry II	[3 + 1]	4
C503	Organic Chemistry II	[3 + 1]	4
G501	Earth Science and Energy & Environmental Sciences	[3 + 1]	4
		Lab contact hrs	**Credits**
CL501	Chemistry Laboratory	[8]	4
			24

(126 of 240 credits)

CB 501: Analytical Chemistry **(45 + 15 = 60 hrs.)**

UNIT-I

(i) Error analysis: Methods of sampling and associated errors, Classification of errors, Propagation of errors, treatment of errors, Normal distribution, Tests of Significance and Confidence Limits.

UNIT-II

(ii) Separation techniques: Solvent Extraction Technique: Conventional, Liquid Membranes – Bulk, Supported and Emulsified, Solid Phase Extraction (SPE). Ion Exchange: Conventional, Membranes. Chromatography: Gas chromatography (GC), High Performance Liquid Chromatography (HPLC), Ion chromatography (IC).

UNIT-III

(iii) Mass Spectrometry: Mass Analysers – Magnetic, Quadrupole, Time of Flight (TOF), Features – Resolution, Dispersion, Abundance, Sensitivity, Detectors, Ion Sources –Thermal Ionisation (TI), Electron Impact, ICP, GD, Laser Ablation (LA-ICP), Secondary Ionisation (SI),

Matrix Assisted Laser Desorption and Ionisation (MALDI), Hyphenated Technique – IC-MS, HPLC-MS, GC-MS.

UNIT-IV

(iv) Thermal Methods: Thermogravimetric Analysis (TGA), Derivative Thermogravimetric Analysis (DTG), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC), Evolved Gas Analysis (EGA).
(v)Electrochemical Methods: Introduction, Potentiometry , Ion Selective Electrodes (ISE), Voltammetry & Polarography , Cyclic, Pulse and Stripping Voltammetry, Coulometry and Amperometry, AC Electrochemical Techniques, Scanning Electrochemical Microscopy.
(vi) Detectors- Photomultiplier Tube (PMT), Charge Coupled Device (CCD), Charge Injection Device (CID), Spectrometers – Czerny Turner, Echelle, Sample Introduction Devices – Flame, Electrothermal, Laser Ablation, Direct Sample Insertion Devices, Interferences, detection limits, sensitivity.

UNIT-V

(vii) Conductance of solutions and electrochemistry: Faraday's laws of electrolysis, Electrolytic conduction- Arrhenius theory of electrolytic dissociation, strong and weak electrolytes. Migration of ions – transference numbers, Determination of transference number using Hittrof's rule and moving boundary method. Conductance of solutions – electrolytic conductance, determination of conductance, equivalent conductance and concentration, Kohlrausch's law of independent migration of ions, ionic mobilities, temperature dependence. Hydration of ions, the interionic attraction theory. Applications of conductance measurements– degree of dissociation of weak electrolytes, dissociation constants of weak acids, degree of dissociation of water, basicity of organic acids, determination of solubilities of sparingly soluble salts, conductometric titrations, activities of electrolytic solutions, ionic strength. The Debye-Huckel theory of dilute ionic solutions.

Suggested texts and References:

(1) D.A. Skoog, D. M. West, F. J. Holler, S.R. Crouch, Fundamentals of Analytical Chemistry, 8th Edition, Thomson (2004).
(2) A.I. Vogel, A text book of Quantitative Analysis, 5th Edition Revised by G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney, ELBS (1989).
(3) A. K. De, S. M. Khopkar and R. A. Chalmers, Solvent Extraction of Metals, Van Nostrand, Reinhold (1970).
(4) L. R. Snyder and J. J. Kirkland, Introduction to Modern Liquid Chromatography, 2nd Edition, Wiley (1979).
(5)Jose A. C. Broekaert, Analytical Atomic Spectrometry with flames and Plasmas, Wiley-VCH (2002).
(6) John Roboz, Introduction to Mass Spectrometry: Instrumentation and Techniques, Interscience (1968).

C 501: Quantum Chemistry (45 + 15 = 60 hrs.)
UNIT-I

(i) Foundations of quantum mechanics.
(ii) Wave function for a free particle, the Schrodinger equation, physical interpretation of the Scrodinger equation wave function, expectation of a dynamical quantity, Wavepackets and the uncertainty principle, WKB approximation.

UNIT-II

(iii) Operator concept in quantum chemistry.
(iv) Solution of Schrodinger's equation in some simple systems: one and three dimensional boxes, electron in a ring, rigid rotator, concept of tunnelling, one dimensional harmonic oscillator, hydrogen-like atoms, shapes of atomic orbitals.

UNIT-III

(v) Approximate methods of quantum chemistry: variational principle; Time-independent perturbation theory: Many electron sysytems: Orbital approximation, Slater determinant; Hartree-Fock self-consistent field theory; Slater type orbitals.

UNIT-IV

Concept of LCAO and introduction to ab-initio and semi-empirical molecular orbital calculations of molecules. Huckel Theory: Extended systems: From bonds to bands. Angular momentum of many-particle systems. Born-Oppenheimer approximation, MO and VB theories illustrated with H2-molecule, An elementary treatment of scattering theory.

UNIT-V

(vi)Spin orbital interaction; LS and JJ coupling. Spectroscopic term symbols for atoms. Molecules and Chemical bonding, Spectroscopic term symbols for diatomics; Directed valence & hybridization in simple polyatomic molecules.

Suggested texts and References:

(1) Ira N. Levine, Quantum ChemistryPrentice Hall India.
(2) John L. Powell and Bernd Crasemann, Quantum Mechanics, Oxford & IBH Publishing.
(3) A. K. Chandra, Introductory Quantum Chemistry, Tata McGraw-Hill Publishing Comp. Ltd.
(4) David B. Beard, Quantum Mechanics, Allyn & Bacon, Inc, Boston.

C 502: Inorganic Chemistry II: (45 + 15 = 60 hrs.)
UNIT-I

(i) Coordination compounds, Werners's theory, effective atomic number, coordination number, shapes of d-orbitals and bonding in transition metal complexes, stability of complexes, the chelates and macrocyclic effects, types of classification of ligands, second sphere of coordination, □-complexes, □-acid ligands, multiple bonds from ligands to metals.

UNIT-II

(ii) Crystal Field theory – crystal filed splitting and elementary treatment of the electronic spectra, Jahn-Teller distortion of octahedral complexes, square planar complexes, tetrahedral complexes, magnetic properties of 3*d* compounds.

UNIT-III

(iii) MO theory – Nomenclature of coordination compounds, d-orbital splitting in various fields - Spectroscopic states - Tanabe-Sugano and Orgel diagrams - Derivation of Ligand field parameters (Dq. B) from electronic spectra - Magnetic moments - Orbital contribution, spin-orbit coupling and covalency.

UNIT-IV

Molecular orbitals and energy level diagrams for common symmetries.
(iv) Bonding involving-donor ligands - Back-bonding - f-orbital splitting - Spectral and magnetic properties of f-block elements.

UNIT-V

(v) Reaction mechanisms: Substitution reactions - Dissociative and associative interchange - trans-effect - Linear free energy relations. Rearrangements - Berry pseudo rotation, Electron transfer reactions. Photo-dissociation, substitution and redox reactions, Fluxional molecules.

Suggested texts and References:

(1) F.A. Cotton, G. Wilkinson, C.A. Murillo and M. Bochmann, Advanced Inorganic Chemistry, Wiley Eastern, John Wiley, 6th Ed., 1999.
(2) J.E. Huheey, E. Keiter and R. Keiter, Inorganic Chemistry, 4th Ed., Harper Collins College Publisher, 1993.
(3) D.Banerjea, Inorganic Chemistry Principles, Books Syndicate Pvt. Ltd., 2000.
(4) N.N. Greenwood and E.A. Earnshaw, Chemistry of Elements, Pergamon Press, 1989.
(5) J.J. Kratz, G.T. Seaborg and L.R. Morss; *The Chemistry of Actinide Elements*, 2nd Edition, Vol. 1&2, Chapman & Hall, New York (1986).
(6) J.C. Bailar, H.J. Emelius, R. Nyholm and A.F. Trotman-Dickenson; *Comprehensive*

C 503: Organic Chemistry – II **(45 + 15 = 60 Hrs.)**

UNIT-I

(A) Stereochemistry of Organic Compounds 25h **(i)** Isomerism – Concept and types **(ii)** Chirality: Configuration, stereogenic/chiral center, chirality and enantiomerism. Representation of configuration by flying wedge formulae and Fischer, Newman and Sawhorse projection formulae. **(iii)** Stereochemistry of carbon compounds with upto three similar and dissimilar asymmetric carbon atoms; enantiomers, diastereomers, and racemic mixtures and their properties, resolution (chemical and chromatographic). **(iv)** Diastereomerism: Threo, erythro, meso diastereomers. Geometrical isomerism in olefins, cycloalkanes and oximes. Absolute

configuration: Assigning of stereochemical descriptors - R/S to Fischer projection and flying wedge formulae of chiral molecules and E/Z to olefins.

UNIT-II

(v) Molecular chirality and elements of symmetry: Stereochemistry and stereochemical nomenclature of biphenyls, spirans, cummulenes, and alkylidene cycloalkanes **(vi)** Conformational concepts, conformations of acyclic molecules (ethane and butane), cyclohexane and mono, di-substituted cyclohexanes. Conformationally rigid and mobile diastereomers. **(vii)** Stereoselectivity and stereospecificity of organic reactions: Enantiomeric and diastereomeric selectivities.

UNIT-III

The mechanism and stereochemical outcome of the following reactions: (a) S_N1, S_N2 and S_Ni reactions (b) Catalytic hydrogenation of alkenes (c) Ionic trans addition of bromine to alkenes (d) Epoxidation of alkenes, acid catalysed ring opening of epoxides. (e) Reactions of OsO_4 and $KMnO_4$ with olefins (f) E2 reactions. (g)Topicity and prostereoisomerism - Enantiotopic and diastereotopic atoms, groups and faces.

UNIT-IV

(B) Chemistry of heterocyclic compounds 25h

Heterocycles containing one heteroatom (furan, thiophene, pyrrole, pyridine) and more than one heteroatom (pyrazole, imidazole, oxazole, thiazole, pyrimidine and pyrazines) their derivatives – preparation, properties and reactions. **(C) Chemistry of Alicyclic compounds:** Cycloalkanes and cycloalkenes. Factors affecting stability of conformations, conformation of cycloalkanes. Reaction mechanism in alicyclic compound.

UNIT-V

(i) Conformation of Cyclic System: Monocyclic compounds and Fused ring and Bridged ring Compound. Topicity and Prostereoisomerism & Racemisation and Methods of Resolution.

(ii) Dynamic stereochemistry: Conformationally rigid and mobile diastereomers, seteroselectivity.

(iii) Chemistry of Carbon radical (Single electron transfer mechanism): neighboring group participation; non-classical carbocataion; S_Ni mechanism. Rearrangements of Carbocataion, Free-radical: Allylic, Pinacol/ Pinacolone, 1,2 rearrangements etc and rearrangement to heteroatoms. Pericyclic reaction and FMO approach.

Suggested texts and References:

(1) I. L. Finar, Organic Chemistry, Vol. 1 & 2, ELBS.
(2) R. K. Bansal, Heterocyclic Chemistry, Synthesis, Reactions and Mechanisms, Wiley Eastern Ltd., 1990.
(3) J.A.J. Joule and G.F. Smith, Heterocyclic Chemistry, ELBS, 2nd Ed., 1982.F.G. Riddell, The Conformational Analyis of Heterocyclic Compounds, Academic Press, 1980.
(4) L.A. Paquette, Principles of Modern Heterocyclic Chemistry, W.B. Benjamin, Inc., 1978.
(5) B.M. Acheson, An Introduction to the Chemistry of Heterocyclic Compounds, Interscience, 2nd Ed., 1975.

G501: Earth Science and Energy & Environmental Sciences

Earth Science

Origin of the earth, type of rocks in different layers, their physical and chemical properties, mechanism of their formation and destruction. Radioactivity and its role in geochronology, Plate tectonics and geodynamics and the role of mantle plumes in sustaining these processes. Gravity, electrical and magnetic properties of the different layers in the earth. Their variations in different geological terrains. Instrumentation, field procedures used in these studies. Response of the earth to the elastic (Seismic) and electromagnetic waves, use of this phenomena to study the earth's interior. Geodynamo and the internal magnetic field of the earth. Paleomagnetic studies, Polar wandering and reversal, possible theoretical arguments for understanding the phenomena. Seismology and its use in understanding of the different layers in the earth's interior. Utility of the different geophysical techniques (discussed above) in exploration for academic as well as for harnessing resources.

Suggested Texts and references:

1. The magnetic field of the Earth, Merill, R.T. McElhinny, M.W. and McFadden, P.L. International Geophysical Series.
2. Earth Science by Edward J. Tarbuck, E.J. and Lutgens, F.K.
3. Introduction to Applied Geophysics: Exploring the Shallow Subsurface Burger, H.R., Sheehan, A.F., C.H.
4. Mantle Plumes and Their Record in Earth History, Condie, K.C., 2001, Cambridge University Press, Cambridge, UK
5. Applied Geophysics (Paperback) W M Telford, Robert E Sheriff and L P Geldart.

Energy and Environmental Sciences

Introduction to Environmental Science. Natural Environments: Ecosystems and ecology, biodiversity. Socio-cultural environments: demography, population density, human organizations. Land use and its planning. Global climate change and effects on environment. Carbon cycle from human activity, calculation of carbon budgets. Water harvesting, storage and treatment. Natural calamities, hazards, and effects of human activity: Chemical and other technological hazards. Various case studies of natural calamities and human-induced disasters. Causes, effects, forecasting, preparedness, planning measures, technological solutions, social interventions. Concept of sustainability, individual and social, and local and global actions for a sustainable future. Introduction to energy Sources - evolution of energy sources with time. Power production, per capita consumption in the world, and relation to development index. Energy scenario in India: Various issues related to consumption and demands -energy crisis issues in India. Renewable and non-renewable energy sources - technology and commercialization of energy sources, local (decentralized) versus centralized energy production, constraints and opportunities of renewable energy (hydrocarbon and coal based energy sources). Energy conservation – calculation of energy requirements for typical and home and industrial applications. Alternative to fossil fuels - solar, wind, tidal, geothermal. Bio-based fuels. Hydrogen as a fuel. Energy transport and storages, comparison of energy sources - passage from source to delivery (source, production, transport, delivery) - efficiencies, losses and wastes. Nuclear energy: Power production: Components of a reactor and its working, types of reactors and comparison. India's three stage nuclear program. Nuclear fuel cycle. Thorium based reactors. Regulations on nuclear energy.

Suggested texts and References:

1. Energy in Perspective, J.B.Marion, University of Maryland, Academic Press, (1974)
2. Energy and Environment, Robert A.Ristinen and Jack J. Kraushaar, 2nd Edn., John Wiley and
Sons, Inc. (2006).
3. Renewable Energy, Boyle Godfrey, Oxford University Press (2004)
4. Environment, Problems and Solutions, D.K.Asthana and Meera Asthana, S.Chand and Co.(2006)
5.Text Book on Environmental Chemistry, Balaram Pani, I.K.International Publishing House(2007).

CL 501 Chemistry Laboratory:

Isolation and purification of lysozyme protein from hen egg by different methods (ethanol, ammonium sulfate and TCA precipitation), Relative quantification of lysozyme obtained from different methods by using:Dialysis, Gel electrophoresis, UV-Vis spectroscopy, Purification of lysozyme obtained from different methods with fast performance liquid chromatography (FPLC), Qualitative analysis of the lysozyme obtained after FPLC by using spectroscopic techniques (UV-Vis and fluorescence spectroscopy), Calculation of Quantum yield using fluorescence Spectroscopy, Binding effect of ligand on fluorescence of protein fluorophore (Calculation of inner filter effect), Calculation of binding constant of a ligand with protein by Stern-Volmer plot using fluorescence spectroscopy, Study of solvent effects on the stability of proteins by drawing a denaturation profile in presence of denaturing agents using UV-Vis and fluorescence spectroscopy.

SEMESTER –VI

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
CB601	Biophysical Chemistry	[3 + 1]	4
C601	Atomic and molecular spectroscopy	[3+ 1]	4
C602	Inorganic Chemistry III	[3 + 1]	4
C603	Organic Chemistry III	[3 + 1]	4
C604	Nuclear Chemistry	[3 + 1]	4
H601	Ethics in Science and IPR	[2 + 0]	2
		Lab contact hrs	**Credits**
CL601	Chemistry Laboratory	[6]	3
			25

(151 of 240 credits)

CB 601: Biophysical Chemistry

UNIT-I

(i) The Chemistry of Life: An introduction: Physical properties of water: Structure, water as solvent, The hydrophobic effect, osmosis and diffusion. Introduction to Biomolecules: Nucleic

Acid, Protein - Polymer Description of Macromolecular Structure, Intermolecular and Intramolecular forces, Non Covalent Interaction

.

UNIT-II

(ii) General principles of Biophysical chemistry I: Hydrodynamic properties: Diffusion and sedimentation, determination of molecular weight from sedimentation and diffusion; Introduction of Ultra Centrifugation, Dynamic Light Scattering and Electrophoresis. Spectroscopic properties of proteins and nucleic acid: UV/Vis, Intrinsic fluorescence, Circular dichroism.

UNIT-III

(iii) General principles of Biophysical chemistry II: The concept and application of Chemical and Physical equilibria in Biological system, The equilibrium constant and Standard Gibbs Free energies of reactants and products, Temperature dependence of the equilibrium constant, Double Strand formation in nucleic acid, Ligand-protein binding, Protein denaturation and stability, Introduction of DSC and ITC.

UNIT-IV

(iv) Molecular self-assembly and Molecular medicine: Protein folding kinetics and Biophysical methods, Misfolding and aggregation; Physical basis of conformation diseases, Therapeutic approaches to protein misfolding diseases**.**

UNIT-V

(v) Introduction to structure biology: Introduction to basic principles of protein X-ray crystallography, protein NMR, Small Angle X-ray scattering (SAXS), and Electron microscopy (EM).

Suggested texts and References:

(1) Tinoco, Sauer, Wang, and Puglisi. (2003) Physical Chemistry: Principles and Applications in the Biological Sciences. Prentice Hall, Inc.

(2) Physical Chemistry for the Life Sciences: Peter Atkins and Julio de Paula

(3) General review papers Dobson CM. Principles of protein folding, misfolding and aggregation. Semin Cell Dev Biol. 2004 Feb;15(1):3-16.

C 601: Atomic and molecular Spectroscopy (45 + 15 = 60 hrs.)

UNIT-I

(i) Born-Oppenheimer approximation - rotational, vibrational and electronic energy levels of homonuclear and heteronuclear diatomic and polyatomic molecules.

UNIT-II

(ii) Microwave Spectroscopy: Rotational of molecules and rotational spectroscopy of rigid diatomic molecules, Effect of isotopic substitution, The non-rigid rotator and rotational spectra. Rotational spectra of polyatomic molecules – linear, symmetruic top and asymmetric top. Techniques and instrumentation.

UNIT-III

(iii) Infrared spectroscopy: energy levels of vibrating diatomic molecule, simple harmonic oscillator and anharmonic oscillator, diatomic vibrating rotator, vibration-rotation spectra of CO. Breakdown of B-O approximation – interaction of rotations and vibrations. Vibrations of polyatomic molecules – Fundamental vibrations and their symmetry, overtone and combination frequencies, influence of rotation on the spectra of polyatomic molecules – linear and symmetric top molecules. Influence of nuclear spin. Group frequencies and analysis of spectra, Techniques and instrumentation, FTIR spectroscopy.

UNIT-IV

(iv) Raman Spectroscopy: Classical and quantum theories of Raman effect and molecular polarizability. Pure rotational Raman spectra, Vibrational Raman spectra, Polarization of light and the Raman effect, Structure determination from Raman and infrared spectroscopy, Techniques and Instrumentation, Near IR FT Raman spectroscopy. Resonance Raman and electronic Raman transition and applications.

UNIT-V

(v) Electronic spectroscopy – Electronic structure and spectra of diatomic and polyatomic molecules. Techniques and instrumentation. Molecular photoelectron spectroscopy.

(vi) Electron spin resonance spectroscopy - spin and spectra - relaxation processes - origin of g-shifts and hyperfine coupling - Tensor quantities - Experimental determination of g, A and D tensors - their interpretation - several examples.

Suggested texts and References:

(1) G. M. Barrow, Molecular spectroscopy

(2) C.N. Banwell and E. M. McCash, Fundamentals of Molecular spectroscopy, Tata McGraw HillPub. Co.New delhi

(3) J. D. Graybeal, Molecular Spectroscopy, McGraw Hill International Book Co. N.Y.

C 602: Inorganic Chemistry III (45+15 = 60 hrs)

UNIT-I

Chemistry of d-block elements

(i) General introduction to transition elements – Electronic structure, Metallic character, variable oxidation state, complexes, magnetic and catalytic properties.

UNIT-II

(ii) Elements of the first transition series: Occurance, separation, extraction and chemistry of the scandium group (IIIB), titanium Group (IVB), vanadium group (VB), chromium group (VIB), Manganeese group (VIIB).

UNIT-III

Iron group (VIIIB(8)), Nickel group (VIII(9)) and Copper group (VIIIB(10)).

(iii) Chemistry of the elements of the second and third transition elements: fnium group (Group IVB), Niobium and Tantalum (Group VB), Molybdenum and tungsten (Group VIB); Technitium and Rhenium (Group VIIB),

UNIT-IV
The Platinum group Metals, Ruthenium and Osmium (Group VIII(8)); Rhodium and Irridium (Group VIII(9)), Palladium and Platinum (Group VIII(10), Silver and gold Group (1B(11)).

UNIT-V
(iv)Chemistry of f-block elements-The lanthanide and actinide elements.

Suggested texts and References:
(1) Advanced Inorganic Chemistry, F. Albert Cotton and G. Wilkinson@1988, John Wiley & Sons.

C 603: Organic chemistry III (45 + 15 = 60 Hrs.)

UNIT-I
Chemistry of Natural Products:
(i) Terpenoids: Classification, structure, chemistry and biogenesis of some important mono; sesqui,di, and triter penes.

UNIT-II
(ii) Steroids: Sterols and bile acids, estrogens, androgens, gestogens and adrenocortical hormones. Hormone production. Cardiac glycosides. Steroidal triterpenes; biogenesis of steroids and correlation with terpenoids.

UNIT-III
(iii) Alkaloids: Characteristic reactions, general methods of degradation, structure and chemistry of some well-known alkaloids.

UNIT-IV
(iv) Natural Pigments: anthocyanines, Flavones, flavanones, isoflavones, xanthones, quinones, pterins, chlorophyll and haemin.

UNIT-V
(v) Carbohydrates: Stereochemistry, reaction and conformation of monosaccharides, deoxy and aminosugars, hexonic acid and vitamin C, disaccharides, polysaccharides, inositol; gangliosides and other glycosides. Chemistry of vitamins A, B, C and E.

Suggested texts and References:
(1) I. L. Finar, Organic Chemistry, Vol. 1 & 2, ELBS.

C 604: Nuclear Chemistry (45 + 15 = 60 hrs.)

UNIT-I
(i) Nuclear Stability: Concept of nucleus and properties, nuclear mass and binding energy, elemental abundance, radioactive decay laws and equilibria. Nuclear Models: Liquid drop model, Shell model, Fermi gas model, collective model, optical model, concept of spin, parity electric and magnetic moments, isomerism.

UNIT-II

(ii) Modes of Decay: □ decay, □ decay, electron captures, □ de-excitation, internal conversion, artificial radioactivity.

(iii) Nuclear reactions: Energetics, cross-section, centre of mass system, angular momentum, compound nucleus, statistical model, nuclear fission and fusion, nuclear reactors, Heavy ion induced reactions, Accelerators.

UNIT-III

(iv) Applications of radioactivity: Probing by isotopes, preparation of radioisotopes, Szilard-Chamers' reaction, Concept of tracers, chemical yield, radiochemical purity, Application of radiotracers in Chemical Sciences, uses of nuclear radiations, radioisotopes as a source of electricity.

UNIT-IV

(v) Elements of Radiation Chemistry: Interaction of radiation with matter, radiation dosimetry, radiolysis of water and some aqueous solutions, other radiolytic events.

(vi) Nuclear Methods: Activation Analysis – Neutron Activation Analysis (NAA),

UNIT-V

Charged Particle Activation Analysis (CPAA), X-ray fluorescence (XRF) spectrometry, Ion Beam Analysis – Backscattering Spectrometry (BS), Particle Induced □-ray Emission (PIGE), Nuclear Reaction Analysis (NRA), Elastic Recoil Detection Analysis (ERDA), Particle Induced X-ray Emission (PIXE).

Suggested texts and References:

(1) G. Friedlander, J. Kennedy, Nuclear and Radiochemistry (1981) –J. M. Miller and J. W. Macias
(2) R. D. Evans, Atomic Nucleus (1955)
(3) S. Glasstone, Source book of Atomic Energy (1969)
(4) G. T. Seaborg, Man made elements (1963).
(5) H. J. Arnikar, Essentials of Nuclear Chemistry (1982).
(6) C. Keller, The Chemistry of Transuranium Elements (1971).
(7) J.C. Bailar, H.J. Emelius, R. Nyholm and A.F. Trotman-Dickenson; Comprehensive Inorganic Chemistry, Vol. 5, Pergamon Press, Oxford (1973).

H601: Ethics of Science and IPR

Introduction to a Collective, Participatory Teaching-learning Program: A Science of Our own. Science Stands the Test of Ethics … Some indicators. Levels of Moral Development - Does it mean anything?

Medical Ethics: Different themes pertaining to medical ethics including ethical issues in public health.

History, Philosophy and Psychology of Ethics: History of Political Economy and Modern Ethics Environmental Ethics

Intellectual Property Rights and Associated Issues: History of Patenting. Digitalizing Culture-I: Free Software and Free Culture. Digitalizing Culture-II: Concentration and appropriation of Power by the few as well as Possibility of Distributive Justice

Journals and Publishers: Monopolistic practices by Academic Publishers Quest for Determining what is Virtuous: Ethics in Practice. Collaborative Projects by the Class.
Teaching the Teachers and other Virtuous Inquiries.

CL 601: Chemistry laboratory:
Experiments based on analytical techniques such as cyclic voltammetry, pulse polarography, electrodeposition, gas chromatography, nuclear magnetic resonance, FTIR, thermal gravimetry methods, atmic absorption spectroscopy etc.

FOURTH YEAR
SEMESTER –VII

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
C701	Photochemistry	[3 + 1]	4
C702	Chemical biology	[3+ 1]	4
C703	Organometallics & Bio-inorganic Chemistry	[3 + 1]	4
C704	Physical Organic Chemistry	[3 + 1]	4
CPr701	Reading project	-	4
		Lab contact hrs	**Credits**
CL701	Advanced Chemistry Laboratory-I	[8]	4
			24

(175 of 240 credits)

C701: Photochemistry **(45 + 15 = 60 hrs.)**

UNIT-I
Basic Principles of photochemistry:
(i) Photophysical processes: Deexcitation processes for the excited molecules (fluorescence, phosphorescence, delayed emission, nonradiative relaxation, excimer and exciplex formation, heavy atom effect, etc.). Kinetics of excited state processes and quantum yields of different processes.
(ii) Properties of the excited state: Acid-base properties, redox potential, geometry, dipole moment, dynamic properties of the excited states.

UNIT-II
(iii) Photoinduced processes: Photo-dissociation, photo-ionization, intramolecular charge and proton transfer processes, intermolecular electron and proton transfer reactions, conformational relaxations, intra and intermolecular energy transfer processes and other important photochemical reactions. Kinetics and mechanism of photochemical reactions.

(iv) Applications of photochemistry: Photosynthesis, vision, solar energy conversion, atmospheric photochemistry, etc.

UNIT-III

(v) Studies on ultrafast processes: Nanosecond, picoseconds and femtosecond laser flash photolysis, fluorescence time domain spectroscopy with special emphasis on energy transfer and electron transfer reactions and studies on excited state properties.

UNIT-IV

(vi) Organic Photochemistry Distintive features of photochemical reactions, methods of preparative photochemistry, Photochemistry of alkenes, alkynes and related compounds – geometrical isomerism, electrocyclic processes, sigmatropic shifts, di-π methane reactions, addition, cycloaddition and oxidative reactions. Photochemistry of aromatic compounds – bond cleavage and hydrogen abstraction reactions, cycloaddition reactions, rearrangements of cyclo-hexenones and cyclo-hexadienones, thiocarbonyl compounds. Photochemistry of other organic compounds – imines, imminium salts, nitriles and nitro compounds, azo and diazo compounds, diazonium salts, sulphur and halogenated compounds, photohalogenation and photonitrosation reactions. Photooxidation of alkanes.

UNIT-V

(vii) Inorganic Photochemistry Introduction to inorganic photochemistry. Photophysical processes. The electronic absorption spectra of inorganic compounds. Characteristics of the electronically excited states of inorganic compounds. Photoelectochemistry of excicted state redox reactions. Photosensitization. Photochemical reactions; substitution, decomposition and fragmentation, rearrangement, and redox reactions. Selective inorganic photochemistry using laser beams. Inorganic photochemistry in biological processes and their model studies. Ligand field photochemistry of dn complexes, photochemistry of carbonyl compounds, energy conversion (solar) and photodecomposition of water.

Suggested texts and References:

(1) K.K.Rohatagi-Mukherjee, Fundamentals of Photochemistry, Wiley Eastern, 1978.
(2) M.S.Wrighton, Inorganic and Organometallic photochemistry, ACS Pub., 1978.
(3) V. Balzani and V. Carasiti, Photochemistry of Co-ordination compounds, Academic Press, 1970.
(4) J. D. Coyle, Introduction to Organic Photochemistry, ISBN

C 702: Chemical Biology (45 + 15 = 60 Hrs.)

UNIT-I

(i) Structure and the Synthesis of Life: Central Dogma, Introduction to Biological Chemistry, Artificial gene synthesis: solid-phase DNA synthesis Versus molecular cloning and polymerase chain reaction (PCR). Synthia and *Mycoplasma laboratorium,*

UNIT-II

DNA digital data storage, Peptide and protein synthesis. Lipid synthesis,Carbohydrate and membrane synthesis.

What Chemists Can Do for Biology: Natural Versus non Natural amino acid, Nonnatural Amino Acids for Site-Specific Protein Conjugation, Bio-orthogonal chemistry, Chemical genetics, reverse chemical genetics.

UNIT-III

Biomimetic Chemistry: Compounds that mimics a biological material in its structure or function, Artificial Enzymes: Chemical transformation, Molecular recognition (Mimic binding), examples of mimics found in research and industry: Cyclodextrins Cryptands,

UNIT-IV

Catalytic antibodies. Nanozymes- next-generation artificial enzymes, A laboratory procedure designed to imitate a natural chemical process: Biomimetic synthesis, Natural product synthesis, Asymmetric catalysis, Reaction methodology.

UNIT-V

(iv) Metabolomics: Technologies in metabolomics. Nutrigenomics. Other omics. Nuclear Magnetic Resonance Spectroscopy and Mass Spectrometry in metabolomics. Metabolic pathways resources: KEGG, Biocarta. Nutrigenomics and metabolic health. Solved problems and future challenges.

C703: Organometalics and Bioinorganic Chemistry (45 + 15 = 60 hrs.)

UNIT-I

Organometallics: Overview, 18-electron rule, square planar complex. Carbonyl ligand – bonding, binary carbonyl complexes, oxygen-bonded carbonyls, other ligands similar to CO, IR spectrum, main group parallels with binary carbonyl. Pi-ligands – linear and cyclic pi systems, NMR spectra of organometallic complexes.

UNIT-II

Comparative survey of structure and bonding of metal alkyls and aryls, complexes with acids, CO and related ligands, complexes with olefins, acetylenes and related unsaturated molecules, catalytic properties of mononuclear compounds, stereochemical non-rigidity in organometallic compounds, boranes, carboranes and metallocarboranes, bimetallic and cluster complexes, structure and applications in catalysis, applications of organometallic compounds in organic synthesis, enantioselective synthesis via organometallic compounds.

UNIT-III

importance of organometallic compounds in certain biological systems. Other important ligands – complexes containing M – C, M= C, M ≡ C bonds, hydride and dihydrogen complexes, phosphines and related ligands.

(ii) Organometallic reactions occurring in metal – ligand substitution, oxidative, addition, reductive, elimination. Organometallic reactions involving modification of ligands – insertion and deinsertion, nucleophilic addition to ligands, nucleophilic abstraction, electrophilic reactions.

UNIT-IV

Homogeneous catalysis and heterogeneous catalysis – use of transition metal complexes, hydroformylation reaction, Walker-Smidt synthesis of acetaldehyde, hydrogenation, Monsanto

acetic acid process. Transition metal carbine complexes – structure, preparation and chemistry, metathesis and polymerization reactions. Applications of organometallics to organic sysnthesis and other applications. Metal cluster compounds - metal-metal bond, carbonyl and non-carbonyl clusters, structure and bonding low dimensional solids, clusters in catalysis.

UNIT-V

(iii) Bio-inorganic chemistry - biochemistry of iron - its storage, transport and function, copper and zinc proteins, biological activation of oxygen, bioinorganic chemistry of alkali and alkaline earth metal cations, photosynthesis, nitrogen fixation, toxicity of metals. Chemical make up and essential inorganic elements of organisms. Chemistry aspects of metal complexes. Spectral, biochemical and biological methods used in bioinorganic chemistry. Bioinorganic chemistry of Na^{+}, K^{+}, Mg^{2+} and Ca^{2+}. Role of metal ions in biology : Proteins and enzymes of V, Mn, Fe, Co, Ni, Cu, Zn and Mo. Structural and functional models. Transport and storage of metal ions. Carcinogenicity of chromium. Selenium in biology.

Suggested texts and References:

(1) G.O.Spessard, G.L.Miessler, Organometallic Chemistry, Prentice Hall, 1997.
(2) C.Elsehenbroich and A. Salzer, Organometallic Chemistry, 2nd Ed., Wiley VCH, 1992.
(3) F.A.Cotton, G. Wilkinson, C.A. Murillo and M. Bochmann, Advanced Inorganic Chemistry, 6th Edn., Wiley, 1999.
(4) N.N.Greenwood and A. Earnshaw, Chemistry of the Elements, lst Edn., Pergamon, 1985.
(5) S.J.Lippard & J.M.Berg, Principles of bioinorganic chemistry, University Science Books, Mill Valley, 1994.
(6) I. Bertini, H.B.Gray, S.J.Lippard and J.S.Valentime, Bioinorganic Chemistry, Univ. Sci. Books, Mill Valley, 1994.
(7) James A.Cowan, Inorganic Biochemistry, VCH Publishers, 1993.

C 704: Physical organic chemistry (45 + 15 = 60 hrs)

UNIT-I

Structure and Models of Bonding: Basic Bonding Concepts, Bonding and Structure of Reactive Intermediates, Molecular Orbital Theory, electron in a box problem, energies and coefficients of linear pi-systems, Secular Determinant, Huckel MOT, HMOT in cyclic and acyclic pi-systems, Aromatic and antiaromatic systems.

UNIT-II

(ii) Strain and Stability: Thermochemistry of Stable Molecules, Thermochemistry of Reactive Intermediates, Relation Between Structure and Energetics-Basic Conformational Analysis, Conformations of Acyclic and Cyclic Systems, Electronic Effects.

Acid-Base Chemistry: Bronsted Acid-Base Chemistry, Aqueous and Non-Aqueous Systems, Predicting Acid Strength in Solution, Lewis Acids/Bases and Electrophiles/Nucleophiles.

UNIT-III

(iv) Thermal Pericyclic Reactions: Cycloadditions, Orbital correlation diagram, Frontier Molecular Orbital, Comments on forbidden and allowed reactions, Photochemical pericyclic reactions, D-A cycloadditions, regio- and stereoselectivity, endo-effect, [2+2] cycloaddition, ketene cycloaddition, 1,3-dipolar cycloaddition, ene-reaction, retrocycloaddition, electrocyclic

reactions, torquoselectivity, sigmatropic rearrangements, Claisen and Cope rearrangements, Cheletropic reactions.

UNIT-IV

(v) Reactivity, Kinetics and Mechanisms: Energy Surfaces and Related Concepts, Postulates and Principles Related to Kinetic Analysis, Kinetic Experiments and Deciphering Mechanisms. **(iv)Experiments Related to Thermodynamics and Kinetics:** Isoptope Effects, Substituent Effects, Hammett Plots and Linear Free Energy Relationships, Other Linear Free Energy Relationship, Acid-Base Related Effects, Experiments for Studying Mechanism.

UNIT-V

(vii) Application of physical methods: Deciphering mechanisms of electrophilic and nucleophilic substitution/additions, eliminations, cyclizations, radical reactions and reactions involving reactive intermediates.

Suggested texts and References:

(1) E. V. Anslyn and D. A. Dougherty, Modern Organic Chemistry, University Science, 2005.
(2) I. Fleming, Molecular Orbitals and Organic Chemical Reactions, John Wiley, 2009.
(3) J. Clayden, S. Warren, N. Greeves, P. Wothers, Organic Chemistry, 1st Edition, Oxford University Press, 2000
(4) F. J. Carey and R. J. Sundburg, Advanced Organic Chemistry, Part A and Part B, 5th Ed., Springer, 2007
(5) J. March, Advanced Organic Chemistry, 3rd edition, McGraw Hill, 1991.
(6) S. H. Pine, Organic Chemistry, 5th edition, McGraw Hill, 1987.

SEMESTER –VIII

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
C801	Chemistry of Materials	[3 + 1]	4
C802	Macro and Supra-molecular chemistry	[3+ 1]	4
C803	Reaction Dynamics	[3 + 1]	4
C804	Computational Chemistry	[3 + 1]	4
		Lab contact hrs	**Credits**
CL801	Advanced Chemistry Laboratory-II	[10]	5
CPr801	Project	-	4
			25

(200 of 240 credits)

C801: Chemistry of Materials **(45 + 15 = 60 hrs.)**

UNIT-I

Basic Aspects of the Solid State

(i) Solid State Structure: Primitive lattice vectors - reciprocal lattice - crystal systems and desymmetrization schemes. Bravais lattices; closed packed structures, octahedral and tetrahedral holes, crystallographic point groups and space groups - organic and in organic crystal structure motifs - polytypes and polymorphs. pervskites and related structures, normal and inverse spinels.
(ii) Defects and Non-stoichiometry: Intrinsic and extrinsic defects - point, line and plane defects; vacancies, Schottky defects, Frenkal defects - Charge compensation in defective solids - non-stoichiometry, thermodynamic aspects and structural aspects.

UNIT-II

(iii) Thermal Properties: Free electron theory, electrical conductivity, Hall effect - band theory, band gap, metals and semiconductors - intrinsic and extrinsic semiconductors, hopping semiconductors - semi-conductor/metal transition - p-n junctions - superconduction, Meissner effects, type I and II superconductors, isotope effect, basic concepts of BCS theory, manifestations of the energy gap, Josephson devices.
(iv) Ionic Conductors: Types of ionic conductors - Mechanism of ionic conduction; interstitial jumps (Frenkel), vacancy mechanism, diffusion - superionic conductors, phase transitions and mechanism of conduction in superionic conductors - examples and applications of ionic conductors.

UNIT-III

(v) High Tc Materials: Defect pervskites - high Tc superconductivity in cuprates – preparation and characterization of 1-2-3 and 2-1-4 materials - normal state properties, anisotropy, temperature dependence of electrical resistance, optical phonon modes – superconducting state, heat capacity, coherence length, elastic constants, positron lifetimes, microwave absorption - pairing and multigap structure in high Tc materials - applications of high Tc materials.
(vi) Magnetic Properties: Classification of magnetic materials - Langevin diamagnetism - Quantum theory of paramagnetism - cooperative phenomena - magnetic domains and hysteresis - magnetism and dimensionality.
(vii) Optical Properties: Optical reflectance - excitons - Raman scattering in crystals - photoconduction - color centers - lasers - photovoltaic effect.

UNIT-IV

(viii) Synthesis of Materials: Phase diagrams - preparation of pure materials, mass transport, nucleation and crystal growth - preparative techniques, zone refining, chemical transport, etc.
(ix) Multiphase materials: Ferrous alloys, Fe-C phase transformations in ferrous alloys, stainless steels - non-ferrous alloys - properties of ferrous and non-ferrous alloys and their applications.
(x) Nanocrystalline phase - preparation procedures – special properties - applications
(xi) Thin Films, Langmuir-Blodgett Films: Preparation techniques, evaporation/sputtering, chemical processes, MOCVD, sol-gel etc. - LB film growth techniques - photolithography - properties and applications of thin films, LB films.

UNIT-V

(xii) Liquids Crystals: Mesmorphic behavior - thermotropic and lyotropic phases – description of ordering in liquid crystals, the director field and order parameters - nematic and semectic

mesophases, smectic -nematic transition and clearing temperature - homeotropic, planar and twisted nematics - chiral nematics - smectic A and smectic C phases - cholesteric-nematic transition - optical properties of liquid crystals - effect of external field.
(xiii) Materials for Solid State Devices: Rectifiers, transistors, capacitors - IV-V compounds - low-dimensional quantum structures, optical properties.
(xiv) Organic Solids, Fullerenes, Molecular Devices: Conducting organics – organic superconductors - magnetism in organic materials.
(xv) Fullerenes - doped fullerenes as superconductors
(xvi) Nonlinear Optical Materials: Nonlinear optical effects, second and third order – molecular hyperpolarisability and second order electric susceptibility - materials for second and third harmonic generation.

Suggested texts and References:
(1) H.V. Keer, Principles of the Solid State, Wiley Eastern (1993).
(2) N.W. Ashcroft, N.W. Mermin, Solid State Physics, Saunders College, Philadelphia (1976).
(3) W.D. Callister, Material Science and Engineering. An Introduction, Wiley, New York (1985).
(4) Charles Kittle, Introduction to solid state physics, John Wiley & Sons, New York (1968). Anthony R.West, Solid State Chemistry and its Applications, John Wiley & Sons, New York (2005).
(5) Lesley E. Smart, Elaine A. Moore, Solid State Chemistry (3rd Ed), Taylor & Francis (2005).
(6) N.N. Greenwood, Ionic crystals, lattice defects and non-stoichiometry,

C 802: Macro and Supramolecular Chemistry (45 + 15 = 60 hrs.)

UNIT-I
A. Polymer Chemistry
(i) Polymerization reactions, mechanism and kinetics – cationic, anionic and radical polymerization. Template, emulsion and electrochemical polymerization, Condensation, ring opening, step growth and radiation polymerization reactions. Coordination complex polymerization, Naturally occurring polymers, Biological polymers, inorganic polymers. Polymerization of cyclic organic compounds. Copolymerization and multicomponent polymerization,
(ii) Thermodynamics and kinetics. Polymerization and depolymerization equilibria - Kinetics of condensation (Step-Growth), Free radical and ionic polymerizations.

UNIT-II
(iii) Physical Characterization: Fabrication and Testing, Relationship between structure and properties - Thermal, flame and chemical resistance - Additives - Electroactive polymers - Biomedical applications. Molecular wieght (Mn, Mw) determination - Morphology -Glass transitions and crystallinity - Conformational analysis. Dynamics of dilute polymer solutions and effect of increasing concentration, NMR and neutron scattering studies.
(iv) Reactions and degradation of polymers, biodegradable polymers. Thermal and oxidative degradation, catalysis by macromolecules, computer applications.

UNIT-III

Supramolecular Chemistry

(i) Introduction to Supramolecular Chemistry.

(ii) Molecular and Chiral Recognition - Self-Organization, Self-Assembly and Preorganization, molecular and chiral recognition, self-Assembly and self-organization, role of preorganization in the synthesis of topological molecules, template reactions, one-pot' reactions.

(iii) Covalent self-assembly based on preorganization - inclusion complexes, host-guest chemistry, early development of host-guest chemistry. pedersen's works onc crown ethers, nomenclature, the structure of inclusion complexes, dynamic character of inclusion complexes, the complexes involving induced fit and without it, endo-hedral fullerene, hemicarcerand and soft rebek's tennis ball-like hosts.

(iv) Mesoscopic Structures as an Intermediate Stage Between Molecules (Micro Scale) on the One Hand and Biological Cells (Macro Scale) on the Other – introduction, medium sized molecular aggregates.

UNIT-IV

(v) Between Classical Organic Chemistry and Biology Understanding and Mimicking Nature-Introduction, the role of self-organization and self-association in the living nature, modeling processes in living organisms.

(vi) On the Border Between Chemistry and Technology - Nanotechnology and Other Industrial Applications of Supramolecular Systems – introduction, between chemistry and solid state physics - crystal engineering, obtaining crystals with desired properties, nanotechnology and other industrial applications of supramolecular systems, supramolecular catalysis.

(vii) The Most Interesting Macrocyclic Ligands which Are Hosts for Inclusion Complexes- . Crown ethers and coronands, cryptates and cryptands, calixarenes, hemispherands, and spherands, carcerands, hemicarcerands and novel `molecular flasks' enabling preparation and stabilization of short-lived species, cyclodextrins, and their Complexes, endohedral fullerene complexes, nanotubes and other fullerene-based supramolecular systems, dendrimers, cyclophanes and steroids forming inclusion complexes, anion binding receptors and receptors with multiple binding Sites.

UNIT-V

(viii) Other Exciting Supramolecular Systems- Making Use of the preorganization phenomenon, topological molecules, multiple hydrogen-bonded Ssstems, organic zeolite, metal directed self-assembly of comple, supramolecular architecture, chains, racks, ladders, grids, macrocycles, cages, nanotubes and self-Intertwining strans (helicates).

(ix) The Prospects of Future Development of Supramolecular Chemistry.

Suggested texts and References:

1. H.R. Allcock, F.W. Lampe and James Mark, Contemporary Polymer Chemistry, Prentice Hall, Inc. (1990).

2. M.P. Stevens, Polymer Chemistry: An Introduction (2nd Edition) Oxford University Press 91990).

3. F.W. Billmeyer, Jr., Textbook of Polymer Science (3rd Edition) Wiley-Inter Science (1984) paperback.

4. A. Ravve, Principles of Polymer Chemistry.

5. Recommended Review Articles in the field of supramolecular chemistry.

6. "Supramolecular Chemistry" by F. Vogtle, John Wiley, 1991.
7. "Crystal Engineering. The Design of Organic Solids" by G.R. Desiraju, Elsevier, 1989.
8. Introduction to Supramolecular Chemistry, Dodzuick Helena.

C 803: Reaction dynamics (45 + 15 = 60 hrs.)

UNIT-I

Chain reactions: general treatment, activation energy, chain length, chain transfer reactions, inhibition, bond dissociation energies, branching chain reactions.

UNIT-II

The collision theory: Dynamics of bimolecular collisions and rate and rate constant of bimolecular reaction, factors determining effectiveness of collisions, Termolecular reactions, unimolecular reactions. Relation between cross section and rate coefficients.

UNIT-III

Potential Energy Surfaces:: Long range, empirical intermolecular and molecular binding potentials, Internal coordinates and normal modes of vibration, Potential energy surfaces, ab-initio calculation of potential energy surface, experimental determination of potential energy surfaces.

UNIT-IV

Details of the reaction path, potential energy surface for electronically excited molecule. Molecular beam scattering, State resolved spectroscopic technique, molecular dynamics of H_2 + H reaction, state-to-state kinetics of F + H_2 reaction.

UNIT-V

(iv) ***Transition State Theory (TST):*** Motion on the potential energy surface, Basic postulates and derivation of TST, dynamical derivation of TST, Quantum mechanical effects on TST, Thermodynamic formulation of TST, Application of TST, Micro-cannonical TST, Variational TST, Experimental observation of TST.

Suggested texts and References:

(1) J.I. Steinfeld, J.S. Francisco and W.L. Hase, Chemical Kinetics and Dynamics, Prentice Hall 1989.
(2) Paul L. Houston, Chemical Kinetics and reaction dynamics.
(3) R.D.Levine and R.B.Bernstein, Molecular Reaction Dynamics and Chemical Reactivity, Oxford University Press, 1987.
(4) Sanjay K. Upadhay, Chemical kinetics and Reaction Dynamics, Springer, 2006

C 804 Computational chemistry (45 + 15 = 60 hrs.)

A brief outline of molecular mechanics, semi-empirical approximations, ab initio methods, basis sets and Z-matrix; Application of these computational methods for prediction of structural and electronic properties of molecules by using standard programs; FMOs in organic chemistry, crystal and ligand field calculations, computation of potential energy surfaces. Conformational

analysis by molecular mechanics; Dynamical and structural studies of molecules using molecular dynamics simulations; Monte Carlo simulations of molecules.

Suggested texts and References:

(1) C. J. Cramer, Essentials of Computational Chemistry: Theories and Models, John Wiley & Sons, 2002.
(2) David Young, Computational Chemistry: A practical Guide for applying Techniques to Real World Problems, Wiley Interscience, 2001.
(3) A.R. Leach, Molecular Modelling: Principles and Applications, Pearson Education, 2001.
(4) J. B. Foresman, A. Frisch, Exploring Chemistry with Electronic Structure Methods. Gaussian Inc., 1996.
(5) M.P. Allen and D.J. Tildesley, Computer Simulations of Liquids, Oxford, 1987.

FIFTH YEAR
SEMESTER –IX

Subject Code	Subject	Contact Hours / Week	Credits
CPr901	Project	-	24
			24

(224 of 240 Credits)

SEMESTER –X

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
CE1001	Elective I	[3 + 1]	4
CE1002	Elective II	[3+ 1]	4
CE1003	Elective III	[3 + 1]	4
CE1004	Elective IV	[3 + 1]	4
			16

(240 of 240 credits)

(P: Physics, M: Mathematics, C: Chemistry, B: Biology, G: General, E: Elective, Pr: Project)

Elective subjects on Physical Chemistry:

Theoretical Organic Chemistry

Structure and Heats of Formation: Classical mechanical approach - Additivity schemes - Relationship between structure and strain - -electrons within the classical modelπConformational energies - Introduction of - Inter and intramolecular forces. Quantum mechanical approaches - Applications of semi-empirical and ab intio electronic structure methods - Analysis of computatioinal results - Computer experiments. Reactivity: Substituent effects in reactions - Predictions from theory - Steric and electronic effects - Transition states - A curve crossing model for organic reactions. Structure - Activity correlations. Computer Assisted Organic Synthesis.

Suggested Reading:

1. U. Burkert and N.L. Allinger, Molecular Mechanics, ACS Monograph 177, American Chemical Society, Washington DC, 1982.
2. L. Salem and W.L. Jorgensen, Organic Chemists- Book of Orbitals, Academic Press, 1973.
3. T.H. Lowry and K.C. Richardson, Mechanism and Theory in Organic Chemistry, 3rd Editiion, Harper and Row, New York, 1987.

Statistical Mechanics

Ensembles and Averages, equivalence of Ensembles, classical Limit. Monte Carlo and Molecular Dyamics simulations. Distribution functions at equilibrium. Integral equation methods. Perturbation theory. Density functional methods. Molecular fluids. Estimation of thermodynamic functions. Non-equilibrium methods. Linear response theory. Projection operator method. Stochastic processes and Brownian motion. Selected applications to problems in chemical dynamics, relaxation processes and neutron diffraction.

Texts/References

M.P.Allen and D.J.Tildesley, Computer Simulation in Liquids, Oxford University Press, 1987.
J.P.Hansen and I.R.McDonald, Second Ed., Theory of Liquids, Academic Press,1986.
D.Chandler, Statistical Mechanics, Oxford University Press,1985.
H.L.Friedman, A Course in Statistical Mechanics, Prentice Hall,1983.
L. D. Landau, E. M. Lifshitz and L.P. Pitaevskii, Statistical Physics Parts I and II, Pergamon Press, 1980

Chemical Applications of Group Theory.

1. The Great Orthogonality Theorem Explained.
2. Projections Operators and SALC's (Symmetry Adapted Linear Combinations).
3. Symmetry of Metal-Ligand o-Bonding in simple M(Xnn (n = 1-9) Species.
Rarity of the Symmetrical Cube as a Coordination Environment.
4. Infinite Groups -- Their treatment by Expansion of a Finite Group.
5. Molecular Vibrations Revisited. Force Constants and F and G Matrices.
6. Crystallographic Symmetry. Translational symmetry, screw axes, glide planes and the 230 Space Groups.

Environmental Chemistry

Biocycles: C, O2, N2, P, S, CO2, etc. Cycles, biodistribution of the elements, chemical -sepration-.Pollution and its Control a. Atmospheric pollution: gaseous air pollution, greenhouse effect and ozone shield, acid-rain particulate air pollutiion, radiation hazard. b. Aquatic pollution: agricultural and pesticidal inorganic and organic pollutants, marine pollution, oil spills and oil pollutiion. c. Industrial pollution: Thermal power, cement, fertilizer, sugar, distillery, drug, paper and pulp and nuclear industry pollution, mining and metallurgy, polymers, etc.

Environmental Analytical Chemistry
Techniques and quantification of pollutants, trace element and radionuclide analysis.
Environmental Toxicology and Detoxification Mechanism Chemical solutions to environmental problems, better biodegradability, kinetics of decomposition, clean technology, etc.

Suggested Reading
1. Handbook of Environmental Chemistry (Ed. O. Hutzinger) Springer-Verlag, Vol.1-3.
2. Environmental Inorganic Chemistry (Ed. J. Irgolic and A.E. Martell), VCH Publishers. 3. The importance of Chemical -speciation- in Environmental Processes (Ed. M.
Bernhard, F.E. Brinckman and P.J. Sadler) Springer-Verlag.
4. Environmental Chemistry, Vol. 1 and 2, Specialist Periodical Report, The Chemical Society (London).
5. Environmental Instrumentation (L.J. Fristschen and L.W. Gay) Springer-Verlag.
6. Comprehensive Analytical Chemistry (Ed. G. Svehla) Elsevier, Vol. I_XXVIII

Radioisotopes – Production and applications.
Production of Radioisotope, Basic principles of radioisotope production using nuclear reactors and charged particle accelerators. Szilard-Chalmers effect and its utility in radioisotope production. Concept of radionuclide generators; Growth and decay of activity in a generator; Different types of 99Mo-99mTc generators; Few other important generator systems such as 90Sr-90Y, 188W-188Re etc. Methods of production of some important radioisotopes (such as 32/33P, 41Ar, 60Co, 79Kr, 82Br, 90Sr-90Y, 99Mo-99mTc, 125I, 131I, 137Cs, 153Sm, 166Ho, 177Lu, 186/188Re, 192Ir, and 11C, 13N, 15O, 18F, 67Ga, 123/124I, 201Tl etc.). Calculations of production yields; Bateman's equation and its utility in production yield calculations. Applications of Radioisotopes in Medicine Concept of nuclear medicine and radiopharmaceuticals, Classification of radiopharmaceuticals, Characteristics of diagnostic (SPECT and PET) and therapeutic radiopharmaceuticals. Basis of designing radiopharmaceuticals, Methods of radiolabeling, New approaches in radiopharmaceuticals chemistry. Some important organ-specific diagnostic radiopharmaceuticals (myocardial imaging, brain imaging, renal imaging, tumor and inflammation imaging, receptor-specific imaging agents etc.). PET radiopharmaceuticals – Principle an applications. Therapeutic radiopharmaceuticals for some specific applications (bone pain palliation, radiation synovectomy, targeted radiotherapy etc.) Concepts of brachytherapy and teletherapy Quality control of radiopharmaceuticals. Basic principles of Radiometric assays for in-vitro estimation of hormones, tumour associated antigens etc. Industrial applications of radiation technology Fundamental aspects of radiation technology, Ionizing radiation: Sources and Effects,

Comparison of different radiation sources for different applications. Radiation dosimetry, Radiation polymerization, Radiation effects on Polymers, Radiation Modification of polymers for industrial applications, Radiation sterilization of Medical products Radiation processing of food, Radiation hygienization of sewage sludge, Radiation processing of flue gases, Application of radioisotopes as tracers in process optimization and trouble shooting in industries.

Isotope tracer applications in hydrology:
Environmental isotopes and artificial radioisotopes in hydrology. Application of environmental isotopes in studying ground water salinity, pollution, recharge etc.; Artificial radioisotopes in studying dam seepage, effluent dispersion, sediment transport etc.

Reference Books:
1. Manual for Reactor Produced Isotopes. IAEA-TECDOC-1340, IAEA, 1999.
2. Fundamentals of Radiochemistry. D.D. Sood, A.V.R. Reddy, N.Ramamoorthy. 3rd Edition, Indian Association of Nuclear Chemists and Allied Scientists, 2004.
3. Radiopharmaceuticals : Chemistry and Pharmacology Adrian D. Nunn. Marcel Dekker, 1992.
4. Fundamentals of Nuclear Pharmacy. G.B. Saha. 2nd Edition, Springer-Verlag, 1984.
5. Radionuclides in Therapy. R.P. Spencer, R.H. Sievers, A.M. Friedman. CRC Press, Boca Raton, 1987.
6. PET in Oncology : Basics and Clinical Applications, J. Ruhlmann, P. Oehr, H.J. Biersack. Springer-Verlag, 1998.

Advanced techniques in NMR spectroscopy

Nuclear magnetic resonance (NMR) phenomenon and the experimental aspects, Chemical shift, indirect spin-spin coupling, direct spin-spin coupling, Relaxation times, nuclear Overhauser effect, polarization transfer, Two-dimensional NMR, correlation spectroscopy (COSY), Nuclear Overhauser effect spectroscopy (NOESY). Hetero-nuclear correlation spectroscopy (HETCOR), Inverse experiments, hetero- nuclear multiple quantum spectroscopy (HMQC), NMR in higher dimensions, NMR of oriented molecules, Structure and dynamics of bio-molecules, NMR in the solid state, Magnetic resonance imaging.

Suggested Reading
1. Modern NMR Techniques for Chemistry Research, Ed. Andrew E. Derome.
2. Introduction to Mass Spectrometry, Ed. S.K. Aggarwal and H.C. Jain.

Advanced Topics in Inorganic Chemistry
Electron transfer properties of metal complexes. Molecular recognition. Asymmetric catalysis. Phosphorus compounds as ligands. Cluster chemistry. Bio-inorganic reaction mechanisms.
Basic aspects of single crystal diffraction. Molecular metals. Inorganic rings. Transition metal chemistry of macrocycles. Metal ions in medicine. Fluxional molecules.

Text/References
1.W.L.Jolly, Modern Inorganic Chemistry, McGraw, Hill Co., 1984.
2.R.W. Hay, Bioinorganic Chemistry, Wiley, 1984.

3.M.Day and J.Selbin, Theoretical Inorganic Chemistry, Von. Nostrand, 2nd Ed. 1980.
4.H.J.Emeleus and J.J. Anderson, Modern Aspects of Inorganic Chemistry, Von. Nostrand, 1962.
5.J.E.Huheey, Inorganic Chemistry, 4th Ed., Harper Collins College Publisher, 1993.
6.G.H.Stout and L.H.Jensen, X-ray Structure Determination : A Practical guide, 2nd Ed., John Wiley, 1989.

Nano- Materials and Soft Condensed Matters

Nano-materials

Introduction: Definition of nano-materials, Difference between bulk and Nano-Materials, Quantum size effect, Evolution of electronic Structure from atoms, clusters, nano-materials to bulk solids, Calculation of surface to volume ratio for different structural arrangements, Different Class of Nano-Materials : Metal nano-particles, nano-crystals, Clusters and cluster assembled materials (example of C60 solid), Semiconductor nanoparticles, Quantum Well/ wire/Dot Core-Shell nanoparticles Polymers, Organic-inorganic nanocomposite, Nano-structured multilayers Self-Assembly, Bio-Materials (poly-peptide), Nanotubes, nanowires, Nano-rods, Synthesis: Chemical precipitation, Sol-Gel method, Ball milling, Physical vapor deposition,Thermal decomposition, Solid state precipitation, Co-sputtering, Silver ion exchange, Ion-implantation, Methods for obtaining monodisperse particles

Properties: Electronic Properties : (IP, EA, Reactivity, Electronic Structure, DOS etc. Optical Properties : Electron and hole confinement in Semiconductor quantum dots, Band-gap engineering, Optical absorption and photoluminescence, efficiency of optical process, application of nano-particles in non-linear optical devices, Magnetic Property, High density data storage.Thermo-Mechanical Properties. Applications: Nano-Catalysis : Electro catalysis, Fuel Cell Materials Bio-medical application, Electronic device application, Molecular Electronics, Spintronics, data storage etc. Carbon based Nano-Materials: Carbon Clusters, Fullerence, nano-tubes : Synthesize, Properties and applications.

Soft Condensed Matters:

2.1 Introduction to Soft Matter : Forces, energies, length and time scales in soft matter. Soft matter systems (colloids, surfactants and polymers). Interactions in soft matter (electrostatic, vander Walls, hydrophilic and hydrophobic interactions, depletion interaction). Soft matter in nature (proteins, polysaccharides, membrances).

2.2 Experimental techniques to investigate structure and dynamics in soft matter : Scattering techniques (Small-angle X-ray scattering (SAXS), Ultra-small-angle-X-ray scattering (USAXS), Small-angle (SANS) and inelastic neutron scattering, Static and Dynamic light scattering (SLS & DLS), NMR, Optical microscopy, digital video microscopy, confocal laser scanning microscopy, Atomic Force Microscopy (AFM), Electron microscopy (TEM &SEM). Optical Tweezers [2 lectures].

2.3 Computer simulations : Molecular dynamics (MD), Monte Carlo (MC), Calculation of pair-correlation function, structure factor.

2.4 Colloids : Sterically stabilized and Charge stabilized colloids, Colloidal interactions, Synthesis of monodisperse colloidal particles, characterization, Structural ordering, Dynamics, Phase Transitions and applications of colloids.

2.5 Surfactants: Classification, Micellization and critical micelle concentration. Surface tension. Gibbs adsorption equation and surface excess. Phase bahavior of surfactants. Cloud point and Kraft temperature. Liquid crystalline phases in surfactants and block copolymers. Langmuir-Blodgett films, Monolayer, Bilayers and Vesicles.
2.6 Polymer Solutions and Polyelectrolytes : A single ideal chain, mean-squared end to-end distance, radius of gyration. Gaussian chain, Freely jointed chain. Worm-like chain and persistence length. Excluded volume, solvent quality and theta-temperature. Size of a polymer in dilute solutions : osmotic pressure, light scattering and intrinsic viscosity, Polyelectrolytes : Debye-Huckle theory, Donnan equilibrium and manning condensation. Dynamics of polymeric liquids: Maxwell model. Scaling laws based on Rouse theory, Zimm theory and reptation theory. Polymer Gels: Classes of gels and theory of gelation.

Reference Books:
1. Nanoparticles and Nanostructured Films: Preparation, Characterization, and Applications, Ed. J.H. Fendler, (Willey-VCH, New York, 1998)
2. Fundamental properties of Nanostructured Materials, Eds. D. Fiorani (World Scientific, Singapore, 1994)
3. Advanced Catalysts and Nanostructured Materials: Modern Synthetic Mthods, Ed. W.R. Moser (Academic, San Diago, 1996)

Advanced Coordination Chemistry

A. Advanced Coordination Chemistry 25 hrs.

Chemistry of Sigma donor and pi-acceptor complexes. Ligand field and molecular orbital theories. Term diagrams in octahedral, tetrahedral and lower symmetries. Electronic dipole selection rules, band intensities, factors influencing band widths. Dichroism studies. Charge transfer spectra. Calculation of ligand field parameters. Magnetic properties of coordination compounds, basic equations of magnetic susceptibility, diamagnetism, paramagnetism, ferromagnetism and antiferromagnetism, temperature independent. paramagnetism and electron delocalisation, effect of zero field splitting. ESR and NMR studies of paramagnetic complexes.

Text/References
1. R.S.Drago, Physical Methods for Chemists, W.B. Saunders Co., 1992.
2. B.N.Figgis, Introduction to Ligand Fields, Wiley Eastern, 1976.
3. A.B.P. Lever, Inorganic Electronic Spectroscopy, Elesevier, 1968.

Molecular Bio-Organic Chemistry

1.New paradigm in synthesis: Rational synthetic design, convergent and divergent strategies, multi-component and Domino reactions, atom economy, high-throughput synthesis, substrate and reagent-controlled asymmetric synthesis.
2.New paradigm in synthetic approaches: Green strategies, biocatalysis and solvent engineering, microwave and soon-chemistry, non-conventional reaction media (room temperature ionic liquids, super critical fluids, florous phase, super-heated steam), template-driven synthesis.

3.New paradigm in functional targets : Design and synthesis of functional molecules/molecular assemblies, non-covalent interactions, electro-magnetic & photoactive organics, organic-inorganic hybrids, organic memory systems for medicinal and separation sciences.

Reference Books

1. Zhu, J. and Bienayme, H.(Eds.) Multi component Reactions. Wiley-VCH Verlag GmbH & Co. 2005.
2. Jung, G. Combinatorial Chemistry: Synthesis, Analysis, Screening, Wiley, 1999.
3. Bannworth, W. and Felder, E. Combinatorial Chemistry: A Practical Approach. Wiley, 2000.
4. Stephenson, G.R. Advanced Asymmetric Synthesis. Chapman & Hall, 1996.

■

Pages (1-12)

Center for Basic Sciences
(CBS)
SCHEME OF EXAMINATION
&
COURSE STRUCTURE
Of
SEMESTER IX and X

M.Sc. Integrated (Chemistry Stream)

UNDER

FACULTY OF SCIENCE

EFFECTIVE FROM JANUARY 2020

Center of Basic Science
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Chemistry
Pt. Ravishankar Shukla University, Raipur (C.G.)

14.02.2020 14/02/2020. 14/2/2020 14/2/2020 14/2 (1)

CENTER FOR BASIC SCIENCES
Pt. Ravishankar Shukla University, Raipur

5-Year Integrated M.Sc. Chemistry
Under the
Faculty of Sciences

SEMESTER-X (CHEMISTRY STREAM)

SEMESTER –X

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
CE1001	Elective I	[3 + 2]	5
CE1002	Elective II	[3 + 2]	5
CE1003	Elective III	[3 + 2]	5
CE1004	Elective IV	[3 + 2]	5
		Total	20

Note- Any four papers out of the available seven papers (mentioned in the syllabus) shall be in operation on availability of the instructors with more than 50% of students opting for them.

CE1- Environmental Chemistry

Unit-I

Scope: Environmental pollution, structure of atmosphere, biogeological cycles – oxygen, nitrogen, carbon, phosphorous, sulphur ; biodistribution of elements, air pollutions - reactions in atmosphere, primary pollutants, air quality standards, analysis of CO, nitrogen oxides, sulphur oxides, hydrocarbons and particulate matter, particulate pollution - control methods, vechicular pollution, green house effect and global warming, climatic changes, ozone, photochemical smog, acid rain, sampling, monitoring & control.

Unit-II

Hydrosphere: Water pollution, hydrological cycle, chemical composition, sea water composition, water quality criteria for domestic and industrial uses, BIS and WHO standards, ground water pollution, surface water pollution - lake and river water, eutrophication, marine pollution, water pollutants - biodgradeability of detergents – pestisides - endosulfan and related case studies.

Unit-III

Classification of industrial waste waters: Principles of water and waste water treatment - aerobic and anaerobic treatment, industrial waste water treatment, heavy metal pollution, hard water - softening - purification of water for drinking purposes, water treatment for industrial use, electrodialysis, reverse osmosis, other purification methods, chemical speciation of elements.

Unit-IV

Water analysis: Color, odor, conductivity, TDS, pH, acidity, alkalinity, chloride, residual chlorine, hardness, trace metal analysis, elemental analysis, ammonia, nitrite, nitrate, fluoride, sulphide, phosphate, phenols, surfactants, BOD, COD, DO, TOC, nondispersive IR spectroscopy, anode stripping, ICP, AES, Chromatography, ion selective electrodes, neutron activation analysis.

Unit-V

Soil pollution: Soil humus, soil fertility, inorganic and organic components in soil, acid, base and ion exchange reactions in soils, micro and macro nutrients, wastes and pollutants in soil, introduction to geochemistry, solid waste management, treatment and recycling soil analysis, radioactive pollution, disposal of radioactive waste.

References:

1. H. Kaur, Environmental Chemistry, 6th Edn, Pragathi Prakashan, Meerut, 2011.
2. K.H.Mancy and W,.J.Weber Jr. Wiley, Analysis of Industrial Waste Water, Interescience New York, 1971.
3. L.W. Moore and E. A. Moore, Environmental Chemistry, McGraw Hill Publication, New York, 2002.
4. S. M. Khopkar, Environmental Pollution Analysis, New Age International (P) Ltd, 1993.
5. Colid Baird. Environmental Chemistry, W. H. Freemand and Company, 1995.

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CE2- Inorganic Rings, Cages and Clusters

Unit-I

Main group clusters: Geometric and electronic structure, three - four and higher connect clusters, the closo-, nido-, arachno- borane structural paradigm, Wade-Mingos and Jemmis electron counting rules, clusters with nuclearity 4-12 and beyond 12. Structure, synthesis and reactivity.

Unit-II

Transition metal clusters: Low nuclearity metal carbonyl clusters and 14n+2 rule, high nuclearity metal carbonyl clusters with internal atoms, structure, synthesis and reactivity - capping rules.

Unit-III

Isobal analogy: Heteronuclear clusters - carboranes and heteroboranes, metal clusters - structural prediction of organometallic clusters, main group transition metal clusters: Isolobal analogs of p-block and d-block clusters - interstitial systems - cubanes and zintl clusters.

Unit-IV

Inorganic homo- & heterocycles: Synthesis, structure and reactivity - structural variety & properties of borazins and phosphazenes, borides, carbides, silicides, nitrides, phosphides, oxides and sulphides of transition elements, multiple bonds and cluster variety of transition metals.

Unit-V

Inorganic rings and polymers: Definition, variety and merits, P, Si, S, N, & O based polymers, poly-phosphazenes, poly-thiazenes, poly-siloxanes and poly-silanes.

References:

1. D. M. P. Mingos and D. J. Wales, Introduction to Cluster Chemistry, Prentice Hall, 1990.
2. N. N. Greenwood and E. A. Earnshaw, Chemistry of Elements, Pergaman Press, 1984.
3. I. Haiduc & D. B. Sowerby (Eds.), Inorganic Homo-and Heterocycles Vols. 1 & 2, Academic Press, 1987. 4. J. E. Mark, R. West & H. R. Allcock, Inorganic Polymers, Academic Press, 1992.
5. T. P. Fehlner, J. F. Halet and J-Y. Saillard, Molecular Clusters: A Bridge to Solid-State Chemistry, Cambridge University Press, 2007.
6. P. Braunstein, L. A. Oro, P. R. Raithby, Ed. Metal Clusters in Chemistry, John Wiley and sons, 1999.
7. T. Chivers, I. Manners, Inorganic Rings and Polymers of the p-Block Elements, from Fundamentals to Applications, RSC Publishing, 2009.

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CE3- Medicinal Chemistry

Unit-I

Introduction: History of medicinal chemistry, general mechanism of drug action on lipids, carbohydrates, proteins and nucleic acids, drug metabolism and inactivation, receptor structure and sites, drug discovery development, design and delivery systems, gene therapy and drug resistance.

Unit-II

Classification: Drugs based on structure or pharmacological basis with examples, synthesis of important drugs such as α - methyl dopa, chloramphenicol griseofulvin, cephelosphorins and nystatin. Molecular modeling, conformational analysis, qualitative and quantitative structure activity relationships.

Unit-III

General introduction to antibiotics: Mechanism of action of lactam antibiotics and non lactam anti biotics, antiviral agents, chemistry, stereochemistry, biosynthesis and degradation of penicillins - An account of semisynthetic penicillins, acid resistant, penicillinase resistant and broad spectrum semisynthetic penicillins.

Unit-IV

Elucidation of enzyme structure: Mechanism, kinetic, spectroscopic, isotopic and stereochemical studies. Chemical models and mimics for enzymes, design, synthesis and evaluation of enzyme inhibitors.

Unit-V

Interactions: DNA-protein interaction and DNA-drug interaction. Introduction to rational approach to drug design, physical and chemical factors associated with biological activities, mechanism of drug action.

Recommended books:

1. I. Wilson, Giswald and F. Doerge, Text Book of Organic Medicinal and Pharmaceutical Chemistry, J.B. Lippincott Company, Philadelphia, 1971.
2. A. Burger, Medicinal Chemistry, Wiley Interscience, New York, Vol. I and II, 1970.
3. Bentley and Driver's Text Book of Pharmaceutical Chemistry revised by L.M. Artherden, Oxford University Press, London, 1977.
4. A. Gringauz, Introduction to Medicinal Chemistry, How Drugs Act and Why?, John Wiley and Sons, 1997.
5. G. L. Patrick, Introduction to Medicinal Chemistry, Oxford Univeristy Press, 2001.

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CE4- Nanochemistry and Nanoscience

Unit-I

Introduction to nanoscience and nanotechnology: Underlying physical principles of nanotechnology, Nanostructured Materials, Size is Everything: Fundamental physicochemical principles; size dependence of the properties of nanostructured matter, quantum confinement, single electron charging, the central importance of nanoscale morphology, Societal aspects of nanotechnology: Health, environment, hype and reality.

Unit-II

The advent of the nanomaterial: Top down and bottom up approaches to building materials, Properties of nanomaterials such as nanoparticles, carbon nanotubes, Overview of selfassembly, Inert gas condensation, arc discharge, RF plasma, plasma arc technique, ion sputtering, laser ablation, laser pyrolysis, ball milling, molecular beam epitaxy, chemical vapour deposition method and electro deposition.

Unit-III

The basic tools of nanotechnology: Scanning electron microscopy (SEM), TEM and EDAX analysis and X-ray diffraction, A brief historical overview of atomic force microscopy (AFM) and an introduction to its basic principles & applications, Optical microscope and their description, operational principle and application for analysis of nanomaterials, UV-VIS-IR spectrophotometers, Principle of operation and application for band gap measurement.

Unit-IV

Metal nanoparticles: Size control of metal nanoparticles and their characterization, study of their properties, optical, electronic, magnetic. Surface plasmon band and its applications, role in catalysis, alloy nanoparticles, stabilization in sol, glass, and other media, change of band gap, blue shift, colour change in sol, glass, and composites, plasmon resonance.

Unit-V

Carbon nano structures: Introduction, Fullerenes, C60, C80 and C240 nanostructures, Properties & applications (mechanical, optical and electrical); Functionalization of carbon nanotubes, reactivity of carbon nanotubes, Nanosensors: Temperature sensors, smoke sensors, sensors for aerospace and defense. Accelerometer, pressure sensor, night vision system, nano tweezers, nano-cutting tools, integration of sensor with actuators and electronic circuitry biosensors.

Recommended books:

1. T. Pradeep, Nano: The Essentials, Tata McGraw-Hill, New Delhi, 2007.

2. G. Cao, Nanostructures and Nanomaterials – Synthesis, Properties and Applications, Imperial College Press, London, 2004, chapters 3, 4 and 5.

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3. C. N. R.Rao, A. Muller and A. K. Cheetham, The Chemistry of Nanomaterials, Volume 1, Wiley –VCH Verlag GmbH & Co. KgaA, Weinheim, 2004, Chapter 4

CE5- Surface Chemistry

Unit-I

Surface and Interface Chemistry: Classifications, micellization, CMC and its determination. Shape and structure of micelles, effect of additives on micellization, thermodynamics of micellization, solubilization and applications, effect of electrolytes on solubilization. Macro and micro emlusions, dispersion and aggregation of solids by surfactants.

Unit-II

Membranes and their applications: Artificial and natural membranes, Donnan membrane equilibrium, transport of electrolytes, membrane potential and ion selective electrodes.

Unit-III

Adsorption on solids and porous materials: Model for multilayer adsorption, BET isotherm and application to different types of adsorbents, adsorption by porous, non-porous and microporous solids, Estimation of specific surface area and pore size distribution.

Unit-IV

Colloid systems and their properties: Origin of the charges, electro-kinetic phenomena, electrophoresis, electroosmosis, sedimentation and streaming potential. The concept of electrical double layer and various models to explain its structure and properties, DLVO theory and stability of colloids. Smoluchowski theory of kinetics of coagulation and distribution of colloids aggregates. Organic and inorganic gels and clay colloids.

Unit-V

Methods to detect interfacial phenomena: Principle and instrumentation of ATR-FTIR spectroscopy, SFG Spectroscopy.

Recommended books:

1. Hunter, R.J., *"Foundation of colloid Science"*, Oxford University,Press,2009
2. Lyklema,J., *"Fundamentals of Interface and Colloid Science"*,Academic press San Diego,2000
3. Adamson, A.W., *"Physical Chemistry of Surface"*,5th Ed.,Jhon Wiley and Sons, NewYork, 1990
3. Kruyt, H.R., *"Colloid Chemistry"* Vol. □ and □. Elsevier Press,1991
4. Gerg, S.J. and Singh, K.S.W., *"Adsorption, Surface Area and Porosity"*, 2nd Ed., Academic Press.,U.K. 1982.

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CE6- Heterocyclic Chemistry

Unit-I

Introduction to Heterocycles: Nomenclature (Hantzsch Widman System), spectral characteristics, reactivity and aromaticity of monocyclic, fused and bridged heterocycles.

Unit-II

Nonaromatic heterocycles: Different types of strains, interactions and conformational aspects on nonaromatic heterocycles. Synthesis, reactivity, and importance of the following ring systems. Azirines, Oxaranes, Thiiranes, Diazirenes, Diaziridines, Azetidines.

Unit-III

Five and six-membered heterocycles with two hetero atoms: Synthesis, reactivity, aromatic character and importance of the following heterocycles: Pyrazole, Imidazole, Oxazole, Thiazole, Pyrimidine, Pyrazine, Oxazine, and Thiazine.

Heterocycles with more than two hetero atoms: Synthesis, reactivity, aromatic character and importance of the following heterocycles: Triazoles, Oxadiazoles, Thiadiazoles, Triazines.

Unit-IV

Larger ring and other heterocycles: Synthesis and reactivity of Azepines, Oxepines and Thiepines. Synthesis and rearrangement of Diazepines. Synthesis of Benzoazepines, Benzodiazepines, Benzooxepines, Benzothiepines, Azocines, and Azonines.

Unit-V

Banzanellated azoles and dipolar structures: Banzanellated azoles: Synthesis and reactivity of Benzimidazoles, Benzoxazoles and Benzothiazoles. Heterocyles with Ring-Junction nitrogen: Synthesis and reactivity of Quinolizines, Indolizines and Imidazopyridines. Heterocycles with Dipolar structures: Betaines. Formation, aromaticity and reactivity of pyridine-N-oxides and pyridinium imides. Mesoionic heterocycles: Synthesis and aromaticity of sydnones and 1,3-dipolar addition reaction of mesoionic heterocycles.

Recommended books:

1. Heterocyclic Chemistry, T. L. Gilchrist.
2. An Introduction to the Chemistry of Heterocyclic compounds, R. M. Acheson.
3. Heterocylic chemistry, J. A. Joule & K. Mills.
4. Principals of Modern Heterocyclic Chemistry, A. Paquette.
5. Heterocyclic Chemistry, J. A. Joule & Smith.
6. Handbook of Heterocyclic Chemistry, A. R. Katritzky

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CE7- Advanced Polymer Chemistry

Unit-I

Properties of commercial polymers Polyethylene, polyvinyl chloride, polyamides, polyesters, phenolic resins, epoxy resins and silicone polymers. Functional polymers – Fire retarding polymers and electrically conducting polymers, Bio-medical polymers – contact lens, dental polymers, artificial heart, kidney, skin and blood cells

Unit-II

Polymer Additives: Role of additives in polymers, Fillers, plasticizers, anti-oxidants and stabilizers, Flame-retardants, colourants.

Unit-III

Natural polymers: Cellulose: Cellulose nitrate, cellulose acetate. viscose rayon, starch, silk, Rubber and modified rubber.

Unit-IV

Polymer supported reagents in organic chemistry: Preparation and application of polymer supported catalysts, acids, bases, phase transfer catalysts, transition metal complexes etc. Polymer supported reagents and polymer supported protecting groups including "Solid Phase" peptide synthesis.

Unit-V

Polymer Degradation and Stabilization: Types of degradation – Physical and chemical degradation.

Types of Physical degradation: a)Thermal degradation b) Photodegradation and stabilization c) Mechanical degradation.

Types of Chemical degradation: a) Solvolytic degradation b) hydrolytical degradation c) Oxidative degradation and stabilization d) biodegradation.

Recommended books:

1. Text book of Polymer science ; F.w.Billmeyer J.Willey
2. Polymer science, V.R.Gowarikar, N.V.Vishwanathan and J.Sreedhar, Wiley Eastern
3. Principles of Polymerization, George Odian III.Ed.
4. Organic Polymer Chemistry, K.J.Saunders
5. Polymer Chemistry, Golding
6. Principles of Polymer Chemistry, Flory
7. Physical Chemistry of Macromolecules, D.D.Deshpande, Vishal Publications,1985
8. Functional monomers and polymers, K.Takemoto, V.Inaki and R.M.Ottanbrite
9. Contemporary polymer chemistry, H.R.alkock and F.W.Lambe, Prentice Hall
10. Physics and Chemistry of polymers, J.M.G.Cowie, Blackie Academic and Professional.

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Center for Basic Sciences
(CBS)
SCHEME OF EXAMINATION
&
COURSE STRUCTURE
of
M.Sc. Integrated (Physics Stream)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Physics

EFFECTIVE FROM JULY 2015

Center of Basic Science
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Course structure for the M. Sc. (Integrated) Physics Stream
July, 2015

(B: **B**iology, C: **C**hemistry, M: **M**athematics, P: **P**hysics, G: **G**eneral, H: **H**umanities, BL: **B**iology **L**aboratory, CL: **C**hemistry **L**aboratory, PL: **P**hysics **L**aboratory, GL: **G**eneral **L**aboratory, PE: **P**hysics **E**lective, PPr: **P**hysics **Pr**oject)

FIRST YEAR

SEMESTER –I

Subject Code	**Subject**	**Contact Hours / Week Theory+Tutorials**	**Credits**
B101	Biology – I	[2 + 1]	3
C101	Chemistry – I	[2 + 1]	3
M100/101	Mathematics – I	[2 + 1]	3
P101	(A) Physics – I (PCM Stream)	[2 + 1]	3
	(B) Physics-I (Biology Stream)		
G101	Computer Basics	[2 + 1]	3
H101	Communication Skills	[2 + 1]	3
		Contact Hours /Week Laboratory	
BL101	Biology Laboratory – I	[4]	1
CL101	Chemistry Laboratory – I	[4]	2
PL101	Physics Laboratory – I	[4]	2
GL101	Computer Laboratory	[4]	2
			25

(25 of 240 credits)

SEMESTER –II

Subject Code	**Subject**	**Contact Hours /Week Theory+Tutorials**	**Credits**
B201	Biology – II	[2 + 1]	3
C201	Chemistry – II	[2 + 1]	3
M200/201	Mathematics – II	[2 + 1]	3
P201	Physics – II (PCM & Bio Stream)	[2 + 1]	3
G201	Electronics and Instrumentation	[2 + 1]	3
G202	Glimpses of Contemporary Science	[2 + 1]	3
		Contact Hours /Week Laboratory	
BL201	Biology Laboratory – II	[4]	1
CL201	Chemistry Laboratory – II	[4]	2
PL201	Physics Laboratory – II	[4]	2
GL201	Electronics Laboratory	[4]	2
			25

(50 of 240 Credits)

SECOND YEAR

SEMESTER –III

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
P301	Mathematical Physics – I	[3 + 1]	4
P302	Classical Mechanics – I	[3+ 1]	4
P303	Electromagnetism	[3 + 1]	4
P304	Waves and Oscillations	[3 + 1]	4
H301	World Literature	[2 + 0]	2
H302	History and Philosophy of Science	[2 + 0]	2
		Contact Hours / Week Laboratory	
PL301	Physics Laboratory – III	[6]	3
GL301	Applied Electronics Laboratory	[4]	2
			25

(75 of 240 Credits)

SEMESTER –IV

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
P401	Mathematical Physics – II	[3 + 1]	4
P402	Quantum Mechanics – I	[3+ 1]	4
P403	Statistical Mechanics – I	[3 + 1]	4
PCB401	Physical and Chemical Kinetics	[3 + 1]	4
G401	Statistical Techniques and Applications	[3+ 1]	4
		Contact Hours / Week Laboratory	
PL401	Physics Laboratory – IV	[6]	3
GL401	Computational Laboratory and Numerical Methods	[4]	2
			25

(100 of 240 Credits)

THIRD YEAR
SEMESTER –V

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
P501	Quantum Mechanics – II	[3 + 1]	4
P502	Classical Mechanics – II	[3+ 1]	4
P503	Atomic and Molecular Physics	[3 + 1]	4
PM501	Numerical Analysis	[3 + 1]	4
G502	Earth Science and Energy & Environmental Sciences	[3+ 1]	4
		Contact Hours / Week Laboratory	
PL501	Physics Laboratory – V	[6]	3
PML501	Numerical Methods Laboratory	[4]	2
			25

(125 of 240 Credits)

SEMESTER –VI

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
P601	Electrodynamics	[3 + 1]	4
P602	Nuclear Physics – I	[3+ 1]	4
P603	Condensed Matter Physics – I	[3 + 1]	4
P604	Lasers	[3 + 1]	4
P605	Nonlinear Dynamics and Chaos	[3+ 1]	4
H601	Ethics of Science and IPR	[2+ 0]	2
		Contact Hours / Week Laboratory	
PL601	Physics Laboratory – VI	[6]	3
			25

(150 of 240 Credits)

FOURTH YEAR
SEMESTER –VII

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
P701	Fluid Mechanics	[3 + 1]	4
P702	Quantum Mechanics – III	[3+ 1]	4
P703	Statistical Mechanics – II	[3 + 1]	4
P704	Reactor Physics and Radiation Science	[3 + 1]	4
		Contact Hours / Week Laboratory	
PL701	Advanced Physics Laboratory – I	[8]	5
PPr701	Reading Project		4
			25

(175 0f 240 Credits)

SEMESTER –VIII

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
P801	Astronomy and Astrophysics	[3 + 1]	4
P802	Accelerator Physics and Applications	[3+ 1]	4
P803	Nuclear and Particle Physics	[3 + 1]	4
P804	Condensed Matter Physics – II	[3 + 1]	4
		Contact Hours / Week Laboratory	
PL801	Advanced Physics Laboratory – II	[8]	5
PPr801	Project		4
			25

(200 of 240 Credits)

SEMESTER- IX

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
PPr901	Project		20

20
(220 of240 Credits)

SEMESTER- X

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
PE1001	Quantum Field Theory	[3 + 1]	4
PE1002	Non-equilibrium Statistical Mechanics	[3+ 1]	4
PE1003	Advanced Mathematical Physics	[3 + 1]	4
PE1004	General Relativity and Cosmology	[3 + 1]	4
PE1005	Experimental Techniques	[3+1]	4
PE1006	Biophysics	[3+1]]	4
PE1007	Quantum Computing and Information	[3+1]	4
PE1008	Disordered Systems	[3+1]	4
PE1009	Particle Physics	[3+1]	4
PE1010	Computational Electrodynamics	[3+1]	4

Min. 16
(240 of 240 Credits)

***Subject to availability of instructors and minimum number of interested students offering a course. The course structure for the above mentioned elective papers will be provided by the respective instructor.**

SEMESTER- I

P101: (B) Physics-I (Classical Physics): (For Biology Stream)

UNIT- I

Concepts of energy and mass, Linear kinematics and dynamics. Concept of force: Conservative and non-conservative forces, Friction. Conservation of momentum, energy, and angular momentum. Work-energy theorem, Centre of mass.

UNIT- II

Moment of inertia. Rotational kinematics and dynamics, Rigid body motion. Impulse and collisions, Central forces, Kinetic theory of gases, Equipartition of energy.

UNIT- III

Free oscillations in one, two, and many degrees of freedom. Linearity and superposition principle. Normal modes; Transverse and longitudinal modes. General notion of a continuous string; Resonance; Coupled pendula and oscillators, Normal coordinates.

UNIT- IV

Probability (chance, fluctuations, random walk, probability distribution, Matter wave, Wave Packet, De-Brogle's theory, uncertainty principle); Curvilinear Coordinates.

UNIT- V

Vector calculus (differentiation and integration, gradient, divergence, curl, Green's theorem, Gauss' theorem, Stokes' theorem); Fourier series (an introduction).

Suggested texts and References:

1. "The Feynman lectures in Physics" volume 1, by R. P. Feynman, R. B. Leighton, M. Sands.
2. "An introduction to mechanics", by D. Kleppner and R. Kolenkow.
3. "Mechanics", by Charles Kittel, Walter D. Knight and Malvin A. Ruderman, Berkeley Physics Course Volume 1.
4. "Waves", by F. S. Crawford, Berkeley Physics Course Volume 3.

P101: (A) Physics – I (For Physics, Chemistry and Mathematics Stream)

UNIT- I

Mechanics: Energy, mass and momentum – evolution of the concepts and definitions. Newton's three laws of mechanics; conservative forces, potential energy functions; Conservation of mechanical energy, linear momentum and angular momentum; Applications to athletics; harmonic oscillator, inverse square law force; Kepler's laws.

UNIT- II

Elementary dynamics of rigid bodies: moment of inertia, angular momentum, rotational kinetic energy, displacement and rotation of rigid bodies. Friction, illustrations of non conservative forces. Impulse, elastic and inelastic collisions, Poisson's hypothesis, deformation energy, Karate punch. Dimensional analysis via examples illustrating Buckingham Pi theorem.

UNIT- III

Thermodynamics and kinetic theory: Thermodynamics: Basic notions of thermodynamics; Macroscopic equilibrium, quasistatic processes, reversible processes; Equation of state; Zeroth law; First law for closed systems; Notion of heat, work and internal energy; Notion of state variable and path.

UNIT- IV

Exact and inexact differentials; Ideal gas and Van der Waal's gas equation, some examples of non – pV systems (qualitative); Second law (Kelvin – Planck and Clausius statements); Carnot cycle; Entropy formulation of Second law; Third law (statement); Thermodynamic potentials.

UNIT- V

Kinetic theory: Kinetic theory of ideal gas; Kinetic interpretation of temperature; Adiabatic reversible compression; Boltzmann factor; Derivation of Maxwell's velocity distribution; Average, *rms* and most probable speed; Elementary theory of transport processes (viscosity, thermal conducting and diffusion coefficient); Failure of classical physics.

Suggested texts and References:

1. Mechanics, Berkeley Physics Course Vol. 1, 2nd Edition, C. Kittel *et al.*, Tata McGraw – Hill Education, 2011.
2. An Introduction to Mechanics, 1st Edition, D. Kleppner and R. J. Kolenkow, Tata McGraw – Hill Education, 2007
3. Thermodynamics, Kinetic theory and Statistical Thermodynamics, 3rd Edition, F. W. Sears and G. L. Salinger, Narosa Publishing House, 1998.
4. Heat and Thermodynamics, 8th Edition, M. W. Zemansky and R. H. Dittman, Tata McGraw – Hill Education, 2011.
5. University Physics, 7th Edition, Francis W. Sears, Mark Zemansky and Hugh D. Young, Massachusetts: Addison Wesley, 1987.
6. Mechanics, D. S. Mathure
7. Thermal Physics, B. K. Agrawal
8. A Treaties on Heat, M. N. Saha and B. N. Shrivastav.
9. Physics: Structure and Meaning L. N. Cooper University press of New England, 1992
10. Fundamentals of Physics, 8th Edition David Halliday, Robert Resnick & Walker New Jersey: John Wiley, 2 2008
11. Mechanics 3rd Edition Keith R. Simon Massachusetts: Addison Wesley Pub. Co., 1987

PL101: Physics Laboratory – I

Introduction to experimental physics – conceptual and procedural understanding, planning of experiments; Plots (normal, semi-log, log-log); uncertainty / error in measurements and uncertainty / error analysis. Introduction to measuring instruments – concepts of standards and calibration; determination of time periods in simple pendulum and coupled strip oscillator system with emphasis on uncertainty in the measurements and accuracy requirements; study of projectile motion – understand the timing requirements; determination of surface tension of a liquid from the study of liquid drops formed under the surface of a glass surface; determination of Young's modulus of a strip of metal by double cantilever method (use of travelling microscope); study of combination of lenses and nodal points and correspondence to a thick lens; study of thermal expansion of metal – use of thermistor as a thermometer; measurement of small resistance of a

wire using Carey- Fosterbridge and determine electrical resistivity of the wire; study of time dependence of charging and discharging of capacitor using digital multimeter – use of semi-log plot.

Suggested Texts and References:

1. Advanced Practical Physics for Students, B. L. Worsnop and H. T. Flint, Methuen and Co. Ltd., London

SEMESTER-II

P201: Physics – II (For Physics, Chemistry and Mathematics Stream) & (For Biology Stream)

UNIT- I

Electricity and Magnetism: Electrostatics: Coulomb's law and Gauss' law; Electrostatic potential, uniqueness theorem, method of images; Electrostatic fields in matter; Conductors and insulators; Capacitors and capacitance; Electric current.

UNIT- II

Magnetostatics: Biot – Savart law, Ampere's law; Electromagnetic induction; Mutual inductance and self inductance; Magnetic fields in matter. Displacement current; Maxwell's equations; Alternating current circuits; Electric and magnetic properties of matter.

UNIT- III

Plane electromagnetic waves in vacuum; Polarisation; Energy and momentum in electromagnetic waves; electromagnetic radiation (qualitative); Dipole radiation formula; Larmor's formula for radiation due to accelerated charge (without proof); Synchrotron radiation (descriptive).

UNIT- IV

Optics: Interference of two beams and involving multiple reflections; Young's experiment, Fresnel's biprism, Lloyd's mirror.

UNIT- V

Optical instruments; Telescope and microscopes; Magnifying power and resolving power. Sources of light and spectra; Dispersion, polarisation, double refraction; Optical activity.

Suggested texts and References:

1. Electricity and Magnetism, Berkeley Physics Course Vol. 2, 2nd Edition, Edward M. Purcell, Tata McGraw Hill, 2011.
2. The Feynman Lectures on Physics Vol. 2, R. P. Feynman, R. B. Leighton and M. Sands, Narosa Publications, 2010.
3. The Feynman Lectures on Physics Vol. 3, R. P. Feynman, R. B. Leighton and M. Sands Narosa 2010.
4. Waves, Berkeley Physics Course Vol. 3, Frank S. Crawford, Tata McGraw – Hill, 2011.
5. Fundamentals of Optics, 4th Edition, F. A. Jenkins and H. E. White, Tata McGraw Hill, 2011.
6. University Physics, 7th Edition, Francis W. Sears, Mark Zemansky and Hugh D. Young, Massachusetts: Addison Wesley, 1987.
7. Optics , 4th Edition Eugene Hecht Massachusetts: Addison Wesley
8. "Foundations of Electromagnetic Theory 4th edition, "John R. Reitz, Fredrick Milford & RobertChrist" Massachusetts: Addison Wesley, 1993

9. Fundamentals of Optics 4th Edition Francis A. Jenkins and Harvey E. White "New York Mc Graw Hill Book Company Inc. 2001"
10. Optical Physics 3rd Edition "Stephen G. Lipson, Henry Lipson & D. S. Tannhauser" New York Cambridge University Press 1995
11. Fundamental of Optics 4th Edition Francis A. Jenkins and Harvey E. White Tata Mc Graw Hill 2011.
12. Introduction to Electrodynamics 3rd Edition David J. Grifiths New Jersey: Prentice hall

PL201: Physics Laboratory – II

Review of uncertainty / error analysis; least squares fit method; introduction to sensors / transducers; determination of 'g' (acceleration due to gravity) by free fall method; study of physical pendulum using a PC interfaced apparatus – study variation of effective 'g ' with change of angle of plane of oscillation - investigation of effect of large angle of oscillation on the motion; study of Newton's laws of motion using a PC interfaced apparatus; study of conservation of linear and angular momentum using 'Maxwell's Wheel' apparatus; study of vibrations of soft massive spring; study of torsional oscillatory system; study of refraction in a prism - double refraction in calcite and quartz; study of equipotential surface using different electrode shapes in a minimal conducting liquid medium; determination of electrical inductance by vector method and study effect of ferromagnetic core and study the effect of non-linearity of inductance with current.

Suggested Texts and References:

1. Advanced Practical Physics for Students, B. L. Worsnop and H. T. Flint, Methuen and Co. Ltd., London

SEMESTER-III

P301: Mathematical Physics – 1

UNIT- I

Review of first order differential equations, the notion of Wronskian and its properties, Series solutions of second order differential equations, Frobenius method. Rodrigues formula and classical orthogonal polynomials, recurrence relations, symmetry properties, special values, orthogonality, normalisation.

UNIT- II

Generating functions. Legendre, Hermite, Laguerre, Bessel and Hypergeometric differential equations. Integral representations of special functions. Expansion of functions in orthonormal basis.

UNIT- III

Complex variables: Notion of analyticity, Cauchy – Riemann conditions, Harmonic functions; Contour integrals, Cauchy theorem, simply and multiply connected domains, Cauchy integral formula, derivatives of analytic functions.

UNIT- IV

Laurent series, uniform convergence; Notion of residues, residue theorem, notion of principal values, applications of residues to evaluation of improper integrals, definite integrals, indentation, branch points and branch cuts.

UNIT- V

Fourier series and simple applications. Fourier transforms, Parseval's theorem, convolution, and their simple applications. Laplace transforms, initial value problems, simple applications, transients in circuits, convolution.

Suggested Texts and References:

1. Complex Variables and Applications, R. V. Churchill and J. W. Brown, McGraw-Hill, 2009
2. Complex Variables: Introduction and Applications, 2nd Edition, M. J. Ablowitz and A. S. Fokas, Cambridge 2003
3. Differential Equations, G. F. Simmons, McGraw-Hill, 2006
4. Ordinary Differential Equations, V. I. Arnold, MIT Press 2009
5. Mathematical Methods for Physicists, 7th Edition, G. Arfken and Hans J. Weber, Elsevier 2012

P302: Classical Mechanics – I

UNIT- I

Recap- Newton's laws, vector algebra, gradient; momentum, energy, constraints, conservative forces, potential energy, angular momentum. Inertial and non – inertial frames, fictitious forces.

UNIT- II

Foucault pendulum, effects of Coriolis force. Central forces, conservation of energy and angular momentum, trajectories, orbits, 1/r potential (quadrature), classical scattering, two body problem, centre of mass and relative motions.

UNIT- III

Rigid body motion, moment of inertia tensor, energy and angular momentum, Euler's theorem, motion of tops, gyroscope, motion of the Earth. Introduction to Lagrangian through variational principle, applications of variational principle.

UNIT- IV

Relativity: Historical background, inconsistency of electrodynamics with Galilean relativity. Einstein's hypothesis and Lorentz transformation formula, length contraction, time dilation.

UNIT- V

Doppler shift. Energy, momentum and mass, mass – energy equivalence. Four vector notation, consistency of electrodynamics with relativity.

Suggested texts:

1. An Introduction to Mechanics, 1st Edition, D. Kleppner and R. J. Kolenkow, Tata McGraw – Hill Education, 2007
2. Classical Mechanics, 5th Edition, T. W. B. Kibble, F. Berkshire, World Scientific 2004.
3. Introduction to Special Relativity, R. Resnik, Wiley (India), 2012
4. Spacetime Physics, 2nd Edition, E. F. Taylor, J. A. Wheeler, W. H. Freeman and Co. 1992.
5. Classical mechanics, N. C. Rana, P. S. Joag, Tata McGraw-Hill Education, 2001.

P303: Electromagnetism

UNIT- I

Electrostatics: Coulomb's law, Electric field, Gauss' law in differential and integral forms, Scalar potential, Poisson and Laplace equations, Discontinuities in Electric field and potential: electrostatic boundary conditions, Uniqueness theorem, conductors and second uniqueness theorem, method of images, multipole expansion, work and energy in electrostatics.

UNIT- II

Electric Fields in matter: dielectrics, polarisation, bound charges, notion of electric displacement, Gauss' law in presence of dielectrics, boundary conditions, linear dielectrics: susceptibility, permittivity, dielectric constant, boundary value problems, energy in dielectric systems.

UNIT- III

Magnetostatics: Lorentz force law, steady currents, Biot – Savert law, Ampere's law, vector potential, magnetostatic boundary conditions, multipole expansion for vector potential, magnetic scalar potential. Diamagnets, paramagnets and ferromagnets, magnetisation, bound currents, the H field, boundary conditions, magnetic susceptibility and permeability.

UNIT- IV

Electrodynamics: Electromotive force, electromagnetic induction and Faraday's law, induced electric fields and inductance, energy in magnetic fields. Maxwell's equations: equation of continuity and Modification in Ampere's law, Gauge transformations, Lorentz and Coulomb gauge. Maxwell's equations in matter, integral and differential forms, boundary conditions.

UNIT- V

Poynting's theorem, conservation of momentum, angular momentum. Lossy media, Poynting's theorem for lossy media. Wave equation, electromagnetic waves in vacuum, plane waves, propagation in lossless and lossy linear media, absorption and dispersion, reflection at the interface of two lossy media, guided waves.

Suggested Texts and References:

1. Introduction to Electrodynamics, 4th Edition, D. J. Griffiths, Addison-Wesley 2012
2. Classical Electricity and Magnetism, 2nd Edition, W.K.H. Panofsky and M. Phillips, Dover 2005.
3. Engineering Electromagnetics, 2nd Edition, Nathan Eda, Springer 2007

P304: Waves and Oscillations

UNIT- I

Free oscillations, Simple harmonic motion, damped and forced oscillations; Coupled oscillators, normal modes, beats, infinite coupled oscillators and dispersion relation of sound; vibrating string; travelling and stationary waves; Amplitude, phase and energy. Derivation of wave equation for a string; Longitudinal and transverse waves.

UNIT- II

Waves in two and three dimensions, the wave vector, wave equation, linearity, superposition, Fourier decomposition of a wave, notion of wave packets, phase and group velocity. Example of mechanical waves (sound waves), speed of sound in air, effect of bubbles, natural observations and qualitative explanations.

UNIT- III

String and wind instruments. Chaldni plates. Propagation in changing media, continuity conditions, characteristic impedance. Snell's laws and translation invariant boundary, prism, total internal reflection, evanescent waves. Water waves, ocean waves, Tsunami.

UNIT- IV
Electromagnetic waves, polarisation, interference.

UNIT- V
Fraunhofer diffraction. Shocks waves, boat wakes, linear analysis of the Kelvin wake. Alfven waves (qualitative).

Suggested Texts and References:
1. Waves, Berkeley Physics Course Vol. 3, Frank S. Crawford, Tata McGraw – Hill Education, 2011
2. Introduction to the Physics of Waves, Tim Freegarde, Cambridge Univ. Press 2012
3. The Physics of Waves, Howard Georgi (http://www.people.fas.harvard.edu/~hgeorgi/new.htm)

H301: Introduction to World Literature
What is Literature? - a discussion; Introduction to literary terms, genres, and forms of various periods, countries, languages, etc. The Novel: Class study of 'Brave New World' by Aldous Huxley; Group discussions and student presentations on other genres such as the graphic novel, detective fiction, children's literature, etc. Plays: Introduction to the history of theatre, class study of (mainly) two plays: 'Pygmalion' by G. B. Shaw and 'Fire and Rain' by Girish Karnad, the setting up of play – reading group through which the students can be introduced to several other plays. Poetry: Brief introduction; Study of poetic genres, forms, topics, figures of speech, poetic language etc. by analysing various poems from around the world. Short stories, essays and other types of writing by various authors. Screening of films based on literary works, such as Pygmalion (My Fair Lady), Fire and Rain (Agnivarsha), Persepolis (a graphic novel) and a few others.

H302: History and Philosophy of Science
History of World Science up to the Scientific Revolution: Introduction about stone age, beginning of agriculture, urban civilization and science. Science in Sumeria, Babylonia and Egypt. Natural philosophy of pre-Socratic Greece. Natural philosophy in Athens. Greek science in the Alexandrian period. Rome and decline of Ancient European science. Science and technology in China. Science and technology in the Muslim world. Technology and the craft tradition in medieval Europe. The scholarly tradition during the middle ages. Renaissance, the Copernican system of the world. Gilbert, Bacon and the experimental method. Galileo and the science of mechanics. Descartes – the mathematical method and the mechanical philosophy. The Protestant reformation and the scientific revolution. Newton –the theory of universal gravitation and optics. Alchemy and iatrochemistry. Medicine, theory of circulation of blood. Growth and characteristics of the scientificrevolution.

History of Ancient Indian Science: Indian civilization from pre-historic times to the Indus Valley Civilization. Ancient Indian mathematics and astronomy. Ancient Indian medicine and biology. Chemistry, metallurgy and technology in general in ancient India. Strengths, weaknesses and potentialities of ancient Indian science.

Introduction to Philosophy of Science: What is science? Scientific reasoning; Explanation in science; Realism and instrumentalism; Scientific change and scientific revolutions.

Great Scientific Experiments: Group wise study and presentations by students of historically significant experiments in science.

Suggested Texts and References:

1. A History of the Sciences, Stephen F. Mason, Collier Books, Macmillan Pub. Co. (1962)
2. A Concise History of Science in India, D. M. Bose, S. N. Sen, B. V. Subbarayappa, INSA (1971)
3. Philosophy of Science – A Very Short Introduction, Samir Okasha, Oxford Univ Press (2002)
4. Great Scientific Experiments – Ron Harre, Oxford University Press (1983)
5. The Story of Physics, Lloyd Motz and Jefferson Hane Weaver, Avon Books (1992)
6. The Cambridge Illustrated History of World Science, Colin A. Ronan, Cambridge-Newnes (1982)
7. Encyclopaedia of Classical Indian Sciences, Ed. Helaine Selin and Roddam Narasimha, University Press (2007)
1. Articles from Wikipedia on History and philosophy of science

PL301: Physics Laboratory – III

Frequency response of R-C circuit (concept of cut-off freq and filter) and frequency response of LC circuit; concepts of phase difference between voltage and current in these circuits, phase factor for appliances using AC mains supply; R-L-C (series / parallel) resonance; transient response in RL- C series circuit; study of Newton's rings and interference in wedge shaped films; study of double refraction in calcite / quartz prisms, polarisation of the refracted light rays, optical activity in dextrose and fructose; soldering experience – make a gated timer with indicator; measurement of heat capacity of air; Use of thermocouple / platinum resistance thermometer, use of instrumentation amplifier in amplifying signal from thermocouple; study of the laws of a gyroscope; determination of the charge of an electron by Millikan's oil drop experiment.

Suggested Texts and References:

1. Advanced Practical Physics for Students, B. L. Worsnop and H. T. Flint, Methuen and Co. Ltd., London

GL301: Applied Electronics Laboratory

The course is based on the micro-controller system expEYES and 'Microhope' based on ATmega32 micro controller, developed at IUAC, under a UGC programme.

Use of expEYES kit for monitoring pendulum motion, charge and discharge of capacitor etc to appreciate the goal of the course; Revision of concepts of binary numbers: ‘Bit’, ‘Byte’, ‘Word’, hexa-decimal numbers; Concepts of microprocessor and microcontrollers - CPU, registers, memory (RAM, ROM, different kinds of ROM), data and address bus, decoder, encoder, instruction set, etc. Review of concepts of Digital to Analogue Conversion (DAC) and Analogue to Digital Conversion (ADC), Introduction to micro-controller ATmega32 (which is used in expEYES). Concepts of programming, flow chart, assembly language, and simulator. Concept of I/O programming for ATmega32 Examples of simple I/O program in assembly language, assemble it in an assembler in a PC and download the hex code into microcontroller kit 'microhope' through USB port and verify the operation. C language for writing larger programmes, such as monitoring temperature, which uses ADC of ATmega32. Concept of interrupt and its use in real time data acquisition. Introduction to elements of PYTHON language. Concepts of how expEYES system program resident in ATmaga32 is interfaced to commands from PC in Python language; Automated measurement of simple experiments under expEYES, such as, applications such as temperature monitor, pH meter, colorimeter, protein measurement experiments, etc., will be done. As a part of these applications, ntroduction will be given to sensors, such as temperature sensors, pressure sensors, humidity, pH sensors, photodetectors etc, The experiments will also include I/O programme for keypad inputs and LCD display.

Suggested Texts and References:

1. Phoenix: Computer Interfaced Science Experiments, B.P. Ajith Kumar at http://www.iuac.res.in/~elab/phoenix/
2. expEYES micro-controller system B.P. Ajith Kumar at http://www.iuac.res.in/~elab/phoenix/
3. The AVR micro-controller and embedded systems using assembly and C, by A.A. Mazidi, S. Naimi and S. Mnaimi, Pearson Publications, Delhi, 2013.

SEMESTER-IV

P401: Mathematical Physics – II

UNIT-I

Review of curvilinear coordinates, scale factors, Jacobian. Partial differential equations in curvilinear coordinates, classification. Laplace equation, separation of variables, boundary conditions and initial conditions, examples.

UNIT-II

Inhomogeneous equations, Green's functions in 1, 2 and 3 dimensions.

UNIT-III

Tensors calculus: contravariant and covariant notation, Levi-Civita symbol, pseudotensors, quotient rule, dual tensors.

UNIT-IV

Integral equations: Fredholm and Volterra equations, separable kernel, applications. Elementary group theory and group representations, cyclic, permutation groups; isomorphism, homomorphism.

UNIT-V

subgroups, normal subgroup, classes and cosets; orthogonal, rotation group, Lie group; equivalent, reducible, irreducible; Schur's lemma.

Suggested Texts and References:

1. Mathematical Methods for Physicists, 7th Edition, G. Arfken and Hans J. Weber, Elsevier 2012
2. Mathematics for Physicists, P. Dennery and A. Krzywicki, Dover 1996
3. Mathematics for Quantum Mechanics, 4th Edition, J. D. Jackson, Dover 2009.
4. Elements of Group Theory for Physicists, A. W. Joshi
5. Lectures on Groups and Vector Spaces for Physicists, C. J. Isham, World Scientific 1989
6. Group Theory and Its Application to Physical Problems, M. Hemmermesh, Dover 1989
6. Elements of Green's Functions and Propagation, G. Barton, Oxford 1989

P402: Quantum Mechanics – 1

UNIT- I

Origins of quantum theory (short version); Wave – particle duality, wave packets, uncertainty relation; Time dependent and time independent Schrödinger equation; Interpretative postulates; Hermitian operators, eigenfunctions and eigenvalues; nodal lines and domains; Orthonormality and completion.

UNIT- II

Energy and momentum eigenfunctions; Illustrative one dimensional phenomena (short revision if done in an earlier semester) rigid box; square well and barrier; Linear harmonic oscillator (detailed treatment).

UNIT- III

Abstract vector space formulation of quantum mechanics; Hilbert space, Dirac notation; Hermitian and unitary operators, momentum space representation; Schrödinger and Heisenberg pictures; Linear Harmonic oscillator (matrix theory).

UNIT- IV

Schrödinger equation for a central potential; Orbital angular momentum eigenfunctions (spherical harmonics) and eigenvalues; Bound state solution of Schrödinger equation for Coulomb potential, Hydrogen atom orbits and energies, degeneracy; Electron spin; Addition of two angular momenta, Clebsch – Gordon coefficients.

UNIT- V

Approximation methods: stationary perturbation theory (non – degenerate and degenerate); Stark effect; Zeeman effect; Time dependent perturbation theory; Harmonic perturbations, transition probability (Fermi's golden rule).

Suggested Texts and References:

1. Introduction to Quantum Mechanics, 2nd Edition, D. J. Griffiths, Pearson Education 2008.
2. Quantum Mechanics, 3rd Edition, L. I. Schiff, Tata McGraw-Hill 2010.
3. Quantum Mechanics I and II, Claud Cohen Tannoudji, B. Diu and F. Laloe, Wiley 2006
4. Lectures on Quantum Mechanics, S. Weinberg, Oxford University Press 2012.

P403: Statistical Mechanics – I

UNIT- I

Elementary probability theory; random walk; binomial, Poisson, log normal distributions; the Gaussian. Kinetic theory of gases.

UNIT- II

Ensembles; micro-canonical ensemble; canonical ensemble; grand canonical ensemble. Partition functions and their properties; calculation of thermodynamic quantities; Gibbs paradox; the equipartition theorem.

UNIT- III

Two level system and paramagnetism. Validity of the classical approximation; identical particles and symmetry; quantum distribution functions; Bose-Einstein statistics; Fermi-Dirac statistics;

UNIT- IV

Quantum Statistics in the classical limit; physical implications of the quantum-mechanical enumeration of states; conduction electrons in metals.

UNIT- V

Special topics: the Chandrasekhar Limit; Saha Ionization formula. Systems of interacting particles; Debye approximation; van der Waals equation; Weiss molecular-field approximation

Suggested Texts and References:

1.Thermodynamics and an Introduction to Thermostatistics, 2nd Edition, H. B. Callen, Wiley 2006
2. Fundamentals of Statistical and Thermal Physics, F. Reif, McGraw-Hill Book Company
3. Statistical Physics part 1, 3rd Edition, L. D. Landau and E. M. Lifshitz, Elsevier 2008
4. Statistical Mechanics: A Set of Lectures, R. P. Feynman, W. A. Benjamin, Inc. 1998
5. A Modern Course in Statistical Physics, L. E. Reichl, Wiley 2009

PCB 401: Physical and Chemical Kinetics

UNIT- I

Basic Concepts: Rate, order and molecularity of a reaction, First, second and third order reactions – effect of concentration on reaction rate, rate expressions and integrated form, pseudo-unimolecular and second order autocatalytic reactions, nth order reaction of a single component, effect of temperature on reaction rate – Arrhenius equation and activation energy.

UNIT- II

Complex Reactions: parallel first order reactions, series first order reactions – determination of rate constants by graphical method and the time ratio method. The stationary state, radioactive decay, general first order series and parallel reactions. Competitive, consecutive second order reactions, reversible reactions, equilibrium from the kinetic view point, complex mechanisms involving equilibria.

UNIT- III

Kinetic Measurements: Experimental determination of reaction rates and order of reactions – correlation of physical properties with concentrations, reactions in the phase, reactions at constant pressure, fractional-life period method, initial rate as a function of initial concentrations.

UNIT- IV

Reactions in Solutions: General Properties, Phenomenological theory of reaction rates, Diffusion limited rate constant, Slow reactions, Effect of ionic strength on reactions between ions, Linear free energy relationships, Relaxation methods for fast reactions.

UNIT- V

Catalysis: Homogeneous catalysis in gas phase, in solution, basis of catalytic action, catalysis and the equilibrium constant, acid base catalysis, The Bronsted catalysis law, linear free energy changes, general and specific catalysis. Heterogeneous catalysis. Negative catalysis and inhibition, Surface reactions – effect of temperature and nature of surface. Industrial catalysis.

Suggested Texts and References:

1. Chemical Kinetics : A Study of Reaction Rates in Solution, K.A. Connors, V.C.H. Publications 1990.
2. Chemical Kinetics and Dynamics, J.I. Steinfeld, J.S. Francisco and W.L. Hase, Prentice Hall 1989.
3. Chemical Kinetics and reaction dynamics, Paul L. Houston.
4. Chemical Kinetics, 3rd ed., K.J.Laidler, Harper and Row, 1987.
5. Kinetics and Mechanisms, J.W. Moore and R.G. Pearson, John Wiley and Sons, 1981.
6. Kinetics and Mechanism, A. A. Forst and R. G. Pearson, Wiley International Edition.

7. Chemical Kinetics and Reaction Dynamics, Sanjay K. Upadhay, Springer, 2006

G401: Statistical Techniques and Applications

UNIT- I

Purpose of Statistics, Events and Probabilities, Assignments of probabilities to events, Random events and variables, Probability Axioms and Theorems. Probability distributions and properties: Discrete, Continuous and Empirical distributions. Expected values: Mean, Variance, Skewness, Kurtosis, Moments and Characteristics Functions.

UNIT-II

Types of probability distributions: Binomial, Poisson, Normal, Gamma, Exponential, Chi-squared, Log-Normal, Student's t, F distributions, Central Limit Theorem.

UNIT- III

Monte Carlo techniques: Methods of generating statistical distributions: Pseudorandom numbers from computers and from probability distributions, Applications. Parameter inference: Given prior discrete hypotheses and continuous parameters, Maximum likelihood method for parameter inference. Error Analysis: Statistical and Systematic Errors, Reporting and using uncertainties.
Propagation of errors, Statistical analysis of random uncertainties, Averaging Correlated/ Uncorrelated Measurements.

UNIT- IV

Deconvolution methods, Deconvolution of histograms, binning-free methods. Least-squares fitting: Linear, Polynomial, arbitrary functions: with descriptions of specific methods; Fitting composite curves. Hypothesis tests: Single and composite hypothesis, Goodness of fit tests.

UNIT- V

P-values, Chi-squared test, Likelihood Ratio, Kolmogorov- Smirnov test, Confidence Interval. Covariance and Correlation, Analysis of Variance and Covariance. Illustration of statistical techniques through hands-on use of computer programs.

Suggested Texts and References:

1.Statistics: A Guide to the Use of Statistical Methods in the Physical Sciences, R.J. Barlow, John Wiley 1989
2. The Statistical Analysis of Experimental Data, John Mandel, Dover Publications 1984
3. Data Reduction and Error Analysis for the Physical Sciences, 3rd Edition, Philip Bevington and Keith Robinson, McGraw Hill 2003

PL401: Physics Laboratory – IV

Application of PHOENIX (IUAC, New Delhi) microcontroller system for automation in 20 experiments (six sessions); study of acoustic resonance in Helmholtz resonator using PHOENIX system; Resolving power of optical grating; study of atomic spectra in hydrogen, helium, mercury; Application of gamma counts from detected by G.M. counter for study of Poisson and Gaussian distributions; study of black body radiation by optical and thermal thermal radiations; study of electrically coupled oscillators – normal and transient response. Assembling components for an experiment on thermal and electrical conductivity of metals and making of measurements.

Suggested Texts and References:

1. Phoenix: Computer Interfaced Science Experiments – http://www.iuac.res.in/~elab/phoenix/
2. The Art of Experimental Physics, D. W. Preston and D. R. Dietz, Wiley 1991

3. Manual of Experimental Physics with Indian Academy of Sciences, Bangalore kit, R. Srinivasan and K.R.S. Priolkar

GL401: Computational Laboratory and Numerical Methods
GNU Plot, FORTRAN90, Pointers and Object Oriented Programming

I. The nature of computational physics: Machine representation, precision and errors in computation. Errors and uncertainties. E.g. One should understand how to analyze whether a calculation is limited by the algorithm or round-off error. Single/double precision.

II. Basic tools for numerical analysis in science: Solution of algebraic functions – Fixed point method, Newton-Raphson method, Secant method. Numerical Integration – Rectangular method, trapezoidal method. Lagrange's interpolation.

III. Matrix Algebra: Approximate solution of a set of linear simultaneous equations by Gauss-Sidel iteration method. Exact solution by Gaussian elimination. Inversion of a matrix by Gaussian elimination. Determining all the eigenvalues of a real symmetric matrix by Householder's method of tridiagonalization followed by QR factorization of the tridiagonalized matrix.

IV. Differential Equations (ODE and PDE): Solution of an ODE by Euler's method and Runge-Kutta (4) method – comparison of convergence Solution of partial differential equation (Laplace's equation and Poisson's equation) – Boundary Value Problem – solved using Gauss-Sidel iteration followed by plotting using GNUPlot

V. Nonlinear Systems, dynamics: Fractals – generating the Mandelbrot set and Julia sets. Definition of each. Solution of nonlinear set of ODEs – Lorenz equations – Observation and definition of strange attractor and sensitive depencence upon initial conditions (butterfly effect). Study of the logistic map – non linear dynamical system – obtaining a bifurcation diagram and estimating Feigenbaum's constant.

VI. Fourier analysis of nonlinear systems: Getting used to programming using FFT subroutines. Understanding the relationship between time-domain and frequency domain. Transforming a Gaussian, understanding how temporal FWHM and spectral FWHM are related. Solving a nonlinear PDE which is amenable to solution by multiple steps of FFTs.

SEMESTER-V

P501: Quantum Mechanics – II

UNIT- I
Collision theory: Scattering cross section; Scattering by spherically symmetric potential; Differential cross section, phase shift; Scattering by rigid sphere; Born approximation.

UNIT- II
Path integral formulation of quantum mechanics; The WKB approximation, solution near a turning point, the connection formulas; Tunnelling through a barrier; The adiabatic approximation.

UNIT- III
Variational method, expectation value of energy, application to excited states, ground state of He-atom, Zero point energy of one dimensional harmonic oscillator, Vander-waals interaction.

UNIT- IV

Foundations (Introductory ideas): The EPR paradox, quantum entanglement; Bell's theorem, the No-clone theorem, Schrodinger's cat; Decoherence, quantum Zeno paradox.

UNIT- V

Symmetry in quantum mechanics; Translation, rotation and space inversion operators; Identical particles; Symmetrical and anti-symmetrical wave functions; Spin – statistics connection (empirical); Density matrix; Equation of motion of density matrix.

Suggested Texts and References:

1. Introduction to Quantum Mechanics, 2nd Editon, D. J. Griffiths, Pearson Education 2008.
2. Quantum Mechanics, 3rd Edition, L. I. Schiff, Tata McGraw-Hill 2010.
3. Quantum Mechanics I and II, Claud Cohen Tannoudji, B. Diu and F. Laloe, Wiley 2006
4. Lectures on Quantum Mechanics, S. Weinberg, Oxford University Press 2012.

P502: Classical mechanics – II

UNIT-I

Variational principle (revisited), Lagrangian formulation, constraints, generalised coordinates, applications. Hamilton's equations of motion (from Legendre transformation), Hamiltonian and total energy, cyclic coordinates, variational principle.

UNIT-II

Small oscillations, single oscillator, damped and forced oscillations, coupled oscillators, normal modes.

UNIT-III

Canonical transformations, Poisson brackets, conservation theorems.

UNIT-IV

Hamilton – Jacobi theory, action – angle variables. Canonical perturbation theory, time dependent and time independent.

UNIT-V

Lagrangian formulation of continuous media as a limiting case, extensions.

Suggested Texts and References:

1. Classical mechanics, N. C. Rana, P. S. Joag, Tata McGraw-Hill Education, 2001.
2. Mechanics, L. D. Landau, E. M. Lifshitz, Elesevier 2005.
3. Regular and Chaotic Dynamics, 2nd Edition, A. J. Lichtenberg, M. A. Lieberman, Springer 1992.
4. Classical mechanics, 3rd Edition, H. Goldstein, C. P. Poole, J. Safko, Pearson Education 2011.

P503: Atomic and Molecular Physics

UNIT- I

Many – electron atoms: One – electron wavefunctions and energies in Coulomb potential (revision); Atomic orbitals, spin – orbit coupling, Thomas precession, fine structure; Alkali atoms; Helium ground state and excited states, direct and exchange integrals; Many – electron atoms: LS and jj coupling schemes; Hartree – Fock method; Pauli's principle and the Periodic Table; Nuclear spin and hyperfine structure.

UNIT- II

Atoms in External Fields: Quantum theory of normal and anomalous Zeeman effect, Linear and quadratic Start effect; Semi – classical theory of radiation; Absorption and induced emission; Einstein's A and B coefficients, dipole approximation, intensity of radiation, selection rules.

UNIT- III

Two level atom in a coherent radiation field, Rabi frequency, radiative damping, optical Bloch equation, Broadening of spectral lines (Doppler, pressure and power broadening).

UNIT- IV

Lasers: Basic concepts, rate equation and lasing conditions, working of some common lasers. Doppler free laser spectroscopy; Crossed – beam method, saturated absorption spectroscopy, two photon spectroscopy; Laser cooling and trapping (descriptive); Atom interferometry (descriptive).

UNIT- V

Molecules: Ionic and covalent bonding, Hydrogen molecular ion (H2 +), Born – Oppenheimer approximation; Bonding and anti – bonding orbitals, Hydrogen molecule; Heitler – London method, Molecular orbital method, hybridisation, quantum mechanical treatment of rotational and vibrational spectra (diatomic and polyatomic molecules); Electronic spectra, Raman effect (classical and quantum theory); Vibrational and rotational Raman spectra; Electron spin resonance.

Suggested Texts and References:

1. Atomic Physics, Christopher Foot, Oxford University Press, 2005.
2. Intermediate Quantum Mechanics, 3rd Edition, H. A. Bethe and R. W. Jackiew, Persius 1997
3. The Physics of Atoms and Quanta: Introduction to Experiments and Theory, H. Haken, H. C. Wolf and W. D. Brewer, Springer 2005
4. Molecular Physics and Elements of Quantum Chemistry: Introduction to Experiments and Theory, H. Haken, H. C. Wolf and W. D. Brewer, Springer 2010.

PM501: Numerical Analysis

UNIT- I

Error, its sources, propagation and analysis; Errors in summation, stability in numerical analysis. Linear algebraic equations: Gaussian elimination, direct triangular decomposition, matrix inversion.

UNIT- II

Rootfinding: review of bisection method, Newton's method and secant method; real roots of polynomials, Laguerre's method. Matrix eigenvalue problems: Power method, eigenvalues of real symmetric matrices using Jacobi method, applications.

UNIT-III

Interpolation theory: Polynomial interpolation, Newton's divided differences, forward differences, interpolation errors, cubic splines. Approximation of functions: Taylor's theorem, remainder term; Least squares approximation problem, Orthogonal polynomials.

UNIT- IV

Numerical integration: review of trapezoidal and Simpson's rules, Gaussian quadrature; Error estimation. Numerical differentiation. Monte Carlo methods.

UNIT- V

Least squares problems: Linear least squares, examples; Non – linear least squares. Ordinary differential equations: stability, predictor – corrector method, Runge – Kutta methods, boundary value problems, basis expansion methods, applications. Eigenvalue problems for differential equations, applications. Solutions of PDE's using differential quadrature: elementary treatment. Applications to diffusion equation, wave equation, etc.

Suggested Texts and references:

1. An introduction to Numerical Analysis, 2nd Edition, Kendall Atkinson, Wiley 2012
2. Numerical Methods for Scientists and Engineers, H. M. Antia, Hindustan Book Agency 2012.
3. Numerical Receipes in Fortran, 2nd Edition, W. H. Press *et al.*, Cambridge University Press 2000.

G501: Earth Science and Energy & Environmental Sciences

Earth Science

Origin of the earth, type of rocks in different layers, their physical and chemical properties, mechanism of their formation and destruction. Radioactivity and its role in geochronology, Plate tectonics and geodynamics and the role of mantle plumes in sustaining these processes. Gravity, electrical and magnetic properties of the different layers in the earth. Their variations in different geological terrains. Instrumentation, field procedures used in these studies. Response of the earth to the elastic (Seismic) and electromagnetic waves, use of this phenomena to study the earth's interior. Geodynamo and the internal magnetic field of the earth. Paleomagnetic studies, Polar wandering and reversal, possible theoretical arguments for understanding the phenomena. Seismology and its use in understanding of the different layers in the earth's interior. Utility of the different geophysical techniques (discussed above) in exploration for academic as well as for harnessing resources.

Suggested Texts and references:

1. The magnetic field of the Earth, Merill, R.T. McElhinny, M.W. and McFadden, P.L. International Geophysical Series.
2. Earth Science by Edward J. Tarbuck, E.J. and Lutgens, F.K.
3. Introduction to Applied Geophysics: Exploring the Shallow Subsurface Burger, H.R., Sheehan, A.F., C.H.
4. Mantle Plumes and Their Record in Earth History, Condie, K.C., 2001, Cambridge University Press, Cambridge, UK

1. Applied Geophysics (Paperback) W M Telford, Robert E Sheriff and L P Geldart.

Energy and Environmental Sciences

Introduction to Environmental Science. Natural Environments: Ecosystems and ecology, biodiversity. Socio-cultural environments: demography, population density, human rganizations. Land use and its planning. Global climate change and effects on environment. Carbon cycle from human activity, calculation of carbon budgets. Water harvesting, storage and treatment. Natural calamities, hazards, and effects of human activity: Chemical and other technological hazards. Various case studies of natural calamities and human-induced disasters. Causes, effects, forecasting, preparedness, planning measures, technological solutions, social interventions. Concept of sustainability, individual and social, and local and global actions for a sustainable future. Introduction to energy Sources - evolution of energy sources with time. Power production, per capita consumption in the world, and relation to development index. Energy scenario in India: Various issues related to consumption and demands -energy crisis issues in India. Renewable and

non-renewable energy sources - technology and commercialization of energy sources, local (decentralized) versus centralized energy production, constraints and opportunities of renewable energy (hydrocarbon and coal based energy sources). Energy conservation – calculation of energy requirements for typical and home and industrial applications. Alternative to fossil fuels - solar, wind, tidal, geothermal. Bio-based fuels. Hydrogen as a fuel. Energy transport and storages, comparison of energy sources - passage from source to delivery (source, production, transport, delivery) - efficiencies, losses and wastes. Nuclear energy: Power production: Components of a reactor and its working, types of reactors and comparison. India's three stage nuclear program. Nuclear fuel cycle. Thorium based reactors. Regulations on nuclear energy.

Energy and Environmental Sciences

1. Energy in Perspective, J. B. Marion, University of Maryland, Academic Press, (1974)
2. Energy and Environment, Robert A. Ristinen and Jack J. Kraushaar, 2nd Edn., John Wiley and Sons, Inc. (2006).
3. Renewable Energy, Boyle Godfrey, Oxford University Press (2004)
4. Environment, Problems and Solutions, D.K. Asthana and Meera Asthana, S.Chand and Co.(2006)
5.Text Book on Environmental Chemistry, Balaram Pani, I.K.International Publishing House(2007).

PL501: Physics Laboratory – V

Study of diffraction by single slit, double slit and multiple slits leading to grating, quantitative determination and compare with simulation; Study of Michelson interferometer and determination of refractive index of air; study of Fabry-Perot interferometer; Study of Zeeman effect using Fabry- Perot Interferometer; study of characteristics of scintillation counter used in nuclear radiation detection; study of Hall effect in semiconductors; Introduction to Labview software for automation and use of NI data acquisition card in PC (six sessions).

Suggested Texts and references:

1. The Art of Experimental Physics, D. W. Preston and D. R. Dietz, Wiley 1991

PML501: Numerical Methods Laboratory

The methods developed in Numerical Analysis (P501) are to be implemented on a computer. Emphasis to be given on applications to physical problems.

Suggested Texts and references:

1. Numerical Receipes in Fortran, 2nd Edition, W. H. Press *et al.*, Cambridge University Press 2000
2. An Introduction to Computational Physics, 2nd Edition, Tao Pang, Cambridge University Press 2010

SEMESTER-VI

P601: Electrodynamics

UNIT- I

Review of Maxwell's equations, vector and scalar potentials, gauge transformations.
Radiating systems: electric dipole fields and radiation, magnetic dipole and electric quadrupole fields, antenna, spherical wave solutions of the scalar wave equation.

UNIT- II

Multipole expansion of the electromagnetic fields, energy and angular momenta of multipole radiation, angular distribution of multipole radiation, multipole moments, multipole radiation in atoms and nuclei, multipole radiation from linear centre fed antenna.

UNIT- III

Scattering and Diffraction problems: scattering at long wavelength, perturbation theory of scattering, explaination of blue sky (due to Rayleigh), scalar diffraction theory.

UNIT- IV

Covariant formulation of electrodynamics: four vector potential, electromagnetic field tensor, covariant description of sources in material media, field equations in a material medium. Retarded potentials, Jefimenko's generalisations of Coulomb and Biot – Savert laws, Lienard – Wiechert potentials.

UNIT- V

Fields of a moving charge. Cerenkov radiation. Covariant formulation of the conservation laws of electrodynamics.

Suggested Texts and References:

1. Introduction to Electrodynamics, 4th Edition, D. J. Griffiths, Addison-Wesley 2012
2. Classical Electricity and Magnetism, 2nd Edition, W.K.H. Panofsky and M. Phillips, Dover 2005.
3. Classical Electrodynamics, 3rd Edition, J. D. Jackson, Wiley 2012
4. Lectures on Electromagnetism, 2nd Edition, Ashok Das, Hindustan Book Agency 2013.

P602: Nuclear Physics – I

UNIT- I

Nuclear Properties: Size – nuclear radius, charge distribution, matter distribution. Mass- binding energy, liquid drop model/mass formula. Spin, Parity, isospin. Electromagnetic moments-magnetic dipole and electric quadrupole moments/nuclear shapes.

UNIT- II

Nuclear stability, alpha, beta, gamma decays, fission. Experimental methods for size, mass, spin, moments to be included.

UNIT-III

Nuclear Forces: Nuclear interaction, saturation of nuclear density, constancy of binding energy per nucleon. Bound two nucleon system, Deuteron problem, absence of bound pp, nn. N-N scattering – as a function of energy, phase shift, cross section. Salient features of nuclear force. Yukawa's theory of nuclear interaction (basics).

UNIT- IV

Nuclear Structure: Magic numbers, shell model, spin orbit interaction, deformed shell model. Nuclear excited states vibration, rotation, Collective model. Electromagnetic interactions in nuclei: multipole transitions, selection rules, life times, electron capture, internal conversion, isomers, Coulomb excitation.

UNIT- V

Nuclear Reactions: Kinematics, Q value, excitation energy, conservation laws, cross section, mean free path. Types of nuclear reactions, experimental observables, excitation function, angular distribution, spectra. Compound nuclear reactions, Resonances, level density, temperature, Bohr model. Direct nuclear reactions, optical model, pick up and stripping reactions, spectroscopic factor Nuclear fission and fusion reactions.

Suggested Texts and References:

1. Introductory Nuclear Physics, K.S. Krane, Wiley 2008
2. Concepts of Nuclear Physics, B. L. Cohen, McGraw Hill 1971
3. Introductory Nuclear Physics, S. S. M. Wong, Prentice – Hall 2010
4. Introduction to Nuclear and Particle Physics, 2nd Edition, A. Das and T. Ferbel, World Scientific 2004

P603: Condensed Matter Physics – I

UNIT- I

Crystal Structure and x-ray diffraction: Crystalline and amorphous solids, translational symmetry. Elementary ideas about crystal structure, lattice and bases, unit cell, reciprocal lattice, fundamental types of lattices, Miller indices, lattice planes, simple cubic, f.c.c. and b.c.c. lattices. Simple crystal structures, Closed packed structure, Determination of crystal structure with X-rays, Neutrons and Electron diffraction-Diffraction of waves by crystals, Laue and Bragg equations, Brillouin Zones, Fourier Analysis of the basis. Debye waller factor, X ray broadening -size and temperature effects. X-ray diffraction of liquids and disordered solids- introduction to radial distribution functions.

UNIT- II

Lattice Vibrations: Elastic waves, Thermal properties: Einstein's and Debye's theories of specific heats of solids, Thermal conductivity, Phonons, Lattice waves, Dynamics of a chain of similar atoms and chain of two types of atoms; optical and acoustic modes; Inelastic scattering of x-rays, neutrons and light by phonons, Optical properties of solids: interaction of light with ionic crystals. Raman scattering and Brillouin scattering.

UNIT- III

The Free electron model: Drude Model, Electon conductivity, Heat capacity of conduction electrons, Fermi surface, Sommerfield model, Thermal conductivity of metals, Hall effect, AC conductivity and optical properties, Wiedemann-Franz law, Failure of the Free-electron model, optical properties of metals.

UNIT- IV

Basics of Semiconductors and device: Crystal structure, Band structure, Intrinsic and extrinsic semiconductors, Concept of majority and minority carriers, Energy gap, Mobility, conductivity, Hall effect, Diffusion, Optical properties: Absorption, Luminescence, Photoconductivity, effect of disorder on absorption. Interpretation of energy band diagrams. Devices: p-n diode (derivation of Shockley equation), tunnel diode, photodiode, solar cell, LED, Lasers.

UNIT- V

Superconductivity: Introduction (Kamerlingh Onnes experiment), effect of magnetic field, Type-I and type-II superconductors, Isotope effect. Meissner effect. Heat capacity. Energy gap. Electrodynamics of superconductivity: London's equation, Thermodynamics of the transition, Intermediate state of Type 1, Mixed state of type 2, Flux Quantization, Salient points of BCS theory, Cooper problem, Definition of coherence length, Josephson effect

Suggested Texts and References:

1. Elementary Solid State Physics, M. Ali Omar, Pearson Education 2008.
2. Introduction to Solid State Physics, 8th Edition, C. Kittel, Wiley 2012.
3. Solid State Physics, N. W. Ashcroft and N. D. Mermin, Cengage 2003.
4. Physics of Semiconductor Devices, 3rd Edition, S. M. Sze and K. K. Ng, 2007.
5. Introduction to Superconductivity, A. C. Rose -Innes, E. H. Rhoderik, Pergamon Press
6. Solid State Physics, J. P. McKelvey, Krieger Publishing Co. 1993.
7. Electron theory of solids, J. M. Ziman, Cambridge University Press, 2011.

P604: Lasers

Unit- I

Laser Characteristics –Spontaneous and stimulated emission, Einstein's quantum theory of radiation, theory of some optical processes, coherence and monochromacity, kinetics of optical absorption, line broadening mechanism, Basic principle of lasers, population inversion, laser pumping, two & three level laser systems, resonator, Q-factor, losses in cavity, threshold condition, quantum yield.

Unit – II

Laser Systems- Solid state lasers- the ruby laser, Nd:YAG laser, ND: Glass laser, semiconductor lasers – features of semiconductor lasers, intrinsic semiconductor lasers, Gas laser -neutral atom gas laser, He-Ne laser, molecular gas lasers, CO2 laser, Liquid lasers, dye lasers and chemical laser.

Unit-III

Advances in laser Physics, Production of giant pulse -Q-switching, giant pulse dynamics, laser amplifiers, mode locking and pulling, Non-linear optics, Harmonic generation, second harmonic generation, Phase matching, third harmonic generation, optical mixing, parametric generation and self-focusing of light.

Unit – IV

Multi-photon processes; multi-quantum photoelectric effect, Theory of two-photon process, three- photon process, second harmonic generation, parametric generation of light, Laser spectroscopy : Rayleigh and Raman scattering, Stimulated Raman effect, Hyper-Raman effect, Coherent anti-stokes Raman Scattering, Photo-acoustic Raman spectroscopy.

Unit – V

Laser Applications – ether drift and absolute rotation of the Earth, isotope separation, plasma, thermonuclear fusion, laser applications in chemistry, biology, astronomy, engineering and medicine.

Communication by lasers: ranging, fiber Optics Communication, Optical fiber, numerical aperture, propagation of light in a medium with variable index, pulse dispersion.

TEXT AND REFERENCE BOOKS:

1. Laud, B.B.: Lasers and nonlinear optics, (New Age Int.Pub.1996).
2. Thyagarajan, K and Ghatak, A.K.: Lasers theory and applications (Plenum press, 1981).
3. Ghatak, A.K.and Thyagarajan, K : Optical electronics (Cambridge Univ. Press 1999).
4. Seigman, A.E.: Lasers (Oxford Univ. Press 1986)
5. Maitland, A. and Dunn, M.H. : Laser Physics (N.H.Amsterdam, 1969).
6. Hecht, J.The laser Guide book (McGraw Hill, NY, 1986).

7. Demtroder, W. : Laser Spectroscopy (Springe series in chemical physics vol.5,Springe verlag, Berlin, 1981).
8. Harper, P.G.and Wherrett B.S. (Ed.): Non-linear-optics (Acad.press, 1977).

P605: Nonlinear Dynamics and Chaos

UNIT-I

Dynamical Systems, phase portraits, vector fields, nullclines, flows, discrete dynamical systems, 1-d maps. Fixed points, linearization of vector fields, canonical forms, generalized eigenvectors, semisimple – nilpotent decomposition, Jordan canonical form.

UNIT-II

Classification of fixed points. Hartman -Grobman theorem, homeomorphism, Stable Manifold Theorem, Centre Manifold Theorem, examples of manifolds. Index theory, Lyapunov functions and stability analysis, Limit cycles, Poincare-Benedixon Dynamical Systems, phase portraits, vector fields, nullclines, flows, discrete dynamical systems, 1-d maps, Fixed points.

UNIT-III

Linearization of vector fields, canonical forms, generalized eigen vectors, semisimple-nilpotent decomposition, Jordan canonical form, classification of fixed points. Hartman-Grobman theorem, homeomorphism, Stable Manifold Theorem, Centre Manifold Theorem, examples of manifolds. Index theory, Lyapunov functions and stability analysis, Limit cycles, Poincare-Benedixon Theorem. Gronwall's inequality.

UNIT-IV

The Variational Equation, exploring neighbourhoods, Lyapunov exponents, Monodromy matrix, Floquet exponents. Bifurcations: Saddle-Node, Transcritical, Pitchfork and Hopf Bifurcation. 1-d maps, linear stability of fixed points and higher order fixed points, chain rule, lyapunov exponent, bifurcation diagram, finding period-n orbits in 1-d maps. 2-d maps, Linearization, the Henon map.

UNIT-V

Poincare surface of section. Symbolic dynamics, Sensitivity to initial conditions, Chaos, Partitions, Transition matrix, Entropies, Smale Horseshoe. Invariant density, the Perron-Frobenius operator. Fractals. Hamiltonian Dynamics.

Suggested Texts and References:

1. Nonlinear Dynamics And Chaos: With Applications To Physics, Biology, Chemistry and Engineering, S. Strogatz, Addison-Wesley 2001
2. Chaos: An Introduction to Dynamical Systems, K.T. Aligood, T.D. Sauer, J.A. Yorke, Springer 2000
3. Differential Equations, Dynamical Systems and an Introduction to Chaos, M. Hirsh, S. Smale and R. Devaney, Elsevier Academic Press, 2012
4. Chaos and Integrability in Nonlinear Dynamics: An Introduction, M. Tabor, John Wiley & Sons,1989
5. Chaos: Classical and Quantum, P. Cvitanovic *et al.*

H601: Ethics of Science and IPR

Introduction to a Collective, Participatory Teaching-learning Program: A Science of Our own. Science Stands the Test of Ethics … Some indicators. Levels of Moral Development - Does it mean anything? Medical Ethics: Different themes pertaining to medical ethics including ethical

issues in public health. History, Philosophy and Psychology of Ethics: History of Political Economy and Modern Ethics. Environmental Ethics.

Intellectual Property Rights and Associated Issues: History of Patenting. Digitalizing Culture-I: Free Software and Free Culture. Digitalizing Culture-II: Concentration and appropriation of Power by the few as well as Possibility of Distributive Justice.

Journals and Publishers: Monopolistic practices by Academic Publishers. Quest for Determining what is Virtuous: Ethics in Practice. Collaborative Projects by the Class. Teaching the Teachers and other Virtuous Inquiries.

PL601: Physics Laboratory – VI

Study of quantum mechanics through acoustic analogue (four sessions); Fourier analysis / synthesis – use of simulation; Study of characteristics of a coaxial cable and determination of speed of electromagnetic waves in the coaxial cable; determination of specific charge (e/m) of electron; Study of Faraday rotation and determination of Verdit's constant in a glass material; investigation of chaos in a spring based coupled oscillator system; Introduction to workshop practice (two sessions); Introduction to vacuum practice (two sessions).

Suggested Texts and References:

1. The Art of Experimental Physics, D. W. Preston and D. R. Dietz, Wiley 1991

Semester-VII

P701: Fluid Mechanics

UNIT-I

Validity of hydrodynamical description. Kinematics of the flow field. Stress-strain relationship. Basic equations governing conservation of mass, momentum & energy.

UNIT-II

Navier-Stokes equation for viscous flows. Shear and bulk viscosity and radiative diffusivity in fluids. Viscous and thermal boundary layers, Potential flows, Water waves. Kelvin's circulation theorem, Stokes's flow Lubrication theory.

UNIT-III

Virial theorem in the tensor form. Magnetohydrodynamic flows. Generalized Ohm's law in the presence of Hall current &Ambipolar diffusion, Magneto-gravity-acoustic modes.

UNIT-IV

Classical hydrodynamic and hydromagnetic linear stability problems: Rayleigh-Taylor and Kelvin- Helmholtz instabilities. Jeans' gravitational instability; Benard convection. Parker instability and magnetic buoyancy. Thermal instability. Non-linear Benard problem.

UNIT-V

Spherical accretion flows onto compact objects and accretion disks. High Speed flow of gases. Shock waves and blast waves. Supernova hydrodynamics. Physiological hydrodynamics. Blood flow in human heart.

Suggested Texts and References:

1. Hydrodynamics, 6th Edition, H. Lamb, Dover 1945
2. An Introduction to Fluid Dynamics, G.K. Batchelor, Cambridge University Press, 2000
3. Fluid Mechanics, 2nd Edition, L.D. Landau and E.M. Lifshitz, Elsevier 1987

4. Magnetohydrodynamics, 2nd Edition, T.G. Cowling, Hilger 1976
5. Introduction to Physics of Fluids and Solids, J. Trefil, Dover 1975.

P702: Quantum Mechanics – III

UNIT- I

Relativistic Equations: Lorentz transformations, covariant notation, Klein – Gordon equation, difficulties with probability interpretation of one – particle K-G equation; Dirac equation; Properties of γ matrices.

UNIT- II

Dirac equation in external electromagnetic field; Non – relativistic reduction; Gyrofactor for spin; Lorentz covariance of Dirac equation; Bilinear covariants.

UNIT- III

Solutions of Dirac equation: Plane wave solutions; Negative energy solutions; Hole theoretic interpretation; Spin; Dirac momentum space spinors; Orthonormality and completeness relations; Projection operators for energy, helicity and spin; Trace theorems; Exact solution of Dirac equation for Coulomb potential; Energy levels of Hydrogen atom in Dirac theory; Fine structure splitting; Relativistic corrections and Lamb shift.

UNIT- IV

Introduction to quantum field theory: Lagrangian field theory, symmetry and conservation laws, Klein – Gordon field (real and complex); Covariant commutators, the K-G propagator; Dirac field; Anti-commutation relations, the Fermion propagator; Electromagnetic field; Covariant quantisation, the photon propagator.

UNIT- V

Feynman rules for QED: Dyson expansion of S – matrix; Feynman diagrams in momentum space, Feynman rules, QED processes in lowest order.

Suggested Texts and References:

1. Relativistic Quantum Mechanics vol. 1: J. D. Bjorken and S. D. Drell, McGraw-Hill 1998
2. Intermediate Quantum Mechanics, H. A. Bethe and R. W. Jackiew, Perseus Books 1997
3. Quantum Field Theory, 2nd Edition, F. Mandl and G. Shaw, Wiley 2010
4. Advanced Quantum Mechanics, F. Schwabl, Springer 2008

P703: Statistical Mechanics – II

UNIT-I

Transport theory using the relaxation time approximation; Boltzmann differential equation formulation; examples of the Boltzmann equation method. Stochastic Processes; Random Walk; Auto-catalytic processes.

UNIT-II

Diffusion equation; Langevin equation; Fokker- Planck equation.

UNIT-III

Ising Model; mean-field theory; Landau theory of second order phase transition; Peierls argument; the Bethe-Peierls approximation; Kramers-Wannier duality argument; Pade Approximant.

UNIT-IV

Phase transition and Critical Phenomenon: critical exponents; exponent inequalities; static scaling hypothesis; block spins and the Kadanoff construction.

UNIT-V

Renormalization Group: Decimation; Migdal-Kadanoff method; general renormalization group prescription; examples. Monte-Carlo Methods in statistical mechanics; Metropolis algorithm; Gilespie method.

Suggested Texts and References:

1. Fundamentals of Statistical and Thermal Physics, F. Reif, McGraw-Hill Book Company
2. Statistical Physics part 1, 3rd Edition, L. D. Landau and E. M. Lifshitz, Elsevier 2008
3. Statistical Mechanics: A Set of Lectures, R. P. Feynman, W. A. Benjamin, Inc. 1998
4. A Modern Course in Statistical Physics, L. E. Reichl, Wiley 2009

P704: Reactor Physics.

UNIT- I

Fission process: Liquid drop model, fission rate, reactor power, prompt and delayed neutrons, fission gammas, fission products energy balance, photo neutrons. fissile, fertile and fissionable materials. Fission product activity and decay heat after shut down.

Interaction of Neutrons with Matter: Production of neutrons and nuclear reactions with thermal and fast neutrons, transmutation.

UNIT- II

Concept of microscopic cross section: Inelastic and elastic scattering, Maxwell-Boltzmann distribution and its departure Variation of cross-section with energy, **f**ast, resonance and thermal ranges. 1/v law of neuron cross-section, Resonance absorption, Doppler effect. Eta vs E curve, conversion & breeding concepts-Thorium utilization.

Diffusion of neutrons: Fick's law and its validity, steady state neutron diffusion equation, concepts of neutron flux and current, interface conditions, diffusion coefficient, diffusion length and extrapolation distance.

UNIT- III

Chain Reaction: Four Factor formula, conceptual treatment of diffusion of one group neutrons in non multiplying and multiplying media, infinite and effective multiplication factors bare homogeneous reactor-concepts of material and geometric buckling, sub criticality and super criticality, critical mass, non leakage probabilities in bare homogeneous cores, neutron cycle and lifetime in finite and in infinite reactor system.

Slowing down process: Neutron slowing down, slowing down power and moderating ratio for moderators. Slowing down with spatial migration, Fermi age concepts, migration length, use of reflectors/blankets, reflector savings.

Heterogeneous reactors: Multigroup neutron diffusion with special reference to 2 group approach, Heterogeneous reactors, comparison with homogeneous reactors, unit-cell concepts.

UNIT- IV

Reactor kinetics: Time dependent neutron diffusion equation, one group kinetic equation, prompt neutron life time, Point kinetic model to illustrate importance of delayed neutrons, reactor period, reactivity and its units. Fuel burn-up units.

Neutron Poisons: Xenon and Samarium Poisons, Xenon loads (operating and post shutdown), Variation of xenon load with power and enrichment. Xenon oscillations and their control.

UNIT- V

Reactivity coefficients: Temperature coefficients of reactivity and void coefficient of reactivity, their relevance to reactor safety. techniques to control reactors, typical reactivity balance, long-term burnup, fuel management. Reactor control system – requirements of physics aspects. Reactor shutdown mechanisms and neutron monitoring during operation and shut down. Approach to criticality, physics measurements and calibrations/validations. Reactivity worth measurements of control rods.

Research Reactors at Trombay, Indian PHWRs.

Suggested Texts and References

1. Nuclear Reactor Engineering: Reactor Systems Engineering, Samuel Glasstone and Alexander Sesonske, 4th Edition, 2012
2. Introduction to Nuclear Engineering, 3rd Ed., John R. Lamarsh and Anthony J. Baratta, 2001.
3. Nuclear Reactor Analysis, James J. Duderstadt and Louis J. Hamilton, 1976
4. Nuclear Energy: An Introduction to the Concepts, Systems, and Applications of Nuclear Processes, 6th Ed., Raymond Murray and Keith E. Holbert, 2008.
5. Fundamentals of Nuclear Reactor Physics, Elmer E. Lewis, 2008.
6. Nuclear Reactor Physics, 2nd Ed., Weston M. Stacy, 2007
7. Nuclear Energy: Principles, Practices and Prospects, David Bodansky, 2008.

PL701: Advanced Physics Laboratory – I

Nuclear Physics

Spectral features of photoelectric absorption and Compton scattering with scintillation detectors (i) Inorganic: NaI(Tl), BaF2 (ii) Organic: BC501A and plastic. Energy calibration, energy resolution, photopeak and total efficiency, relative intensity, photoelectric and Compton cross-sections, radiation shielding. Alpha spectroscopy with a silicon surface barrier detector. Fine structure of alpha spectrum and determination of age of source. Fast timing and coincidence measurements using BaF2 and BC501A detectors. Angular correlation of gamma rays using NaI(Tl) detectors. High resolution, low-energy photon measurements with a silicon drift detector: Internal conversion studies, elemental composition through X-Ray Fluorescence (XRF) analysis. Geiger-Muller counter: operating characteristics, dead time measurement, determination of mass absorption coefficient, verification of inverse square law. Lifetime measurements: from nanoseconds through minutes using fast coincidence and decay studies. High-resolution gamma ray measurements with high-purity germanium detectors. Classic experiments: Rutherford scattering, cloud chamber, beta spectrometer. Spectrum analysis techniques and fitting routines: data/peak fitting, energy and efficiency calibration, 1D and 2D histograms.

(Selected experiments from the above list are performed based on number of contact hours prescribed)

Condensed Matter

Growth of metallic thin films by physical vapor deposition techniques like thermal evaporation and DC magnetron sputtering. Tuning of growth parameters to change the deposition rate and

hence thickness of the films. Introduction to vacuum techniques: vacuum pumps, rotary pump, diffusion pump and turbo molecular pumps. Measurement of vacuum: thermocouple gauges, hot and cold cathode gauges. Thickness measurement of thin films by quartz crystal monitor.
Structural characterization of materials (some known and some unknown) by X-ray diffraction (XRD) and X-ray fluorescence (XRF) (a) Phase identification (b) Chemical composition (c) difference between powder diffraction pattern of single and polycrystalline systems (d) Reasons for line broadening in XRD: Rachinger correction and estimation of particle size from Debye-Scherer formula. (e) Identifying crystal structure and determination of lattice constant.
Introduction to low temperature measurements: operation of a closed cycle cryostat, low temperature thermometers, controlling temperatures using PID feedback using temperature controllers, making electrical contacts on thin films and measuring DC resistance with sourcemeter using four probe method-advantages and disadvantages of the technique, temperature dependent (300-20K) measurement of electrical resistivity of metallic thin films and comparing the room temperature value with the standard. Determination of superconducting transition temperature of a high temperature superconductor using electrical transport measurements. Determination of band gap of a semiconductor: highly doped Si by fitting the temperature dependent resistance to the standard variation in semiconductors. Concepts of measuring electrical resistance in labs: from metals to dielectrics. Introducing GPIB interfacing of electronic instruments with the computer and writing LABVIEW programs to interface temperature controller and sourcemeter.

Introduction to phase sensitive measurements: using of a dual phase lock-in amplifier. Measurement of the superconducting transition temperature of a superconducting thin film using a mutual inductance technique down to 2.6K (working of a cryogen free system). Measuring AC resistance of a milliohm resistor using phase sensitive detection and studying the frequency and amplitude variation of the resistance: introduction to noise, White noise and 1/f noise.

Suggested Texts and References:

1. Radiation Detection and Measurement, Glenn F. Knoll, John Wiley 2010
2. Techniques for Nuclear and Particle Physics Experiments: William R. Leo, Springer 1995
3. Basic Vacuum technology, 2nd Edition, A. Chambers, R. K. Fitch and B. S. Halliday, IOP 1998
4. Physical Vapor Deposition, R. J. Hill, McGraw-Hill 2005
5. Elements of X-ray Diffraction, 3rd Edition, B. D. Cullity and S. R. Stock, Prentice Hall 2001
6. Introduction to Solid State Physics, 8th Edition, C. Kittel, Wiley 2012.

SEMESTER-VIII

P801: Astronomy and Astrophysics

UNIT-I

Stellar Physics: Equations governing the structure of stars: Mechanical & Thermal equilibrium. Virial theorem. Modes of energy transfer in stars: radiative & convective transport of energy. Auxiliary input: equation of state, opacity and energy generation by thermonulcear processes. Boundary conditions at the stellar surface & at the centre.

UNIT-II

Models with linear & quadratic density profiles. Polytropic models. Mass-luminosity-radius relations for low, intermediate & high mass stars. Sources of opacity and nucleosynthesis in stars. Manufacturing of iron-peak and heavier elements by rapid neutron capture processes. Mixing

length theory of convective transport of hear. Completely convective stars. Hertzsprung-Russel diagram. Pre-main sequence contraction and the Hayashi phase. Zero-age main sequence.

UNIT-III

Stellar evolution: main sequence, red giant and asymptotic giant branch. Advanced stages of stellar evolution: white dwarfs, neutron stars & black holes. Physics and astrophysics of collapsed objects: pulsars, X-ray &gamma ray sources. Spherical accretion and Bondi solution. Physics of accretion discs. Stellar rotation and magnetism.

UNIT-IV

Galactic Physics: Units in astronomy, co-ordinate system, multi-wavelength sky (radio, IR, Optical, UV, X-ray, Gamma ray), distance ladder, Milkyway Galaxy, interstellar medium, basics of star formation, spiral and elliptical galaxies (morphology, content and kinematics), evidences for dark matter, . astronomy and society (including citizen science), constraints and prospects of astronomy and astrophysics research in India.

UNIT-V

AGNs, evidences for supermassive black holes, M-sigma and similar correlations, radio galaxies, synchrotron radiation, accretion onto black hole, physical processes behind black holegalaxy co-evolution (merger, infall and feedback), clusters of galaxies (contents and kinematics), high redshift galaxies, cosmic evolution of galaxies and black holes, hierarchical structure formation, cosmic-web, GMRT

Suggested Texts and References:

1. The Internal Constitution of Stars, A. S. Eddington, Cambridge University Press, 1988.
2. An Introduction to the Study of Stellar Structure, S.Chandrasekhar, Dover Publications, 2003.
3. The stucture & Evolution of the Stars, M.Schwarzschild, Dover Publications, 1962.
4. Cox and Giuli's Principles of Stellar Structure, 2nd Ed., A. Weiss et al., Cambridge, 2003.
5. The Physical Universe: An Introducing to Astronomy, F. H.Shu, University Science Books, 1982.
6. Galactic Astronomy, James Binny and Michael Merrifield, Princeton University Press, 1998.
7. An Introduction to Active Galactic Nuclei, B. M. Peterson, Cambridge University Press, 1997.
8. Extragalactic Astronomy and Cosmology: An Introduction, Peter Schneider, Springer, 2006.
9.Physics of the Interstellar & Intergalactic Medium, Bruce T. Draine, Princeton Univ. Press, 2011.

P802: Accelerator Physics and Applications

UNIT-I

Transverse beam dynamics: Accelerator coordinates; Canonical transformation to accelerators coordinates; Guide field; Dipole and Quadrupole Magnets; Hills equation and solution; Twiss parameters; Matrix formulation; Dispersion; Design of lattices; Field and gradient errors; Chromaticity; sextupole magnets and dynamics aperture.

UNIT-II

Longitudinal beam dynamics: Fields and forces; acceleration by time varying fields; relativistic equations; Overview of acceleration; transit time factor; main RF parameters; momentum compaction factor; transition energy; Equations related to synchrotron; synchronous particle; synchrotron oscillations; principle of phase stability; RF acceleration for synchronous and for non-synchronous particle; small amplitude oscillations; Oscillations with Hamiltonian formalism; limits of stable region; adiabatic damping.

UNIT-III

Linear accelerators: Basic methods of linear acceleration; Fundamental parameters of accelerating structures; Energy gain in linear accelerating structures; Q, Shunt-impedance, transit-time factor; periodic accelerating structures; RFQs; Microwave topics for linacs; Single particle dynamics in linear accelerators; Multi-particle dynamics in linear accelerators.

UNIT-IV

Synchrotron radiation: Introduction to electromagnetic radiation; Radiation of accelerated charged particles; radiation from wigglers and undulators; Electron dynamics with radiation; Low emittance lattices; synchrotronradiation sources.

UNIT-V

Free-electron lasers: Introduction; electron dynamics in the undulator; spontaneous emission; electron dynamics in the laser field; dynamics of the laser field; dimensionless equations of motion; solution in the small-signal, small-gain regime; Madey theorem; three-dimensional effects; undulators; X-ray laser. Advanced accelerator concepts: Photo injectors; laser-wakefield acceleration; plasma-wakefield acceleration; linear colliders; muon colliders.

Suggested Texts and References:

1. An Introduction to the Physics of High-Energy Accelerators, D. A. Edwards & M. J. Syphers
2. An Introduction to Particle Accelerators, Edmund Wilson
3. Introduction to Accelerator Physics, Arvind Jain
4. R. F. Linear Accelerators, T. P. Wangler
5. Classical Electrodynamics, 3rd Edition, J. D. Jackson, Wiley 2012

P803: Nuclear and Particle Physics

UNIT-I

Nuclear Reactions: Partial wave decomposition, phase shifts and partial wave analysis of the cross sections in terms of phase shifts. Behaviour of phase shifts in different situations. Black sphere scattering. Optical theorem and reciprocity theorem. Unitarity.

Optical potential: Basic definition. Relation between the imaginary part, W of the OP and σ_{abs} , and between W and mean free path. Folding model and a high energy estimate of the OP.

UNIT-II

Catagorisation of Nuclear Reaction mechanisms:

Low energies: Discrete region, Continuum Region: (a) Discrete Region: Decaying states. Relation between the width and the mean life time. Energy definition: Lorentzian or Breit-Wigner. Resonance scattering. Derivation of the resonance cross section from phase shift description of cross section. Transmission through a square well and resonances in continuum. Coulomb barrier penetration for charged particles scattering and centrifugal barrier for l non-zero states. Angular distributions of the particles in resonance scattering. Application to hydrogen burning in stars. (b) Continuum Region: Bohr's compound nucleus model.

UNIT-III

Direct Reactions: Cross section in terms of the T-matrix. Phase space, and its evaluation for simple cases. Lippmann Schwinger equation for the scattering wave function, and its formal solution. On-shell and off-shell scattering. Plane wave and distorted wave approximation to the T-matrix(PWBA, DWBA). Application to various direct reactions like, stripping, pick-up, knock-out etc.High energy scattering. Glauber theory. Eikonal approximation to the scattering wave function.Evaluation of scattering cross section in eikonal approximation. Introduction to heavy-ion scatteringand the physics with radioactive ion beams.

UNIT-IV

Nuclear Structure: Generalization of the single-particle shell model, residual interactions, Fermi gas model. Single-particle energies in a deformed potential, shell corrections and the Strutinski method. Pairing: BCS model and the Bogolyubov transformation. Hartree-Fock method: general variational approach, Hartree-Fock equations and applications. Nuclear shape parametrization, quadrupole and higher- order deformations. Collective rotation and vibration; Giant resonances. Cranking model, phenomena at high spin including super-deformation. introduction to Density-Functional Models, including relativistic mean field. Selected contemporary research topics: Superheavy nuclei; Spectroscopy of drip-line nuclei.

UNIT-V

Particle Physics: Symmetries and conservation laws, conserved quantities in reactions of particles. Relativistic kinematics in particle reactions, invariants, resonances, decays of resonances and their decays etc. Particle classification, mesons and baryons, SU(3) multiplets, quark model. Quarks, gluons, QCD interaction, colour neutrality. Detection of quarks and gluons, structure function in deep inelastic reactions. Quark and lepton families, weak interactions as guage theory, W and Z bosons. Symmetry breaking and generation of masses, Higgs bosons. Present boundary (strings, grand unification, matter-anti-matter asymmetry, dark matter and energy - seminar, qualitative)

Suggested Texts and References:

1. Subatomic Physics, E. M. Henley & A. Garcia, World Scientific
2. Concepts of Nuclear Physics, B. C. Cohen, McGraw-Hill.
3. Introduction to Nuclear and Particle Physics, A. Das and T. Ferbel, World Scientific.
4. Structure of the Nucleus: M.A. Preston and R.K. Bhaduri, Levant Books, 2008
5. Nuclear Models: W. Greiner and J.A. Maruhn, Springer, 1996
6. Nuclear Structure from a Simple Perspective: R. F. Casten, Oxford University Press, 1990
7. Theory of Nuclear Structure: M.K. Pal, Affiliated East-West Press, 1982
8. An Introduction to Quarks and Partons, F. E. Close, Academic Press 1980
9. Quarks and Leptons: An Introductory Course in Modern Particle Physics, F. Halzen and A. D. Martin, John Wiley 1984
10. Introduction to High Energy Physics, 4th Edition, D. Perkins, Cambridge 2000

P804: Condensed Matter Physics – II

UNIT-I

Superconductivity: Revision, Introduction to second quantization, BCS theory, Electron tunneling and energy gap, Josephson effect (AC and DC). GL theory and concept of penetration depth, coherence length and surface energy, Flux quantization.

UNIT-II

Modified London Equation of Mixed Phase, Interaction between Flux tubes, Flux flow, Flux pinning, Magnetization of Mixed State: Bogoliubov transformation, Boundary between normal metal and superconductor, Andreev Reflection and Proximity effect.

UNIT-III

Magnetism: Quantum theory of magnetism: Rationalization of the Heisenberg Hamiltonian, Hubbard model and Stoner Model: Derivation of susceptibility, Spin wave using Holstein-Primakov transformation.

UNIT-IV

Introduction to Density Functional Theory

Introduction to Special topics: Integer and Fractional Quantum hall effect, unconventional superconductivity, frustrated magnets, Josephson junction qubits, Graphene physics, Topological insulators.

UNIT-V

Kondo Physics, Metamaterials, Physics of photonic band gap materials, quantum cascade lasers, free electron lasers, organic electronics etc.

Note: Special topics in Fermi Liquid Theory may be covered if time permits.

Suggested Texts and References:

1. Introduction to Superconductivity, 2nd Edition, M. Tinkham, Dover 2004
2. Superconductivity, J. B. Ketterson and S. N. Song, Cambridge 1999
3. Basic Solid State Physics by A. K. Raychaudhuri
4. Magnetism in Solids, D. H. Martin, Butterworth 1967
5. Quantum theory of Magnetism, 3rd Edition, R. M. White, Springer 2006
6. Electronic Structure, Basic Theory & Practical Methods, R. Martin, Cambridge 2008

PL801: Advanced Physics Laboratory – II

Introduction to Observational Astronomy: Transmission of radiation through atmosphere in different bands, need for space platforms for invisible astronomies, Introduction to Optical, Infrared, Ultra-violet, X-ray and Gamma-ray astronomy, what do me measure and learn from different wavebands.

Introductory Astronomy and Different types of Optical Telescopes: Astronomical parameters like Apparent and Absolute magnitude, Flux, Luminosity and its dependence on size and temperature of stars, Atmospheric Extinction, Coordinate System in Astronomy Refracting and Reflecting telescopes, different focal plane configurations, their applications and relative merits and demerits. Reflectivity and its wavelength dependence, "seeing" and factors affecting it, use of active and adaptive optics in modern telescopes to overcome atmospheric and thermal effects, calculation of focal length, focal ratio, magnification, field of view, plate scale, diffraction limit of telescopes.

Introduction to Focal Plane Detectors for Optical, infrared and UV astronomy: Developments and evolution of modern Optical and Infrared imaging detectors: Photographic Plates, Phototubes, Image Intensifiers, Charge Coupled Devices (CCDs), Bolometers and how they work, their characterization and parameters (charge transfer efficiency, quantum efficiency, flat fielding etc.). CCDs uses in Imaging, morphological and Spectroscopic studies, Infrared Detectors and IR Arrays, UV Imaging and Photon Counting Detectors.

Different types of Focal Plane Instruments: Imagers, Photometers, Fast Photometers for photon counting, limitations of PMT and CCD bases photometers, Importance of spectroscopy, Design and description of Low and High Resolution Spectrometers and their applications, Polarimeters and their applications.

Interaction of radiation with matter: (a) Passage of charged and neutral particles through matter, Ionization loss formulae and dependence on different parameters, relativistic rise in ionization loss, detection of neutrons, Bremsstrahlung process, Cerenkov radiation and its application (b) Interaction of photons with matter: Photoelectric interaction, mass absorption formula and dependence on energy, atomic number etc, Thompson scattering, Compton scattering, Pair production process, formula and dependence on energy, atomic number, radiation length, critical energy

Introduction to Different Types of Gas-Filled Radiation Detectors: Role of development of new detection techniques in new discoveries in high energy physics and astrophysics, different kind of detection techniques for charged and neutral radiation Dependence of charge multiplication on high voltage and pressure, Townsend coefficient, need for use of inert gases, quench gas, mobility of electrons and ions (a) Ionization Chamber (IC), description of a typical IC, its characteristics, application of IC in physics (b) Proportional Counters (PC): Single and multi cell PCs, filling gases, Penning effect, charge multiplication process, energy resolution of PC, Fano factor, use of PCs in high energy physics, and astronomy especially in X-ray astronomy (c) Geiger Mueller (GM)Counter: Typical GM counter, its characteristics, applications of GM counter

Scintillation Counters, Cerenkov Detectors and other Solid State Detectors: Scintillation processes, dependence on energy, charge and atomic number, Photomultiplier (PMT) for detection of light, PMT characteristics, charge multiplication and use of PMTs with scintillators (a) Organic Scintillation Counters: Plastic Scintillators and light yield, their use in charged particle detection, a typical PS detector and its characteristics (b) Inorganic Scintillation Counters: Scintillation medium and need for activators, Sodium Iodide (NaI) and Caesium Iodide detectors, their light output, application of these detectors in physics and astrophysics (c) Silicon detectors and their applications in X-ray Astronomy, Germanium Detectors, Cadmium -Telluride devices and their arrays

Observational X-ray Astronomy: Birth and evolution of X-ray Astronomy, different types of X-ray sources, Discovery of X-ray Binaries, their broad properties, optical identification, classification in Low Mass X-ray binaries (LMXBs) and High Mass X-ray Binaries (HMXBs), their unique characteristics, estimation of mass of the compact star in X-ray binaries from the binary parameters (a) Neutron Star Binaries (NSB): X-ray Pulsars in Binaries, Rotation powered pulsars in SNRs, detailed discussion of their timing and spectral properties, New physics and astrophysics learnt from their studies (b) Black Hole Binaries (BHB): Inference about black hole nature, time variability, spectral measurements, mass of black hole

X-ray Radiation Processes: (a) Thermal Emission, Black Body emission, Thermal Bremstrahlung (free-free emission),spectral line formation in thermal plasma, examples of thermal spectra, measurement of temperature and elemental abundances from spectral data (b) Non-thermal Emission: Synchrotron mechanism (magnetic bremstrahlung), spectral shape, polarized emission, Inverse Compton Scattering, spectrum of radiation, examples of non-thermal spectra, Cyclotron process in strongly magnetized stars and formation of cyclotron lines, determination of magnetic field of the stars

Experiments to be performed:

1. Measuring energy resolution (R) of a Cadmium Telluride Detector using X-rays of different energies (E) from radioactive sources and deriving expression for variation of R with E.
2. Solar Constant measurement.
3. Measurement of Solar Limb Darkening.
4. Observing an Optical Binary Star and deriving its light curve.
5. Determine Pulsation period and binary light curve of an accreting Neutron star from X-ray data.
6. Measuring X-ray Energy Spectrum of a Black Hole Binary and fit it with different spectral models.
7. Characteristics of a Proportional Counter and dependence of its energy resolution on different parameters of the PC.

Center for Basic Sciences

(CBS)

SCHEME OF EXAMINATION

&

COURSE STRUCTURE

of

SEMESTER IX and X

M.Sc. Integrated (Physics Stream)

UNDER

FACULTY OF SCIENCE

Approved by Board of Studies in Physics

EFFECTIVE FROM FEBRUARY 2020

Center of Basic Sciences
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Physics on 07, January 2020

PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

CENTER FOR BASIC SCIENCES
Pt. Ravishankar Shukla University, Raipur

SEMESTER-X (Physics Streams)

Subject code *	Subject	Subject Contact hrs/per week Theory+Tutorial	Credits
PE1001	Quantum Field Theory	[4 + 1]	5
PE1002	General Relativity and Cosmology	[4 + 1]	5
PE1003	Experimental Techniques	[4 + 1]	5
PE1004	CCD Imaging and Spectroscopy	[4 + 1]	5
PE1005	Biophysics	[4 + 1]	5
PE1006	Particle Physics	[4 + 1]	5

Min. 20
(Total 240 credits)

***Four Subjects will be offered according to the availability of instructors and minimum number of interested students offering a course.**

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Center for Basic Sciences

Pt. Ravishankar Shukla University, Raipur

PHYSICS STREAM SYLLABUS

SEMESTER X

PE1001 Quantum Field Theory

UNIT-I

Preliminaries: Why Quantum Field Theory, Creation and annihilation operators, Special relativity, Space and time in relativistic quantum theory, natural units

UNIT - II

Canonical Quantization: General Formulation. Conjugate Momentum and Quantization. Neutral Scalar Field. Commutation Relations, Normal Ordering, Bose Symmetry, Fock Space. Charged Scalar Field. U(1) Invariance, Charge
Conservation, Particles and Antiparticles. Time Ordered Product, Feynman Propagator for Scalar Fields, Bose- Einstein Distribution, Propagators at Finite Temperature.

UNIT - III

Dirac Field: The Dirac Equation, Relativistic Covariance. Anti-Commutators. Quantization of the Dirac Field, Electrons and Positrons. Connection between Spin and Statistics. Discrete Symmetries, Parity, Charge Conjugation, Time Reversal, CPT Theorem.

UNIT - IV

Gauge Field: Gauge Invariance and Gauge Fixing. Quantization of the Electromagnetic Field, Propagator, Vacuum Fluctuations.

UNIT - V

Interacting Theory and Elementary Processes: Wick's Theorem. Feynman Rules and Feynman Diagrams for Spinor Electrodynamics, Lowest Order Cross-Section
for Electron-Electron, Electron-Positron and Electron- Photon Scattering.

References:

1. Quantum Field Theory, C. Itzykson and J. B. Zuber, McGraw-Hill Book Co, 1985.
2. Quantum Field Theory, L. H. Ryder, Cambridge University Press, 2008.
3. Field Theory, A Modern Primer, P. Ramond, Benjamin, 1980.
4. The Quantum Theory of Fields, Vol I, S. Weinberg, Cambridge University Press, 1996.

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5. Introduction to The Theory of Quantum Fields, N. N. Bogoliubov and D. V. Shirkov, Interscience, 1960.
6. An Introduction to Quantum Field Theory, M. E. Peskin and D. V. Schroeder, Westview Press, 1995.
7. Quantum Field Theory: Mandl and Shaw
8. A first book of Quantum Field Theory, Amitabha Lahiri, Palash B. Pal, Alpha Science International Ltd., 2000

PE1002 General Relativity and Cosmology

UNIT - I

Review of Newtonian Mechanics. Special theory of relativity. Prelude to General relativity, historical developments, 4-Vectors and 4-tensors, examples from physics

UNIT - II

Principle of Equivalence, Equations of motion, Gravitational force, Tensor Analysis in Riemannian space, Effects of Gravitation, Riemann-Christoffel curvature tensor, Ricci Tensor, Curvature Scalar, Einstein Field Equations, Experimental tests of GT, Scwartzchild Solution,

UNIT - III

Introduction to Cosmology, The cosmic history and inventory, The expanding Universe

UNIT- IV

Friedmann Equations and Cosmological Models, The Standard cosmological model, The inflationary Universe, Big-Bang Hypothesis

UNIT- V

Primordial nucleosynthesis and the thermal history of the Universe. Perturbations in an expanding Universe, Growth of perturbations, Dark Matter Halos

References:

1. A first course in General Relativity- B. Schutz
2. Gravity: HJ. Hartle
3. The Classical Theory of Fields: Landau and Lifshitz
4. Gravitation and Cosmology: S. Weinberg5. Introducing Einstein's Relativity: D'Inverno
5. Introducing Einstein's General Relativity - Ray D'Inverno
6. The Early Universe - Kolb and Turner
7. Introduction to Cosmology - Barbara Ryden4. Modern Cosmology - Scott Dodelson
8. Principles of Physical Cosmology - P.J.E. Peebles
9. Large Scale Structure of the Universe - P.J.E. Péebles
10. Structure Formation in the Universe - T. Padmanabhan

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PE1003 Experimental Techniques

UNIT – I

Vacuum technology: gases, gas flow, pressure and flow measurement, vacuum pumps, pumping mechanisms, ultrahigh vacuum, leak detection

UNIT – II

Optical systems: optical components, optical materials, optical sources Charge particle optics: electrostatic lenses, charged-particle sources, energy and mass analyzer

UNIT – III

Detectors: optical detectors, photoemission detectors, particle and ionizing radiation detectors, signal to noise ration detection, surface barrier detector.

UNIT – IV

Particle detectors and radioactive Decay: Interactions of charged particles and photons with matter; gaseous ionization detectors, scintillation counter, solid state detectors

UNIT – V

Electronics: electronic noise, survey of analog and digital I/Cs, signal processing, data acquisition and control systems, data analysis evaluation

References:

1. The art of Measurement, by Bernhard Kramer, VCH publication
2. Building Scientific apparatus by J. H. Moore et al.
3. Experiments in Modern Physics, Second Edition by Adrian C. Melissinos, Jim Napolitano
4. Vacuum Technology, A. Roth North-Holland Publisher
5. Charge Particle Beams, by Stanley Humphries, John Wiley and Sons
6. Principles of charged Particles Acceleration, by Stanley Humphries, John Wiley and Sons
7. Radiation detection and Measurements, G. Knoll, 3rd Edition
8. Techniques for Nuclear and particles physics experiments, W. R. Leo, 2nd edition, Springer
9. The Physics of Micro & Nanofabrication, Ivor Brodie,and Julius J. Muray, Springer
10. Physical Principles of Electron Microscopy: An Introduction to TEM, SEM, and AEM, R.Egerton, Springer, 2005
11. Egerton, Springer, 2005Modern Spectroscopy, J. M. Hollas, John Wiley, 4th Edition, 2004

07/01/2020

07/01/2020

PE1004 CCD Imaging and Spectroscopy

UNIT-I

Introduction : Why use CCDs?, CCD mahufacturing and operation, CCD operation, CCD types, CCD coatings, Analog-to-digital converters

UNIT-II

Characterization of charge-coupled devices: Quantum efficiency, Charge diffusion, Charge transfer efficiency, Readout noise, Dark current, CCD pixel size, pixel binning, full well capacity, and windowing, Overscan and bias, CCD gain and dynamic range,

UNIT-III

CCD imaging, Photometry and astrometry: Image or plate scale, Flat fielding, Calculation of read noise and gain, Signal-to-noise ratio, Basic CCD data reduction, CCD imaging, Stellar photometry from digital images, Two-dimensional profile fitting, Difference image photometry, Aperture photometry, Absolute versus differential photometry, High speed photometry, PSF shaped photometry, Astrometry, Pixel sampling

UNIT-IV

Review of spectrographs: CCD spectrographs, CCD spectroscopy, Signal-to-noise calculations for spectroscopy, Data reduction for CCD spectroscopy, Extended object spectroscopy, Slitless spectroscopy

UNIT-V

CCDs used in space and at short wavelengths : CCDs in space, Radiation damage in CCDs, CCDs in the UV and EUV (300–3000 Å) spectral range, CCDs in the X-ray, (<500 Å) spectral range

References:

1. Handbook of CCD Astronomy, Second editionS. B. Howell
2. Stellar Magnitudes from Digital Pictures, Adams, M., Christian, C., Mould, J., Stryker, L., & Tody, D., 1980, Kitt Peak National Observatory publication.
3.The Next Generation Space Telescope, Bely, P.-Y., Burrows, C., & Illingworth, G. (eds.), 1989, Space Telescope Science Institute publication.
4. Blouke, M., Yang, F., Heidtmann, D., & Janesick, J., 1988, in Instrumentation for Ground-Based Optical Astronomy, ed. L. B. Robinson, Springer-Verlag, p. 462.
5. Bonanno, G., 1995, in New Developments in Array Technology and Applications, eds. A. G. D. Philip, K. A. Janes, & A. R. Upgren, Kluwer, p. 39.
6. Born, M. & Wolf, E., 1959, Principles of Optics, MacMillan, Chap. VIII.
7. Bowen, I. S., 1960a, in Astronomical Techniques, ed. W. A. Hiltner, University of Chicago Press, Chap. 2.
8. Brown, R. (ed.), 1993, The Future of Space Imaging, Space Telescope Science Institute publication, Chap 8.

07/01/2020

PE1005 Biophysics

UNIT- I

Mathematical Methods in Biophysics : Functions of One Variable and Ordinary Differential Equations, Functions of Several Variables: Diffusion Equation in One Dimension., Random Walks and Diffusion, Random Variables, Probability Distribution, Mean, and Variance , Diffusion Equation in Three Dimensions., Complex Numbers, Complex Variables, and Schrodinger's Equation , Solving Linear Homogeneous Differential Equations., Fourier Transforms, Nonlinear Equations: Patterns, Switches and Oscillators

UNIT- II

Quantum Mechanics Basic to Biophysical Methods: Quantum Mechanics Postulates, . One-Dimensional Problems, The Harmonic Oscillator, The Hydrogen Atom, Approximate Methods, Many Electron Atoms and Molecules , The Interaction of Matter and Light

UNIT- III

Computational Modeling of Receptor–Ligand Binding and Cellular Signaling Processes: Differential Equation-Based Mean-Field Modeling, Application: Clustering of Receptor–Ligand Complexes, Modeling Membrane Deformation as a Result of Receptor–Ligand Binding, Limitations of Mean-Field Differential Equation-Based Modeling, Master Equation: Calculating the Time Evolution of a Chemically Reacting System,

UNIT- IV

Stochastic Simulation Algorithms: Stochastic Simulation Algorithm (SSA) of Gillespie, Application of the Stochastic Simulation Algorithm (SSA), Free Energy-Based Metropolis Monte Carlo Simulation, Application of Metropolis Monte Carlo Algorithm, Stochastic Simulation Algorithm with Reaction and Diffusion: Probabilistic Rate Constant–Based Method,Mapping Probabilistic and Physical Parameters, Modeling Binding between Multivalent Receptors and Ligands, Multivalent Receptor–Ligand Binding and Multi-molecule Signaling Complex Formation, Application of Stochastic Simulation Algorithm with Reaction and Diffusion,Choosing the Most Efficient Simulation Method

UNIT- V

Fluorescence Spectroscopy: Fundamental Process of Fluorescence,

Fluorescence Microscopy, Types of Biological Fluorophores, Application of Fluorescence in Biophysical Research, Dynamic Processes Probed by Fluorescence

Electrophysiological Measurements of Membrane Proteins :

Membrane Bioelectricity, . Electrochemical Driving Force, Voltage Clamp versus Current Clamp, Principles of Silver Chloride Electrodes, Capacitive Current and Ionic Current.Gating and Permeation Functions of Ion Channels, Two-Electrode Voltage Clamp for Xenopus Oocyte Recordings , Patch-Clamp Recordings , Patch-Clamp Fluorometry

References

1. Fundamental Concepts in Biophysics, Thomas Jue

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2. Alon U. 2006. An introduction to systems biology: design principles of biological circuits. Boca Raton: Chapman & Hall.
3. Berg HC. 1993. Random walks in biology. Princeton: Princeton UP.
4. Nelson P. 2004. Biological physics: energy, information and life. New York: W.H. Freeman and Company.
5. Van Kampen NG. 1992. Stochastic processes in physics and chemistry. Amsterdam: North Holland.
6. Shankar R. 1994. Principles of quantum mechanics. New York: Plenum.
7. Cohen-Tannoudji C, Diu B, Laloe F. 1977. Quantum mechanics. Trans SR Hemley, N Ostrowsky, D Ostrowsky, New York: Wiley.
8. Lauffenburger DA, Linderman JJ. 1993. Models for binding, trafficking and signaling. Oxford: Oxford UP.
9. Fall CP, Marland S, Wagner JM, Tyson JJ, eds. 2002. Computational cell biology. New York: Springer

PE1006 Particle Physics

UNIT-I

Elementary particles, discrete symmetries and conservation laws, Symmetries and Quarks.

UNIT-II

Klein-Gordon equation, concept of antiparticle, Lorentz symmetry and scalar / vector / spinor fields.

UNIT-III

Dirac equation, Scattering processes of spin-1/2 particles (Feynmans rules as thumbrule QFT course), propagators.

UNIT-IV

Current-current interactions, weak interaction, Fermi theory, Gauge symmetries, spontaneous symmetry breaking, Higgs mechanism

UNIT-V

Electroweak interaction, Glashow-Salam-Weinberg model, Intoduction to QCD, structure of hadrons (form factors, structure func-tions), parton model, Deep inelastic sattering.

References:

1. Quarks and Leptons: An Introductory Course in Modern Particle Physics - FrancisHalzen, Alan D. Martin
2. Introduction to Elementary Particles, David Griffiths
3. Concepts of Particle Physics, Volume I, Kurt Gottfried and Victor F. Weisskopf, 1986, Oxford University Press,
4. Classical Electrodynamics second edition, J.D. Jackson, 1975, John Wiley & Sons, Inc., (chapters 11 and 12)
5. Introduction to High Energy Physics, fourth edition, Donald H. Perkins, 2000, Cambridge University Press,

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6. Experimental Techniques in High Energy Physics, Thomas Ferbel (editor), 1987, Addison Wesley
7. Gauge Theory of Elementary Particle Physics, Ta-Pei Cheng and Ling-Fong Li, 1984, Oxford University Press
8. Weak Interactions of Leptons and Quarks, E.D. Commins and P.H. Bucksbaum, 1983, Cambridge University Press

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Center for Basic Sciences
Pt. Ravishankar Shukla University, Raipur

Course structure for the M. Sc. (Integrated) Mathematics stream

w.e.f. July 1st , 2015

(P: **P**hysics, M: **M**athematics, C: **C**hemistry, B: **B**iology, G: **G**eneral, H: **H**umanity, ME: **M**ath **E**lective, MPr : **M**ath **P**roject)

Semester Scheme

There shall be 10 semesters in Integrated M.Sc. Mathematics Course. Five out of thirty elective courses should be taken from the elective courses offered by the School of Mathematical Sciences. Credit points in each semester is indicated in the table below. **Minimum credit points** required to pass each semester is **10.** A total of **minimum 100 credit points** is required to get **M.Sc. degree in Mathematics** from the School of Mathematical Sciences.

Year	Semester	Subjects			Credit Points Min	Credit Points Max	Cumulative Credit Points
		Theory	Practical	Project			
1st Year	Sem. I	5(x3)+ 1(x2) = 18	4(x2)= 08	----	10	25	25
	Sem. II	5(x3)+ 1(x2) = 18	4(x2)= 08	----	10	25	50
2nd Year	Sem. III	5(x4)+2(x2)= 24	1(x1)= 01	----	10	25	75
	Sem. IV	5(x4)= 20	1(x4)+1(x1) = 05	----	10	25	100
3rd Year	Sem. V	6(x4)= 24	1(x1)= 02	----	10	25	125
	Sem VI	5(x4)+1(x2)= 22	1(x3)=03	----	10	25	150
4th Year	Sem VII	5(x4) = 20	----	05	10	25	175
	Sem VIII	5(x4) = 20	----	05	10	25	200
5th Year	Sem IX	----	----	20	10	20	220
	Sem X	Elective Papers 5(x4)=20	----	----	10	20	240
Total Credit Points							**240**
Minimum Credit Points Required to get M.Sc. degree in Mathematics							**100**

FIRST YEAR

SEMESTER –I

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
B101	Biology – I	[2 + 1]	3
C101	Chemistry – I	[2 + 1]	3
MB101/M101	Mathematics – I	[2 + 1]	3
P101	Physics – I	[2 + 1]	3
G101	Computer Basics	[2 + 1]	3
H101	Communication Skills	[2 + 0]	2
		Lab Hours per Week	
BL101	Biology Laboratory – I	[4]	2
CL101	Chemistry Laboratory – I	[4]	2
PL101	Physics Laboratory – I	[4]	2
GL101	Computer Laboratory	[4]	2
		Semester Credits	**25**
		Subtotal	**25**

MB101: Mathematics – 1 **(For Biology Stream)**

Unit-I The idea of derivative of a function, polynomials, slope and tangent line, derivatives of trigonometric functions, product and quotient rules. Notion of limits and continuous functions.

Elementary results pertaining to limits of functions: product and quotient rules. Higher order derivatives, examples. Maxima and minima, curve tracing, Conic sections: circle, ellipse, hyperbola and parabola; equations, focus, directrix, latus rectum. Generalised conic section equation, exponential and logarithmic functions and their derivatives.

Unit-II Application of derivatives to root finding: Newton's method (to be supplemented by an introduction to iterative processes). Mean value theorem of differential calculus, Rolle's theorem, applications. l'Hôpital's rule. The chain rule of differentiation, Implicit differentiation, Inverse functions and their derivatives, Inverse trigonometric functions, Applications.

Concept of infinite series, Geometric series, convergence tests; Taylor series, Maclaurin series for elementary functions, power series, simple applications.

Unit-III Notion of an integral, integral as limit of sums; anti-derivatives, area under a curve, definite integrals, indefinite integrals. Rules of integration: integration by parts, integration by substitution. Properties of definite integrals including mean value theorem for integral calculus. Fundamental theorem of integral calculus. Integrals involving polynomial, exponential, logarithmic, trigonometric, inverse trigonometric functions. Application of integrals to areas, length of a plane curve, volumes of solids of revolution.

Unit-IV Complex numbers: real and imaginary parts, The complex plane, Complex algebra (complex conjugate, absolute value, complex equations, graphs, physical applications). Elementary functions of complex numbers, Euler's formula, Powers and roots of complex numbers. The exponential and trigonometric functions, Hyperbolic functions, Logarithms, Complex roots and powers, Inverse trigonometric and hyperbolic functions, Some applications.

Unit-V Separable equations, Linear first order equations, Other methods for first order equations, Second order linear equations with constant coefficients and both zero and non-zero right hand side, Other second order equations.

Suggested Texts and References:
1) Calculus: Gilbert Strang (MIT Courseware)
2) Calculus: M. Weir, J. Hass and F. R. Giordano (Pearson Education)

M101: Mathematics – I (For Physics, Mathematics & Chemistry Stream)

Unit-I **Introduction to coordinate geometry:** Equation of a straight line and circle. Introduction to trigonometry (including addition formulas for sine and cosine) through coordinate geometry. AP and GP and inequalities of the mean. Binomial theorem for integer powers.

Unit-II **Complex numbers:** real and imaginary parts, the complex plane, complex algebra (complex conjugate, absolute value, complex equations, graphs, physical applications). Consequences of Euler's formula.

Unit-III The idea of derivative of a function, effects of small changes, slope and tangent line, derivatives of polynomials and trigonometric functions, product and quotient rules. Notion of limits and continuous functions. Higher order derivatives, examples. Maxima and minima. Graphical representation of elementary functions such as polynomials, conics, trigonometric functions, exponentials, logarithms and the sawtooth functions. Inverse functions and their graphical representations. Derivatives of exponential, hyperbolic and logarithmic functions. Application of derivatives to root finding: Newton – Raphson method. The chain rule of differentiation, implicit differentiation, inverse functions and their derivatives.

Unit-IV Concept of sum of infinite series, geometric series, harmonic series, simple convergence tests. Taylor series, applications to elementary functions, binomial expansion for non-integral powers. Notion of an integral, integral as limit of sums; anti-derivatives, area under a curve, definite integrals, indefinite integrals. Rules of integration: integration by parts, integration by substitution. Properties of definite integrals. Integrals involving elementary functions. Application of integrals to areas and volumes of solids of revolution.

Unit-V System of linear equations, notion of a matrix, determinant. Simple properties of matrices and their inverses. Examples of inverting 2X2 and 3X3 matrices. Elementary discussion on scalars and vectors, norm of a vector, dot product, projections, cross product, triple products, applications to areas and volumes.

Suggested Texts and References:

1. Calculus, Gilbert Strang (MIT Courseware) http://ocw.mit.edu/resources/res-18-001- calculus-online-textbook-spring-2005/textbook/
2. Thomas' Calculus, 11th Edition, M. Weir, J. Hass and F. R. Giordano, Pearson

Education.
3. Mathematical Methods in the Physical Sciences, 3rd Ed., Mary L. Boas, Wiley Student Ed., Wiley India (Reprint) 2009 (for complex numbers and differential equations)
4. Elementary Linear Algebra, 10th Ed., Howard Anton and Chris Rorres, Wiley, 2011.
5. Introduction to Linear Algebra, 4th Edition, Gilbert Strang, Wellesley Cambridge Press, 2009.

M101: Mathematics – I (For Physics, Mathematics & Chemistry Stream)

Unit I Numbers, Functions and Sequences: Real Numbers, Functions, Sequences – Convergent, Bounded and Monotone, Limit theorems. Limit and Continuity: Limit of a function at a point, Continuity of functions, Discontinuities of functions, Properties of continuous functions.
Differentiation: Differentiation, Chain rule, Successive differentiation, Rolle 's Theorem and mean value theorem.

Unit II Maxima, Minima and Curve Sketching: Sufficient conditions for a function to be increasing/decreasing, Sufficient conditions for a local extremum, Absolute minimum/maximum, Convex/concave functions, Asymptotes, Curve sketching.
Integration: Integral from upper and lower sums, Integral as a limit of Riemann sums, Fundamental theorem of calculus and its applications. Logarithmic and Exponential functions: Logarithmic functions, Exponential functions, Power functions, l'Hôpital's rule. Applications of Integration: Arc length of a plane curve, Arc length of a plane curve in parametric form, Area of a surface of revolution, Volume of a solid of revolution by slicing, by the washer method and by the shell method.

Unit-III Limit and Continuity of Scalar Fields: Spaces $\mathbf{R^2}$ **and** $\mathbf{R^3}$, Scalar fields, level curves and contour lines, Limit of a scalar field, Continuity of a scalar field, Properties of continuous scalar fields.
Differentiation of Scalar Fields: Partial derivatives, Differentiability, Chain rules, Implicit differentiation, Directional derivatives, Gradient of a scalar field, Tangent plane and normal to a surface, Higher order partial derivatives, Maxima and minima, Saddle points, Second derivative test for maxima/minima/saddle points.Vector Fields: Vector fields and their properties, Curves in space, Tangent vector, Basic idea of divergence and curl.

Unit-IV Complex Numbers: Real and imaginary parts, The complex plane, Complex algebra (complex conjugate, absolute value, complex equations, graphs, physical applications), Elementary functions of complex numbers, Euler's formula, Powers and roots of complex numbers, The exponential and trigonometric functions, Hyperbolic functions, Logarithms, Complex roots and powers, Inverse trigonometric and hyperbolic functions, Some applications.

Unit V Ordinary Differential Equations: Separable equations, Linear first order equations, Other methods for first order equations, Second order linear equations with constant coefficients and both zero and non-zero right hand side, Other second order equations, The Laplace transform, Solution of differential equations by Laplace transforms.

Suggested Texts and References:
1.Calculus @ iitb – Concepts,Examples and Quizzes, Inder K. Rana, Version 2, 2010 (Math4all).
2. Introduction to Real Analysis, 3rd Ed., Robert G. Bartle and Donald R. Sherbert, Wiley
3. Student Ed., Wiley India (4th Reprint) 2007.

4. Mathematical Methods in the Physical Sciences, Mary L. Boas, 3rd Edition, Wiley Student Ed.,Wiley India (Reprint) 2009 (for complex numbers and ordinary differential equations).

SEMESTER –II

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
B201	Biology – II	[2 + 1]	3
C201	Chemistry – II	[2 + 1]	3
MB201/M201	Mathematics – II	[2 + 1]	3
P201	Physics – II (Optics, Electricity & Magnetism)	[2 + 1]	3
G201	Electronics and Instrumentation	[2 + 1]	3
G202	Glimpses of Contemporary Science	[2 + 0]	2
		Contact Hours / Week Laboratory	
BL201	Biology Laboratory	[4]	2
CL201	Chemistry Laboratory	[4]	2
PL201	Physics Laboratory	[4]	2
GL201	Electronics Laboratory	[4]	2
		Semester Credits	**25**
		Subtotal	**50**

MB201: Mathematics – II **(For Biology Stream)**

Unit I Functions of several variables, partial derivatives, geometric interpretation, properties of partial derivatives, chain rule, applications. Elementary discussion on scalars and vectors, norm of a vector, dot product, projections. Linear equations and matrices, matrix operations. Concept of a determinant, its properties, evaluation of a determinant, cross product as a determinant, lines and planes. Elementary ideas of tensors.

Unit II Vector functions. Gradient of a function, geometric interpretation, properties and applications; divergence and curl of a vector function, geometric interpretation, properties and applications; higher derivatives, Laplacian. Line integrals. Double and triple integrals, their properties and applications to areas, volumes, etc.

Unit III Gradient theorem, Green's theorem, Stokes' theorem, divergence theorem, applications. Proofs of Stokes' and divergence theorems through physical examples (such as circulation in a 2 dimensional plane and accumulation of fluid in a given volume).

Unit IV Curvilinear coordinate systems, spherical and cylindrical coordinates, area and volume elements, illustrations. Gradient, divergence and curl in curvilinear coordinate systems.

Unit V Introduction to linear algebra. Vector spaces, linear dependence and independence, notion of basis, and dimension, subspaces. Examples. More on matrices: special kinds of matrices, their properties.

Eignevalues and eigenvectors, secular determinant, characteristic polynomial. Eigenvalues and eigenvectors of a real symmetric matrix. Illustrative examples. Applications of linear algebra.

Suggested Texts and References (for M100 and M200)

1) Calculus: Gilbert Strang (MIT Courseware)
2) Calculus: Thomas
3) Elementary Linear Algebra: Howard Anton and Chris Rorres
4) Introduction to Linear Algebra: Gilbert Strang (MIT Courseware)
5) Mathematical Methods for Scientists and Engineers: George B. Arfken and Hans J. Weber (for curvilinear coordinates, beta and gamma functions only)

M201: Mathematics – II (For Physics & Chemistry Stream)

Unit I Differential equations: separable equations, first order differential equations. Second order differential equations and Wronskian; equations with constant coefficients, homogeneous and inhomogeneous equations.

Unit II Scalar functions of several variables, partial derivatives, geometric interpretation (maxima, minima, saddle points), properties of partial derivatives, chain rule, applications. Gradient of a function, geometric interpretation, properties and applications.

Unit III Vector functions. Derivatives of a vector function, divergence and curl, geometric interpretation, properties and applications; higher derivatives, Laplacian.

Unit IV Spherical and cylindrical coordinates, area and volume elements, illustrations. Gradient and divergence in spherical and cylindrical coordinates.

Unit V Line integrals. Double and triple integrals, their properties and applications to areas, volumes, etc. Gradient theorem, divergence theorem, Stokes' theorem, applications. Illustrations from fluid flow and electromagnetism.

Suggested Texts and References

1. Calculus, Gilbert Strang (MIT Courseware) http://ocw.mit.edu/resources/res-18-001-calculus-online-textbook-spring-2005/textbook/
2. Thomas' Calculus, 11th Edition, M. Weir, J. Hass and F. R. Giordano, Pearson Education.
3. Mathematical Methods in the Physical Sciences, 3rd Ed., Mary L. Boas, Wiley Student Ed., Wiley India (Reprint) 2009 (for complex numbers and differential equations)
4. Elementary Linear Algebra, 10th Edition, Howard Anton and Chris Rorres, Wiley Student Ed., Wiley 2011.
5. Introduction to Linear Algebra, 4th Edition, Gilbert Strang, Wellesley Cambridge Press, 2009.

M201: Mathematics – II (For Physics & Chemistry Stream)

Unit I Algebra of matrices (real numbers and other fields), special matrices (scalar, diagonal, upper and lower triangular, etc.). Linear equations and their matrix representations, row-echelon form, Gauss- Jordan elimination, general and particular solutions, homogeneous equations. Invertible matrices and elementary matrices, computation of inverse using elementary row operations. Determinants and their properties, minors and cofactors, determinant of a product of matrices, adjoint of a matrix, invertible matrices and determinants. Cramer's rule. Rank of a

matrix, rank and invertibility. Vector spaces (real numbers and other fields). Examples including the space of polynomials, the space of functions, the solution space of a system of homogeneous linear equations, and row and column spaces of a matrix. Span, linear independence, basis, dimension and its uniqueness.

Unit II Linear transformations, isomorphisms, kernel and image, the dimension formula. Eigenvalues and eigenvectors of a square matrix or a linear operator, computation of eigenvalues and eigenvectors, characteristic polynomial, sums and products of eigenvalues, similar matrices, diagonalization.

Unit III Review of geometric properties of vectors in $\mathbf{R^2}$ **and** $\mathbf{R^3}$, dot, cross and scalar triple products, their properties and their geometric interpretation. Vector fields, review of definitions and basic properties of gradient, divergence, directional derivatives, divergence, curl and the Laplace operator. Paths and curves in $\mathbf{R^2}$ and $\mathbf{R^3}$, tangent, velocity, acceleration and force vectors, arc length.

Unit IV A brief overview of differentials. Double integrals as limits of Riemann sums and as volumes, their computation as iterated integrals, elementary regions. Triple integrals as limits of Riemann sums, their computation as iterated integrals, elementary regions. Change of variables, the Jacobian determinant, spherical and cylindrical coordinates.

Unit V Application of double and triple integrals to finding volume, centre of mass, etc. Line integrals, their dependence on parametrization, their computation, work done. Parametrized surfaces, normal to a surface, surface area, surface integrals and their dependence on parametrization, their computation. Oriented surfaces, statement of Green's theorem and its application to computing the area of a region, statements of Stokes' theorem, and Gauss' divergence theorem. Conservative vector fields.

Suggested Texts and References:

1. A Course in Linear Algebra with Applications, 2nd Edition, D. J. S. Robinson, World Scientific 2006.
2. Calculus and Analytic Geometry, 9th Edition, G. B. Thomas and R. L. Finney, Pearson Education 2002.
3. Basic Multivariable Calculus, J. Marsden, A. Tromba and A. Weinstein, Springer (India),2009.
4. Calculus @ iitb–Concepts, Examples and Quizzes, Inder K. Rana, Version 2, 2010(Math4all).

M201 : Mathematics II (Calculus and Linear Algebra)

(For Mathematics Stream only)

Unit I Recollection and rigorous treatment of continuity and differentiability of a function of one variable.Riemann integration, proof of the Fundamental Theorem of Calculus. Functions of two and three variables, double and triple integrals.

Unit II Line integrals. Parametrized surfaces, oriented surfaces. Stokes Theorem, Gauss Divergence Theorem (both without proof).

Unit III Recollection of the algebra of matrices (mainly over the field of real numbers, but mention other fields also), linear equations, row-echelon form, Gauss-Jordan elimination. Determinants, rank of a matrix, rank and invertibility.

Unit IV Vector spaces (mainly over the field of real numbers, but mention other fields also), span, linear independence, basis, dimension and its uniqueness (without proof).

Unit V Linear transformations, kernel and image, the rank-nullity formula. Eigen values and eigenvectors of a square matrix or a linear operator.

References

[1] D.J.S. Robinson, A Course in Linear Algebra with Applications, World Scientific.
[2] G. B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th ed., Addison-Wesley/Narosa,1998.
[3] J. Marsden, A. Tromba and A. Weinstein, Basic Multivariable Calculus, Springer
[4] Inder K. Rana, Calculus@iitb, Concepts and Examples, Version 1.2, math4all 2009.

SECOND YEAR

SEMESTER –III

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
M301	Foundations	[3 + 1]	4
M302	Analysis I	[3+ 1]	4
M303	Algebra I	[3 + 1]	4
M304	Discrete Mathematics	[3 + 1]	4
M305	Computational Mathematics I	[3 + 1]	4
H301	World Literature	[2 + 0]	2
H302	History and Philosophy of Science	[2 + 0]	2
		Lab Hours per Week	
GL301	Computation Mathematics Laboratory	[2]	1
		Semester Credits	**25**
		Subtotal	**75**

M301 : Foundations

Unit I Logic: Quantifiers, negations, examples of various mathematical and non-mathematical statements. Exercises and examples.
Set Theory: Definitions, subsets, unions, intersections, complements, symmetric difference, De Morgan's laws for arbitrary collection of sets. Power set of a set.

Unit II Relations and maps: Cartesian product of two sets. Relations between two sets. Examples of relations. Definition of a map, injective, surjective and bijective maps. A map is invertible if and only if it is bijective. Inverse image of a set with respect to a map. Relation between inverse images and set theoretic operations. Equivalence relations (with lots of examples). Schroeder-Bernstein theorem.

Unit III Finite and Infinite sets: Finite sets, maps between finite sets, proof that number of elements in a finite set is well defined. Definition of a countable set (inclusive of a finite set). Countably infinite and uncountable sets. Examples. Proof that every infinite set has a proper, countably infinite subset. Uncountability of P(N).

Unit IV Partially Ordered Sets: Concept of partial order, total order, examples. Chains, Zorn's Lemma.

Unit V Peano's Axioms. Well-Ordering Principle. Weak and Strong Principles of Mathematical Induction. Transfinite Induction. Axiom of Choice, product of an arbitrary family of sets. Equivalence of Axiom of Choice, Zorn's Lemma and Well-ordering principle.

Additional Topics (Optional)

(i) Dedekind's Construction of Real Numbers.
(ii) Decimal, dyadic, triadic expansions of real numbers.
(iii) Cantor Sets.

References

[1] Naive Set Theory, P. Halmos.
[2] Set Theory and Logic, R. Stoll.
A lot of the material can be found in the beginning sections of the following books:
[3] Methods of Real Analysis, R. Goldberg.
[4] Topology, J. Munkres.
[5] Elementary Number Theory, D. Burton.
[6] Real Analysis, Bartle and Sherbert.

M302 : Analysis I

Unit I Real Number System: Concept of a field, ordered field, examples of ordered fields, supremum, infimum. Order completeness of **R, Q** is not order complete. Absolute values, Archimedean property of **R. C** as a field, and the fact that **C** cannot be made into an ordered field. Denseness of **Q** in **R.** Every positive real number has a unique positive n-th root.

Unit II Sequences: Sequences, limit of a sequence, basic properties like $\lim_n(x_n y_n) = (\lim_n x_n)(\lim_n y_n)$.Bounded sequences, monotone sequences, a monotone increasing sequence bounded above converges to it's supremum. Sandwich theorem and its applications. Using the Arithmetic mean-Geometric mean inequality to prove results like $\lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$ and $\lim_n(1-\frac{1}{n})^n$ and are equal,$\lim_n \sqrt[n]{n} = 1$ and $\lim_n a^{\frac{1}{n}} = 1$. Cauchy's first limit theorem, Cauchy's second theorem.
Subsequences and Cauchy sequences: Every sequence of real numbers has a monotone subsequence. Definition of a Cauchy sequence. Cauchy completeness of **R, Q** is not Cauchy complete.

Unit III Infinite Series: Basic notions on the convergence of infinite series. Absolute and conditional convergence. Comparison test, ratio test, root test, alternating series test, Theorem of Dirichlet, Statement of Riemann's rearrangement theorem, Cauchy product of two series. Power series, radius of convergence via examples.

Unit IV Continuous functions: Continuity, sequential and neighbourhood definitions, basic properties such as sums and products of continuous functions are continuous. Intermediate Value Theorem, Continuous functions on closed and bounded intervals, Monotone continuous functions, inverse functions, Uniform Continuity, examples and counter-examples.

Differentiable functions: Definition : as a function infinitesimally approximable by a linear map, equivalence with Newton ratio definition, basic properties. One-sided derivatives, The O; o and $\sim$ notations with illustrative examples. Chain rule with complete proof (using above definition). Local monotonicity, relation between the sign of f' and local monotonicity. Proofs of Rolle's theorem and the Cauchy-Lagrange Mean value theorem. L'Hospital's rule and applications. Higher derivatives and Taylor's theorem, estimation of the remainder in Taylor's theorem, example:

$$f(x) = \begin{cases} e^{-\frac{1}{x^2}} & x \neq 0 \\ 0 & x = 0 \end{cases}$$. Convex functions.

Unit V Riemann Integration: Definition via upper and lower Riemann sums, basic properties. Riemann integrability, Thm : $f: [a, b] \rightarrow \boldsymbol{R}$ continuous implies $\boldsymbol{f}$ is Riemann integrable, examples of Riemann integrable functions which are not continuous on $[a, b]$. Thm : if $f: [a, b] \rightarrow \boldsymbol{R}$ is Riemann integrable then so is $|f|$ and $|\int_a^b f(x)dx| \leq \int_a^b |f(x)|dx$. Cauchy-Schwartz inequality

Improper integrals, power series and elementary functions : Cauchy's condition for existence of improper integrals, test for convergence. Examples : $\int \frac{\sin x}{x}\ dx$, $\int \cos x^2\ dx$, $\int \sin x^2\ dx$. Power series and basic properties, continuity of the sum, validity of term by term differentiation. Binomial theorem for arbitrary real coeficients. Elementary transcendental functions e^x, sin x, cos x and their inverse functions, $\log x$, $tan^{-1} x$, Gudermannian and other examples.

References

[1] Introduction to Real Analysis : R. Bartle & D. Sherbert, Wiley.
[2] A First Course in Analysis : G. Pedrick

M303 : Algebra I (Groups, rings, fields)

Unit I Recollection of equivalence relations and equivalence classes, congruence classes of integers modulo n. Definition of a group, examples including matrices, permutation groups, groups of symmetry, roots of unity. First properties of a group, laws of exponents, finite and infinite groups.

Unit II Subgroups and cosets, order of an element, Lagrange theorem, normal subgroups, quotient groups. Detailed look at the group S_n of permutations, cycles and transpositions, even and odd permutations, the alternating group, simplicity of A_n for $n \geq 5$.

Unit III Homomorphisms, kernel, image, isomorphism, the fundamental theorem of group Homomorphisms. Cyclic groups, subgroups and quotients of cyclic groups, finite and infinite cyclic groups.

Unit IV Cayleys theorem on representing a group as a permutation group. Conjugacy classes, centre, class equation, centre of a p-group. Sylow theorems, solvable and nilpotent groups.

Unit V Definition of a ring, examples including congruence classes modulo n, ideals and Homomorphisms, quotient rings, polynomial ring in one variable over a ring, units, fields, non-zero divisors, integral domains. Rings of fractions, field of fractions of an integral domain. PID, unique factorization in the ring of integers and in the polynomial ring over a field, Gauss Lemma.

References

[1] M. Artin, Algebra, Prentice Hall of India, 1994.
[2] D.S. Dummit and R.M. Foote, Abstract Algebra, 2nd Ed., John Wiley, 2002.
[3] N. Jacobson, Basic Algebra II, Hindustan Publishing Corporation, 1983.
[4] S. Lang, Algebra, 3rd ed. Springer (India) 2004.

M 304 : Discrete Mathematics

Unit I Combinatorics: Permutations and combinations. Linear equations and their relation to distribution into boxes.Distributions with repetitions and non-repetitions. Combinatorial derivation of these formulae. Pigeonhole Principle and applications.

Unit II Binomial and multinomial theorems. Inclusion-Exclusion Principle and Applications. Recurrence Relations and Generating Functions. Partitions of a number. Number of partitions. Brief introduction to the combinatorics of Young tableaux.

Unit III Graph theory: Vertices and edges. Graphs and special types like complete graph, bipartite graph. Degree of a vertex, weighted graphs. Traveling Salesman's Problem. Koenigsberg Seven-bridge puzzle. Walks, Paths, Circuits.

Unit IV Euler Graphs, Hamiltonian Paths and Circuits. Trees and algorithms to find trees in a given graph. Planar Graphs.

Unit V Spaning trees and cut sets. Minimal spanning trees and algorithms for their computer implementation: the Kruskal's algorithm. Coloring in graph theory. The four colour problem.

References

[1] Richard Stanley, Enumerative Combinatorics.
[2] Alan Tucker, Applied Combinatorics.
[3] F. Harrary, Graph Theory.
[4] Narsingh Deo, Graph Theory.

M305 : Computational Mathematics I

Unit I Basics of Spreadsheet Programmes (such as Libreoffce/gnumeric).

Unit II Inroduction to Mathematica including writing simple programmes.

Unit III Detailed exploration of notion of calculus of one variable, and simple multivariable calculus using Mathematica.

Unit IV Basic Linear Algebra Using Mathematica.

Unit V Numerical Solutions of Linear and Non-linear equations using Mathematica. Developing Programmes for each of these methods.

References

[1] Selwyn Hollis, CalcLabs with Mathematica for Single Variable Calculus, Fifth Edition.
[2] Selwyn Hollis, CalcLabs with Mathematica for Multivariable Calculus, Fifth Edition.
[3] Kenneth Shiskowski, Karl Frinkle, Principles of Linear Algebra with Mathematica.

H301 : World Literature

Unit I What is literature? - A discussion; introduction to literary terms, genres, and forms of various periods, countries, languages, etc.

Unit II The novel: Class study of 'Brave New World' by Aldous Huxley; group discussions and student presentations on other genres such as the graphic novel, detective fiction, children's literature, etc.

Unit III Plays: Introduction to the history of theatre, class study of (mainly) two plays: 'Pygmalion' by G. B. Shaw and 'Fire and Rain' by Girish Karnad, the setting up of a play-reading group through which the students can be introduced to several other plays.

Unit IV Poetry: Brief introduction, study of poetic genres, forms, topics, figures of speech, poetic language, etc. by analyzing various poems from around the world. Short stories, essays, and other types of writing by various authors.

Unit V Screening of films based on literary works, such as Pygmalion (My Fair Lady), Fire and Rain (Agnivarsha), Persepolis (a graphic novel), and many others.

SEMESTER –IV

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
M401	Analysis II	[3 + 1]	4
M402	Algebra II	[3+ 1]	4
M403	Elementary Number Theory	[3 + 1]	4
M404	Topology I	[3 + 1]	4
G401	Statistical Techniques and Applications	[3 + 1]	4

		Lab Hours per Week	
GL401	Computational Laboratory & Numerical Methods	[8]	4
GL402	Statistical Techniques Laboratory	[2]	1
		Semester Credits	**25**
		Subtotal	**100**

M401 : Analysis II (Multivariable Calculus)

Unit I Linear maps from $\mathbf{R}^n$ to $\mathbf{R}^m$, Directional derivative, partial derivative, total derivative, Jacobian, Mean value theorem and Taylors theorem for several variables, Chain Rule.

Unit II Parametrized surfaces, coordinate transformations, Inverse function theorem , Implicit function theorem, Rank theorem.

Unit III Critical points, maxima and minima, saddle points, Lagrange multiplier method.

Unit IV Multiple integrals, Riemann and Darboux integrals, Iterated integrals, Improper integrals, Change of
variables.

Unit V Integration on curves and surfaces, Greens theorem, Differential forms, Divergence, Stokes theorem.

References

[1] M. Spivak, Calculus on Manifolds.
[2] W. Fleming, Functions of Several Variables, 2nd Ed., Springer-Verlag, 1977.
[3] J.E.Marsden, A.J. Tromba and A. Weinstein, Basic Multivariable Calculus.
[4] W. Rudin, Principles of Mathematical Analysis, 3rd ed., McGraw-Hill, 1984.
[5] A Modern Approach to Classical Theorems of Advanced Calculus, W. A. Benjamin, Inc., 1965.

M402 : Algebra II (Linear Algebra)

Unit I Modules over a commutative ring, submodules and quotient modules, generators,homomorphisms, exact sequences, finitely generated free modules.

Unit II Vector spaces as modules over a field, subspaces, quotient spaces.Span and linear independence, basis, dimension.

Unit III Linear maps and their corrrespondence with matrices with respect to given bases, change of bases.

Unit IV Eigenvalues, eigenvectors, eigenspaces, characteristic polynomial, Cayley-Hamilton.

Unit V Bilinear forms, inner product spaces, Gram-Schmidt process, diagonalization, spectral theorem.

Note: Jordan and rational canonical forms to be done in M602 in Semester VI as an application of

the structure of finitely generated modules over a PID.

References

[1] M. Artin, Algebra, Prentice Hall of India, 1994.
[2] D.S. Dummit and R. M. Foote, Abstract Algebra, 2nd Ed., John Wiley, 2002.
[3] K. Ho_man and R. Kunze, Linear Algebra, Prentice Hall, 1992.
[4] N. Jacobson, Basic Algebra II, Hindustan Publishing Corporation, 1983.
[5] S. Lang, Algebra, 3rd ed. Springer (India) 2004.

M403 : Elementary Number theory

Unit I Fundamental theorem of arithmetic, divisibility in integers.Prime numbers and infinitude of primes. Infinitude of primes of special types. Special primes like Fermat primes, Mersenne primes, Lucas primes etc. Euclidean algorithm, greatest common divisor, least common multiple.

Unit II Equivalence relations and the notion of congruences. Wilson's theorem and Fermat's little theorem. Chinese remainder theorem. Continued fractions and their applications. Primitive roots, Euler's Phi function. Sum of divisors and number of divisors, M*ö*bius inversion.

Unit III Quadratic residues and non-residues with examples. Euler's Criterion, Gauss' Lemma. Quadratic reciprocity and applications. Applications of quadratic reciprocity to calculation of symbols.

Unit IV Legendre symbol: Definition and basic properties. Fermat's two square theorem, Lagrange's four square theorem.

Unit V Pythagorean triples. Diophantine equations and Bachet's equation. The duplication formula.

References

[1] D. Burton, Elementary Number Theory.
[2] Kenneth H. Rosen, Elementary number theory and its applications.
[3] Niven, Ivan M.; Zuckerman, Herbert S.; Montgomery, Hugh L, An Introduction to the Theory of Numbers.

M404 : Topology I

Unit I Recollection of some set theory, particularly the following topics:
(i) Equipotence of sets, Schroeder-Bernstein theorem, countable and uncountable sets, countability of **Q** and uncountability of **R**:
(ii) Equivalence relations, Zorn's lemma, axiom of choice.
Metric spaces: Definition and basic examples including the following:
(i) The discrete metric on any set.
(ii) **R** and $\mathbf{R}^n$ with Euclidean metrics, Cauchy-Schwarz inequality, definition of a norm on a finite dimensional **R**-vector space and the metric defined by a norm.
(iii) The set ***C***[0, 1] with the metric given by $\sup\ |f(t) - g(t)|$ (resp. $\int_0^1 |f(t) - g(t)|dt$).
(iv) Metric subspaces, examples.

Unit II Topology generated by a metric: Open and closed balls, open and closed sets, complement of an open (closed) set, arbitrary unions (intersections) of open (closed) sets, finite

intersections (unions) of open (closed) sets, open (closed) ball is an open (closed) set, a set is open if and only if it is a union of open balls, Hausdorff property of a metric space.

Equivalence of metrics, examples, the metrics on $\mathbf{R}^2$ given by $|x_1 - y_1| + |x_2 - y_2|$ (resp. $\max\{|x_1 - y_1|, |x_2 - y_2|\}$ is equivalent to the Euclidean metric, the shapes of open balls under these metrics.Limit points, isolated points, interior points, closure, interior and boundary of a set, dense and nowhere dense sets.

Unit III Continuous maps: $\varepsilon - \delta$ definition and characterization in terms of inverse images of open (resp. closed) sets, composite of continuous maps, pointwise sums and products of continuous maps into **R**; homeomorphism, isometry, an isometry is a homeomorphism but not conversely, uniformly continuous maps, examples.

Complete metric spaces: Cauchy sequences and convergent sequences, a subspace of a complete metric space is complete if and only if it is closed, Cantor intersection theorem, Baire categorytheorem and its applications, completion of a metric space.

General topological spaces, stronger and weaker topologies, continuous maps, homeomorphisms, bases and subbases, finite products of topological spaces.

Unit IV Compactness for general topological spaces: Finite subcoverings of open coverings and finite intersection property, continuous image of a compact set is compact, compactness and Hausdorff property.

Compactness for metric spaces**:** Bolzano-Weierstrass property, the Lebesgue number for an open covering, sequentially compact and totally bounded metric spaces, Heine-Borel theorem, compact subsets of **R**; a continuous map from a compact metric space is uniformly continuous.

Unit V Connectedness: definition, continuous image of a connected set is connected, characterization in terms of continuous maps into the discrete space **N**, connected subsets of **R**; intermediate value theorem as a corollary, countable (arbitrary) union of connected sets, connected components,

References

[1] E. T. Copson, Metric spaces.
[2] M. Eisenberg, Topology.
[3] R.H. Kasriel, Undergraduate topology.
[4] W. Rudin, Principles of mathematical analysis.
[5] G. F. Simmons, Topology and modern analysis.
[6] W. A. Sutherland, Introduction to metric and topological spaces.

G401: Statistical Techniques and Applications

Unit-I Purpose of Statistics, Events and Probabilities, Assignments of probabilities to events, Random events and variables, Probability Axioms and Theorems. Probability distributions and properties: Discrete, Continuous and Empirical distributions.

Unit-II Expected values: Mean, Variance, Skewness, Kurtosis, Moments and Characteristics Functions. Types of probability distributions: Binomial, Poisson, Normal, Gamma, Exponential, Chi-squared, Log-Normal, Student's t, F distributions, Central Limit Theorem.

Unit-III Monte Carlo techniques: Methods of generating statistical distributions: Pseudorandom numbers from computers and from probability distributions, Applications. Parameter inference: Given prior discrete hypotheses and continuous parameters, Maximum likelihood method for parameter inference.

Unit-IV Error Analysis: Statistical and Systematic Errors, Reporting and using uncertainties, Propagation of errors, Statistical analysis of random uncertainties, Averaging Correlated/ Uncorrelated Measurements. Deconvolution methods, Deconvolution of histograms, binning-free methods. Least-squares fitting: Linear, Polynomial, arbitrary functions: with descriptions of specific methods; Fitting composite curves.

Unit-V Hypothesis tests: Single and composite hypothesis, Goodness of fit tests, P-values, Chi-squared test, Likelihood Ratio, Kolmogorov- Smirnov test, Confidence Interval. Covariance and Correlation, Analysis of Variance and Covariance. Illustration of statistical techniques through hands-on use of computer programs.

Suggested Texts and References:

1. Statistics: A Guide to the Use of Statistical Methods in the Physical Sciences, R.J. Barlow, John Wiley 1989
2. The Statistical Analysis of Experimental Data, John Mandel, Dover Publications 1984
3. Data Reduction and Error Analysis for the Physical Sciences, 3rd Edition, Philip Bevington and Keith Robinson, McGraw Hill 2003

THIRD YEAR

SEMESTER –V

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
M501	Analysis III	[3 + 1]	4
M502	Algebra III	[3+ 1]	4
M503	Topology II	[3 + 1]	4
M504	Probability Theory	[3 + 1]	4
G501	Earth Science & Energy & Environmental Sciences	[3 + 1]	4
PM501	Numerical Analysis	[3 + 1]	4
		Lab Hours per Week	
PML501	Numerical Methods Laboratory	[2]	1
		Semester Credits	**25**
		Subtotal	**125**

M501 : Analysis III (Measure Theory and Integration)

Unit I Sigma algebra of sets, measure spaces. Lebesgues outer measure on the Real line. Measurable set in the sense of Caratheodory. Translation invariance of Lebesgue measure. Existence of a non-Lebesgue measurable set. Cantor set- uncountable set with measure zero.

Unit II Measurable functions, types of convergence of measurable functions. The Lebesgue integral for simple functions, nonnegative measurable functions and Lebesgue integrable function, in general.

Unit III Convergence theorems- monotone and dominated convergence theorems. Comparison of Riemann and Lebesgue integrals. Riemanns theorem on functions which are continuous almost everywhere.

Unit V The product measure and Fubinis theorem. The L^p spaces and the norm topology. Inequalities of Hölder and Minkowski. Completeness of L^p and L^∞ spaces.

References

[1] H.L. Royden, Real Analysis, Pearson Education.
[2] G. DeBarra, Introduction to Measure Theory, Van Nostrand Reinhold.
[3] I. K. Rana, An Introduction to Measure and Integration, Narosa.
[4] H.S. Bear, A Primer on Lebesgue Integration, Academic press.

M502 : Algebra III (Galois Theory)

Unit I Prime and maximal ideals in a commutative ring and their elementary properties.

Unit II Field extensions, prime fields, characteristic of a field, algebraic field extensions, finite field extensions, splitting fields, algebraic closure, separable extensions, normal extensions,

Unit III Finite Galois extensions, Fundamental Theorem of Galois Theory.

Unit IV Solvability by radicals.

Unit V Extensions of finite fields.

References

[1] M. Artin, Algebra, Prentice Hall of India, 1994.
[2] D. S. Dummit and R. M. Foote, Abstract Algebra, 2nd Ed., John Wiley, 2002.
[3] N. Jacobson, Basic Algebra I & II, Hindustan Publishing Corporation, 1983.
[4] S. Lang, Algebra, 3rd ed. Springer (India) 2004.
[5] R. Lidl and H. Niederreiter, Introduction to Finite Fields and Their Applications, Cambridge University Press, 1986.

M503 : Topology II

Unit I Review of some notions from Topology I. Basic Separation axioms and first and second countability
axioms. Examples.

Unit II Products and quotients. Tychonoff's theorem. Product of connected spaces is connected. Weak

topology on X induced by a family of maps $f_\alpha: X \to X_\alpha$ where each X_α is a topological space.The coherent topology on Y induced by a family of maps $g_\alpha : Y_\alpha \to Y$ where Y_α are given topological spaces. Examples of quotients to illustrate the universal property such as embeddings of $\mathbf{RP}^2$ and the Klein's bottle in $\mathbf{R}^4$.

Unit III Completely regular spaces and its embeddings in a product of intervals. Compactification, Alexandroff and Stone-Cech compactifications.

Unit IV Normal spaces and the theorems of Urysohn and Tietze. The metrization theorem of Urysohn.

Unit V Local compactness, local connectedness and local path-connectedness and their basic properties. If $q: X \to Y$ is a quotient map and Z is locally compact Hausdorff space then $q \times id : X \times Z \to Y \times Z$ is also a quotient map. Locally finite families of sets and Partitions of unity. Baire Category theorem for locally compact Hausdorff spaces.

References

[1] G. F. Simmons, Topology and modern analysis
[2] W. A. Sutherland, Introduction to metric and topological spaces.
[3] S. Willard, General Topology, Dover, New York.

M 504 : Probability Theory

Unit I Probability as a measure, Probability space, conditional probability, independence of events, Bayes formula. Random variables, distribution functions, expected value and variance. Standard Probability distributions: Binomial, Poisson and Normal distribution.

Unit II Borel-Cantelli lemmas, zero-one laws. Sequences of random variables, convergence theorems, Various modes of convergence. Weak law and the strong law of large numbers.

Unit III Central limit theorem: DeMoivre-Laplace theorem, weak convergence, characteristic functions, inversion formula, moment generating function.

Unit IV Random walks, Markov Chains, Recurrence and Transience.

Unit V Conditional Expectation, Martingales.

References

[1] Marek Capinski and Tomasz Zastawniak, Probability through Problems, Springer, Indian Reprint 2008.
[2] P. Billingsley, Probability and Measure, 3rd ed., John Wiley & Sons, New York, 1995.
[3] J. Rosenthal, A First Look at Rigorous Probability, World Scientific, Singapore, 2000.
[4] A.N. Shiryayev, Probability, 2nd ed., Springer, New York, 1995.
[5] K.L. Chung, A Course in Probability Theory, Academic Press, New York, 1974.

SEMESTER –VI

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits

M601	Analysis IV	[3 + 1]	4
M602	Algebra IV	[3+ 1]	4
M603	Differential Geometry & Applications	[3 + 1]	4
M604	Differential Equations & Dynamical Systems	[3 + 1]	4
M605	Computational Mathematics II	[3 + 1]	4
PM601	Ethics of Science and IPR	[2 + 0]	2
		Lab Hours per Week	
PML601	Numerical Methods Laboratory	[6]	3
		Semester Credits	**25**
		Subtotal	**150**

M601 : Analysis IV (Complex Analysis)

Unit I Complex numbers and Riemann sphere. Mobius transformations.

Unit II Analytic functions. Cauchy-Riemann conditions, harmonic functions, Elementary functions, Power series, Conformal mappings.

Unit III Contour integrals, Cauchy theorem for simply and multiply connected domains. Cauchy integral formula, Winding number.

Unit IV Morera's theorem. Liouville's theorem, Fundamental theorem of Algebra. Zeros of an analytic function and Taylors theorem. Isolated singularities and residues, Laurent series, Evaluation of real integrals.

Unit V Zeros and Poles, Argument principle, Rouchs theorem.

References

[1] L.Ahlfors, Complex Analysis.
[2] R.V. Churchill and J. W. Brown, Complex Variables and Applications, International Student Edition,Mc-Graw Hill, 4th ed., 1984.
[3] B.R. Palka, An Introduction to Complex Function Theory, UTM Springer-Verlag, 1991.

M602 : Algebra IV (Rings and Modules: Some Structure Theory)

Unit I Recollection of modules, submodules, quotient modules, homomorphisms.

Unit II External and internal direct sums of modules. Tensor product of modules over a commutative ring. Functorial properties of and Hom.

Unit III Definitions and elementary properties of projective and injective modules over a commutative ring.

Unit IV Structure of finitely generated modules over a PID. Applications to matrices and linear maps over field: rational and Jordan canonical forms.

Unit V Simple modules over a not necessarily commutative ring, modules of finite length, Jordan-Holder Theorem, Schur's lemma.

(**Optional, if time permits**) Semisimple modules over a not necessarily commutative ring, Wedderburn Structure Theorem for semisimple rings.

References

[1] M. Artin, Algebra, Prentice Hall of India, 1994.
[2] D.S. Dummit and R. M. Foote, Abstract Algebra, 2nd Ed., John Wiley, 2002.
[3] N. Jacobson, Basic Algebra I & II, Hindustan Publishing Corporation, 1983.
[4] S. Lang, Algebra, 3rd ed. Springer (India) 2004.

M603 : Differential Geometry & Applications

Unit I Curvature of curves in E^n: Parametrized Curves, Existence of Arc length parametrization, Curvature of plane curves, Frennet-Serret theory of (arc-length parametrized) curves in E^3, Curvature of (arc-length parametrized) curves in En, Curvature theory for parametrized curves in E^n. Significance of the sign of curvature, Rigidity of curves in E^n.

Unit II Euler's Theory of curves on Surfaces **:** Surface patches and local coordinates, Examples of surfaces in E^3, curves on a surface, tangents to the surface at a point, Vector fields along curves, Parallel vector fields, vector fields on surfaces, normal vector _elds, the First Fundamental form, Normal curvature of curves on a surface, Geodesics, geodesic Curvature, Christoffel symbols, Gauss' formula,Principal Curvatures, Euler's theorem.

Unit III Gauss' theory of Curvature of Surfaces **:** The Second Fundamental Form, Weingarten map and the Shape operator, Gaussian Curvature, Gauss' Theorema Egregium, Guass-Codazzi equations,Computation of First/Second fundamental form, curvature etc. for surfaces of revolution and other examples.

Unit IV More Surface theory**:** Isoperimetric Inequality, Mean Curvature and Minimal Surfaces (introduction), surfaces of constant curvature, Geodesic coordinates, Notion of orientation, examples of non-orientable surfaces, Euler characteristic, statement of Gauss-Bonnet Theorem.

Unit V Modern Perspective on Surfaces: Tangent planes, Parallel Transport, Afine Connections, Riemannian metrics on surfaces.

References

[1] Elementary Differential Geometry : Andrew Pressley, Springer Undergraduate Mathematics Series.
[2] Elementary Differential Geometry : J. Thorpe, Elsevier.
[3] Differential Geometry of Curves and Surfaces : M. do Carmo.
[4] Elements of Differential Geometry : R. Millman & G. Parker.

M604 : Differential Equations & Dynamical Systems

Unit I Basic existence and uniqueness of systems of ordinary differential equations satisfying the Lipschitz's condition. Examples illustrating non-uniqueness when Lipschitz or other relevant conditions are dropped. Gronwall's lemma and its applications to continuity of the solutions with

respect to initial conditions. Smooth dependence on initial conditions and the variational equation. Maximal interval of existence and global solutions. Proof that if (a, b) is the maximal interval of existence and a < 1 then the graph of the solution must exit every compact subset of the domain on the differential equation.

Unit II Linear systems and fundamental systems of solutions. Wronskians and its basic properties. The Abel Liouville formula. The dimensionality of the space of solutions. Fundamental matrix. The method of variation of parameters.

Unit III Linear systems with constant coefficients and the structure of the solutions. Matrix exponentials and methods for computing them. Solving the in-homogeneous system. The Laplace transform and its applications.

Unit IV Second order scalar linear differential equations. The Sturm comparison and separation theorems and regular Sturm-Liouville problems.

Unit V Series solutions of ordinary differential equations and a detailed analytic study of the differential equations of Bessel and Legendre. Dynamical systems and basic notions of dynamical systems such as ows, rectification theorem, rest points and its stability. Liouville's theorem on the preservation of phase volume. First integrals and their applications.

References

[1] R. Courant and D. Hilbert, Methods of Mathematical Physics, Volume - I
[2] W. Hurewicz, Lectures on ordinary differential equations, Dover, New York.
[3] . F. Simmons, Differential equations with applications and historical notes, McGraw Hill.

M605 : Computational Mathematics II

Unit I Introduction to SAGE. Using SAGE to explore basics notions of Linear algebra, Number theory, Group Theory

Unit II Solving linear and non-linear optimization problems using Mathematica. Developing programmes for various numerical optimization techniques.

Unit III . Exploration of Galois theory and Finite Fields Using Sage/Singular/Kash etc.

Unit IV Basics of discrete mathematics using Sage/Mathematica. Exploring advanced notions of Complex Analysis and Differential Equations using Mathematica.

Unit V Applied Linear Algebra using Mathematica, various matrix factorizations and their applications.

FOURTH YEAR

SEMESTER –VII

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits

M701	Functional Analysis	[3 + 1]	4
M702	Commutative Algebra	[3+ 1]	4
M703	Differential Topology	[3 + 1]	4
M704	Partial Differential Equations	[3 + 1]	4
M705	Representation Theory of Finite Groups	[3 + 1]	4
MPr701	Project		5
		Semester Credits	**25**
		Subtotal	**175**

M701 : Functional Analysis

Unit I Normed linear spaces. Riesz lemma. Heine-Borel theorem. Continuity of linear maps. Hahn-Banach extension and separation theorems.

Unit II Banach spaces. Subspaces, product spaces and quotient spaces. Standard examples of Banach spaces like l^p, L^p, C([0; 1]) etc.Uniform boundedness principle. Closed graph theorem. Open mapping theorem. Bounded inverse theorem.

Unit III Spectrum of a bounded operator. Eigenspectrum. Gelfand-Mazur theorem and spectral radius formula. Dual spaces. Transpose of a bounded linear map. Standard examples.

Unit IV Hilbert spaces. Bessel inequality, Riesz-Schauder theorem, Fourier expansion, Parseval's formula.

Unit V In the framework of a Hilbert space: Projection theorem. Riesz representation theorem. Uniqueness of Hahn-Banach extension.

References

[1] J.B. Conway, A course in Functional Analysis, Springer-Verlag, Berlin, 1985.
[2] G. Go_man and G. Pedrick, First course in functional analysis, Prentice-Hall, 1974.
[3] E. Kreyszig, Introductory Functional Analysis with applications, John Wiley & Sons, NY, 1978.
[4] B.V. Limaye, Functional Analysis, 2nd ed., New Age International, New Delhi, 1996.
[5] A. Taylor and D. Lay, Introduction to functional analysis, Wiley, New York, 1980.

M702 : Commutative Algebra

Unit I Prime and maximal ideals in a commutative ring, nil and Jacobson radicals, Nakayamas lemma, local rings.

Unit II Rings and modules of fractions, correspondence between prime ideals, localization.

Unit III Modules of finite length, Noetherian and Artinian modules. Primary decomposition in a Noetherian module, associated primes, support of a module.

Unit IV Graded rings and modules, Artin-Rees, Krull-intersection, Hilbert-Samuel function of a local ring, dimension theory, principal ideal theorem.

Unit V Integral extensions, Noethers normalization lemma, Hilberts Nullstellensatz (algebraic and geometric versions).

References

[1] M.F Atiyah and I.G MacDonald, Introduction to Commutative Algebra, Addison-Wesley, 1969.
[2] D. Eisenbud, Commutative Algebra with a view toward algebraic geometry, Springer-Verlag, Berlin, 2003.
[3] H. Matsumura, Commutative ring theory, Cambridge Studies in Advanced Mathematics No. 8, Cambridge University Press, Cambridge, 1980.
[4] S. Raghavan, B. Singh and R. Sridharan, Homological methods in commutative algebra, TIFR Math. Pamphlet No.5, Oxford, 1975.
[5] B. Singh, Basic Commutative Algebra, World Scientific, 2011.

M703 : Differential Topology

Unit I Differentiable functions on $\mathbf{R}^n$: Review of differentiable functions $\mathbf{f : R^n \to R^m}$, Implicit and Inverse function theorems, Immersions and Submersions, critical points, critical and regular values.

Unit II Manifolds: Level sets, sub-manifolds of $\mathbf{R}^n$, immersed and embedded sub-manifolds, tangent spaces, differentiable functions between sub-manifolds of R_n, abstract differential manifolds and tangent spaces.

Unit III Differentiable functions on Manifolds: Differentiable functions $f : M \to N$, critical points, Sard's theorem, non-degenerate critical points, Morse Lemma, Manifolds with boundary, Brouwer fixed point theorem, mod 2 degree of a mapping.

Unit IV Transversality: Orientation of Manifolds, oriented intersection number, Brouwer degree, transverse intersections.

Unit V Integration on Manifolds: Vector field and Differential forms, integration of forms, Stokes' theorem, exact and closed forms, Poincar Lemma, Introduction to de Rham theory.

References

[1] Topology from a Di_erentiable Viewpoint : J. Milnor.
[2] Di_erential Topology : V. Guellemin & A. Pollack.
[3] Di_erential Topology : M. Hirsch.

M704 : Partial Differential Equations

Unit I Generalities on the origins of partial differential equations. Generalities on the Cauchy problem for a scalar linear equation of arbitrary order. The concept of characteristics. The Cauchy-Kowalevsky theorem and the Holmgren's uniqueness theorem. The fundamental equations of mathematical physics as paradigms for the study of Elliptic, Hyperbolic and Parabolic equations.

Unit II Quasilinear first order scalar partial differential equations and the method of characteristics. Detailed discussion of the inviscid Burger's equation illustrating the formation of discontinuities in finite time. The fully nonlinear scalar equation and Eikonal equation. The Hamilton-Jacobi equation.

Unit III Detailed analysis of the Laplace and Poisson's equations. Green's function for the Laplacian and its basic properties. Integral representation of solutions and its consequences such as the analyticity of solutions. The mean value property for harmonic functions and maximum principles. Harnack inequality.

Unit IV The wave equation and the Cauchy problem for the wave equation. The Euler-Poisson-Darboux
equation and integral representation for the wave equation in dimensions two and three. Properties of solutions such as finite speed of propagation. Domain of dependence and domain of inuence.

Unit V The Cauchy problem for the heat equation and the integral representation for the solutions of The Cauchy problem for Cauchy data satisfying suitable growth restrictions. Infinite speed of propagation of signals. Example of non-uniqueness. Fourier methods for solving initial boundary value problems.

References

[1] R. Courant and D. Hilbert, Methods of Mathematical Physics, Volume - II
[2] R. C. McOwen, Partial differential equations, Pearson Education, 2004.

M705 : Representation Theory of Finite Groups

Unit I Recollection of left and right modules, direct sums, tensor products.

Unit II Semi-simplicity of rings and modules, Schur0s lemma, Maschke0s Theorem,

Unit III Wedderburn0s Structure Theorem. The group algebra.

Unit IV Representations of a finite group over a field, induced representations, characters, orthogonality relations.

Unit V Representations of some special groups. Burnside's p^aq^b theorem.

References

[1] M. Artin, Algebra, Prentice Hall of India, 1994.
[2] M. Burrow, Representation Theory of Finite Groups, Academic Press, 1965.
[3] D.S. Dummit and R. M. Foote, Abstract Algebra, 2nd Ed., John Wiley, 2002.
[4] N. Jacobson, Basic Algebra I & II, Hindustan Publishing Corporation, 1983.
[5] S. Lang, Algebra, 3rd ed. Springer (India) 2004.
[6] J .P. Serre, Linear Representation of Groups, Springer-Verlag, 1977.

SEMESTER –VIII

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
M801	Fourier Analysis	[3 + 1]	4
M802	Algebraic Number Theory	[3+ 1]	4

M803	Algebraic Topology	[3 + 1]	4
M804	Stochastic Analysis	[3 + 1]	4
M805	Computational Mathematics III	[3 + 1]	4
MPr801	Project		5
		Semester Credits	**25**
		Subtotal	**200**

M801 : Fourier Analysis

Unit I Fourier series. Discussion of convergence of Fourier series.

Unit II Uniqueness of Fourier Series, Convolutions, Cesaro and Abel Summability, Fejer`s theorem, Dirichlets theorem, Poisson Kernel and summability kernels. Example of a continuous function with divergent Fourier series.

Unit III Summability of Fourier series for functions in L^1 , L^2 and L^p spaces. Fourier-transforms of integrable functions. Basic properties of Fourier transforms, Poisson summation formula, Hausdorff-Young inequality, Riesz-Thorin Interpolation theorem.

Unit IV Schwartz class of rapidly decreasing functions, Fourier transforms of rapidly decreasing functions, Riemann Lebesgue lemma, Fourier Inversion Theorem, Fourier transforms of Gaussians, Plancheral theorem, Paley-Weiner theorem.

Unit V Distributions and Fourier Transforms: Calculus of Distributions, Tempered Distributions: Fourier transforms of tempered distributions, Convolutions, Applications to PDEs.

References

[1] Y. Katznelson, Introduction to Harmonic Analysis, Dover.
[2] R. E. Edwards, Fourier Series, Academic Press.
[3] E. M. Stein and R. Shakarchi, Fourier Analysis: An Introduction, Princeton University Press, Princeton 2003.
[4] W. Rudin, Fourier Analysis on groups, Interscience.

M802 : Algebraic Number Theory

Unit I Field extensions and examples of field extensions of rational numbers, real numbers and complex numbers. Monic polynomials, Integral extensions, Minimal polynomial, Characteristic polynomial.

Unit II Integral closure and examples of rings which are integrally closed. Examples of rings which are not integrally closed. The ring of integers. The ring of Gaussian integers. Quadratic extensions and description of the ring of integers in quadratic number fields. Units in quadratic number fields and relations to continued fractions.

Unit III Noetherian rings, Rings of dimension one. Dedekind domains. Norms and traces. Derive formulae relating norms and traces for towers of field extensions. Discriminant and calculations of the discriminant in the special context of quadratic number fields. Different and it's applications.

Unit IV Cyclotomic extensions and calculation of the discriminant in this case. Factorization of ideals into prime ideals and its relation to the discriminant. Ramification theory, residual degree and its relation to the degree of the extension. Ramified primes in quadratic number fields.

Unit V Ideal class group. Geometric ideas involving volumes. Minkowski's theorem and its application to proving finiteness of the ideal class group. Real and complex embeddings. Structure of finitely generated abelian groups. Dirichlet's Unit Theorem and the rank of the group of units. Discrete valuation rings, Local fields.

References

[1] Janusz, Algebraic Number Fields.
[2] Neukirch, Algebraic Number Theory.
[3] Marcus, Number Fields.

M803 : Algebraic Topology

Unit I Review of quotient spaces and its universal properties. Examples on $\mathbf{RP^n}$, Klein's bottle, Mobius band, $\mathbf{CP^n}$, ***SO(n, R) .*** Connectedness and path connectedness of spaces such as ***SO(n, R)*** and other similar examples. Topological groups and their basic properties. Proof that if H is a connected subgroup such that G/H is also connected (as a topological space) then G is connected. Quaternions, $\mathbf{S^3}$ and ***SO(3, R) .*** Connected, locally path connected space is path connected.

Unit II Paths and homotopies of paths. The fundamental group and its basic properties. The fundamental group of a topological group is abelian. Homotopy of maps, retraction and deformation retraction. The fundamental group of a product. The fundamental group of the circle. Brouwer's fixed poin theorem. Degree of a map. Applications such as the fundamental theorem of algebra, Borsuk-Ulam theorem and the Perron Frobenius theorem.

Unit V Covering spaces and its basic properties. Examples such as the real line as a covering space of a circle, the double cover $\eta : \mathbf{S^n} \to \mathbf{RP^n}$, the double cover $\eta : \mathbf{S^3} \to$ ***SO(3, R) .*** Relationship to the fundamental group. Lifting criterion and Deck transformations. Equivalence of covering spaces. Universal covering spaces. Regular coverings and its various equivalent formulations such as the transitivity of the action of the Deck group. The Galois theory of covering spaces.

Unit IV Orbit spaces. Fundamental group of the Klein's bottle and torus. Relation between covering spaces and Orientation of smooth manifolds. Non orientabilty of $\mathbf{RP^2}$ illustrated via covering spaces.

Unit V Free groups and its basic properties, free products with amalgamations. Concept of push outs in the context of topological spaces and groups. Seifert Van Kampen theorem and its applications. Basic notions of knot theory such as the group of a knot. Wirtinger's algorithm for calculating the Group of a knot illustrated with simple examples.

References

[1] E. L. Lima, Fundamental groups and covering spaces, A. K. Peters, 2003.
[2] W. Massey, Introduction to algebraic topology. Springer Verlag.

M804 : Stochastic Analysis

Unit I Preliminaries: Martingales and properties. Brownian Motion- definition and construction, Markov property, stopping times, strong Markov property zeros of one dimensional Brownian motion.

Unit II Reection principle, hitting times, higher dimensional Brownian Motion, recurrence and transience,occupation times, exit times, change of time, Levys theorem.

Unit III Stochastic Calculus: Predictable processes, continuous local martingales, variance and covariance processes.

Unit IV Integration with respect to bounded martingales and local martingales, Kunita Watanabe inequality, Ito s formula, stochastic integral, change of variables.

Unit V Stochastic differential equations, weak solutions, Change of measure, Change of time, Girsanovs theorem.

References

[1] Richard Durrett, Stochastc Calculus A Practical Introduction, CRC Press 1996.
[2] Karatzas I. and Steven Shreve, Brownian Motion and Stochastic Calculus, Springer.
[3] Oksendal Bernt, Stochastic Differential Equations, Springer.
[4] J.Michael Steele, Stochastic Calculus and Financial Applications, Springer, 2000

M805 : Computational Mathematics III

Unit I Differential Geometry of curves and surfaces using Mathematica. Exploring Differential Equation and Dynamical System using XPPAUT or some other specialized software.

Unit II Design of Experiments and Statistics Quality control using R. Project/Math Modeling problem using any Mathematical Software and developing Mathematica packages for various specific methods.

Unit III Exploring solutions of Partial Differential equations using Mathematica. Developing programmes to solve problems numerically.

Unit IV Exploring basic Notions of Commutative algebra using Sage/Singular /Kash etc.

Unit V Advanced notion of optimization techniques using Mathematica. Project/Math Modeling problem using any Mathematical Software and developing Mathematica packages for various specific methods.

References

[1] Alfred Gray, Elsa Abbena, Simon Salamon, Modern Differential Geometry of Curves and Surfaces with Mathematica, Third Edition.

FIFTH YEAR

SEMESTER –IX

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
MPr901	Project		20
		Semester Credits	**20**
		Subtotal	**220**

SEMESTER –X

Subject Code	Subject	Contact Hours / Week Theory+Tutorials	Credits
ME1001	Elective 1	[3 + 1]	4
ME1002	Elective 2	[3+ 1]	4
ME1003	Elective 3	[3 + 1]	4
ME1004	Elective 4	[3 + 1]	4
ME1005	Elective 5	[3 + 1]	4
		Semester Credits	**20**
	Total Credits (with 5 Electives)		**240**
	Minimum required		**240**

Electives

Students shall opt 5 Electives from the 30 Electives offered by School of Mathematical Sciences in the Xth semester

1. Advanced Commutative Algebra & Applications.
2. Advanced Differential Topology.
3. Advanced Numerical Techniques.
4. Combinatorics & Enumeration.
5. Lie Groups & Geometry
6. Topics in Algebraic Geometry.
7. Advanced Algebraic Topology & Applications.
8. Advanced Differential Geometry & Applications.
9. Algebraic curves.
10. Analytic number theory.
11. Class field theory.
12. Coding Theory & Cryptography.
13. Combinatorial Design Theory.
14. Econometrics.
15. Elliptic curves.
16. Financial Mathematics.
17. Finite Fields & Applications.
18. Fluid Mechanics.

19. Fractals & Applications.
20. Geometric algebra.
21. Homological Algebra & Applications.
22. Industrial Mathematics.
23. Introduction to algebraic groups.
24. Mathematical Applications to Engineering.
25. Mathematics & Nano Technology.
26. Modular forms.
27. Operator Theory.
28. Perturbation Theory.
29. Quantum Computing.
30. Wavelet Analysis & Applications.

Center for Basic Sciences
(CBS)
SCHEME OF EXAMINATION
&
COURSE STRUCTURE
Of
SEMESTER IX and X

M.Sc. Integrated (Mathematics Stream)

UNDER

FACULTY OF SCIENCE

EFFECTIVE FROM JANUARY 2020

Center of Basic Science
Pt. Ravishankar Shukla University
Raipur (C.G.) 492010
PH: - 0771-2262864
WEBSITE: -www.prsu.ac.in

Approved by Board of Studies in Mathematics
Pt. Ravishankar Shukla University, Raipur (C.G.)

27/2/2020

22-02-2020

CENTER FOR BASIC SCIENCES
Pt. Ravishankar Shukla University, Raipur

5 Year Integrated M.Sc. (Mathematics)
Under
Faculty of Science

SEMESTER-X (Mathematics Stream)

Subject		Subject Contact hrs/per week Theory+Tutorial	Credits
ME 1001	Electives I	[4 + 1]	5
ME 1002	Electives II	[4 + 1]	5
ME 1003	Electives III	[4 + 1]	5
ME 1004	Elective IV	[4 + 1]	5
		Total	20

Min. 20
(Total 240 credits)

***Four Subjects will be offered according to the availability of instructors and more than 50% of students opting for a course.**

Elective-1: Integrated M.Sc. 10th Semester (Mathematics)

Dynamical Systems Using Matlab

Introduction to Matlab

Unit-I: Arithmetic Operations, built-in-MATH functions, scalar variables, creating arrays, built-in functions for handling arrays, mathematical operations with arrarys, script files, two dimensional plots, programming in MATLAB, polynomial, curve fitting, and interpolation, three-dimensional plots.

Discrete Dynamical Systems

Unit-II: One-dimensional maps, cobweb plot: graphical representation of an orbit, stability of fixed points, periodic points, the family of logistic maps, sensitive dependence on initial conditions, analysis of logistic map, Periodic Windows, Feigenbaum number, chaos in logistic map.

Unit-III: higher-dimensional maps, sinks, sources, and saddles, nonlinear maps and the jacobian matrix, stable and unstable manifolds, lyapunov exponents, Numerical Calculation of Lyapunov Exponent, chaotic orbits. Strange Attractors, Gaussian and Hénon Maps. Julia Sets and the Mandelbrot Set.

Differential Dynamical Systems

Unit-IV: Differential dynamical systems, existence and uniqueness theorem, phase portraits, vector fields, nullclines, flows, fixed points, linearization of vector fields, planar systems, canonical forms, eigenvectors defining stable and unstable manifolds, phase portraits of linear systems in the plane, linearization and Hartman's theorem, limit cycles, existence and uniqueness of limit cycles in the plane, Lyapunov functions and stability.

Unit-V: Nonlinear systems and stability, bifurcations of nonlinear systems, normal forms, multistability and bistability, the Rössler system and chaos, the Lorenz equations, Chua's circuit, and the Belousov–Zhabotinski reaction.

Books and References:

1. Dynamical Systems with Applications using MATLAB® 2nd edition, Stephen Lynch, Springer International Publishing Switzerland 2014.
2. CHAOS: An Introduction to Dynamical Systems, Kathleen T. Alligood Tim D. Sauer James A. Yorke, Springer-Verlag .
3. Nonlinear Dynamics And Chaos: With Applications to Physics, Biology, Chemistry, and Engineering, Steven H. Strogatz, CRC Press Taylor & Francis Group, 2018.
4. Differential Equations, Dynamical Systems, and an Introduction to Chaos, Morris W. Hirsch , Stephen Smale , Robert L. Devaney , Elsevier, 2013.
5. Dynamical Systems with Applications using Mathematica, 2nd edition, Stephen Lynch , Springer International Publishing, 2017.

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Elective-2: Integrated M.Sc. 10th Semester (Mathematics)

Mathematical Biology

Unit- I: Simple Single Species Models: **Continuous Population Models**, Exponential Growth, The Logistic Population Model, Harvesting in Population Models, Constant-Yield and Constant-Effort Harvesting, Eutrophication of a Lake: A Case Study.
Discrete–Time Metered Models, Systems of Two Difference Equations, Oscillation in Flour Beetle Populations: A Case Study.

Unit-II: Continuous Single-Species Population Models with Delays: Models with Delay in Per Capita Growth Rates, Delayed-Recruitment Models, Models with Distributed Delay, Harvesting in Delayed Recruitment Models, Nicholson's Blowflies: A Case Study.

Unit-III: Models for Interacting Species: The Lotka–Volterra Equations, The Chemostat Model, Equilibria and Linearization, Qualitative Behavior of Solutions of Linear Systems, Periodic Solutions and Limit Cycles, Species in Competition, Kolmogorov Models, Mutualism, The Spruce Budworm: A Case Study.
The Community Matrix, the Nature of Interactions Between Species, Invading Species and Coexistence.

Unit-IV: Harvesting in Two-species Models: Harvesting of Species in Competition, Harvesting of Predator–Prey Systems, Intermittent Harvesting of Predator–Prey Systems, Some Economic Aspects of Harvesting, Optimization of Harvesting Returns, A Nonlinear Optimization Problem, Economic Interpretation of the Maximum Principle.

Unit-V: Models for Populations with Age and Spatial Structure: Linear model with age structure, The Method of Characteristics, Nonlinear Continuous Models, Models with Discrete Age Groups, Some Simple Examples of Metapopulation Models, A General Metapopulation Model, A Metapopulation Model with Residence and Travel, The Diffusion Equation, Solution by Separation of Variables, Solutions in Unbounded Regions, Linear Reaction–Diffusion Equations, Nonlinear Reaction–Diffusion Equations, Diffusion in Two Dimensions.

Books and References:

1. Mathematical Models in Population Biology and Epidemiology, 2nd edition, Fred Brauer, Carlos Castillo-Chavez, Texts in Applied Mathematics 40, Springer, 2012.
2. Elements of Mathematical Ecology, Mark Kot, Cambridge University Press, 2001.
3. Mathematical Biology-I: An Introduction, James D. Murray, Springer, 2002.
4. Mathematical Biology-II: Spatial Models and Biomedical Applications, James D. Murray, Springer, 2003.

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Elective-3: Integrated M.Sc. 10th Semester (Mathematics)

Financial Mathematics

Unit I: Review Of probability, finite probability space.

Unit II: Derivatives security, interest rates, other financial instruments, Arbitrage and pricing, risk less issue, yield curves, mean terms matching and immunization, interest rate models.

Unit III: Dependent annual rates of return, random walk and Markov process, stochastic calculus.

Unit IV: option pricing, portfolio optimization, Fokker-plank equation, distribution and green functions.

Unit V: Feynman-kac formula options, dividends revisited. Exotic options.

Books and References:

1. Financial mathematics, Richard Brass, Springer, 2003
2. Mathematics of financial derivatives, Wilmott & Howison, Springer, 2005
3. Hand book of stochastic methods, Gardiner, Wiely, 2000
4. The Mathematics of Financial Derivatives: A Student Introduction, Wilmott, Dewynne and Howison, Cambridge University Press, 1995
5. Futures, and Other Derivatives, 5th ed, Hull, Prentice Hall, 2000

Elective-4: Integrated M.Sc. 10th Semester (Mathematics)

Non-linear Analysis

Unit-I: Calculus in Banach space

Various form of continuiuty, geometry in normed spaces and duality mappings, Gateaux and Frechet derivative, properties of derivatives, Taylor theorem, inverse function theorem and impliocit function theorem, subdeifferential of convex function.

Unit-II: Monotone operators

Monotone operators, Maximal monotone operators and its propwerties, constructive solution of operator equations, subdifferential and monotonicity, some generalization of monotone operator.

Unit-III: Fixed point theorems

Banach contraction principle and its generalizations, nonexpansive mappings, fixed point theorem of Brouwder and Schauder. Fixed point theorems for multi-functions, common fixed point theorems, sequence of contractions, generalized contractions and fixed points.

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Unit-IV: Applications of monotone operators theory

Introduction, Sobolev space, differential equation, nonlinear differential equations, integral equation, Nonlinear ammerstein integral equation, Generalized Hammerstein integral equation.

Unit-V: Applications of fixed point theorems

Application to Geometry of Banach Spaces, Application to System of Linear Equations, Perron–Frobenius, Fundamental Theorem of Algebra, Game Theory and Nash Equilibria, Differential eqautions , integral equations.

Books and References:

1. Some topics in nonlinear analysis, M. C. Joshi and R. K. Bose, Wiley Eastern limited, New Delhi, 1985.
2. An introduction to nonlinear analysis and fixed point theory, H. K. Pathak, Springer, 2018.
3. Nonlinear functional analysis and its applications-I, Fixed point theorem, Zeidler, Springer, Heidelberg, 1986.
4. Nonlinear functional analysis, Akerker, Narosa publishing house, New Delhi.

Elective-5: Integrated M.Sc. 10th Semester (Mathematics)

Operations Research

Unit I Introduction, Nature and Scope of operations research. Linear Programming: Introduction, Mathematical formulation of the problem, Graphical Solution methods, Mathematical solution of linear programming problem, Slack and Surplus variables. Matrix formulation of general linear programming problems.

Unit II The Simplex Method: Simplex algorithm, Computational procedures, Artificial variables, Two phase Simplex Method, Formulation of linear programming problems and its solution by simplex method.

Unit III Unrestricted variables, problems of degeneracy, Principle of duality in simplex method, Formation of dual with mixed type of constraints, Solution of primal and dual constraints.

Unit IV Elementary queuing and inventory models. Steady-state solutions of Markovian queuing models: M/M/1, M/M/1 with limited waiting space, M/M/C, M/M/C with limited waiting space, M/G/1.

Unit V Game Theory: Introduction, Two persons zero sum games, The maxmin and minimax principles. Graphical Solution: Reduction of game problem to LPP.

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Books and References:

1. Introduction to Operations Research', Hillier, F.S. and G.J. Lieberman, , 9th Ed., 2010, McGraw Hill, New York.
2. Operation Research, Kanti Swarup,P K Gupta, Man Mohan, Sultanchand and Sons.
3. Operation Research, Theory and Application, J.K. Sharma, Macmillan India.
4. Linear Programming, N.P. Loomba, Tata Mc-Graw Hill.
5. Operation Research: An Introduction, H.A. Taha, Macmillan India.

Elective-6: Integrated M.Sc. 10th Semester (Mathematics)

Introduction to Cryptography

Unit-I:

Classical Cryptosystems: Some Simple Cryptosysteims, Monoalphabatic and Polyalphabatic cipher, The Shift Cipher, The Substitution Cipher, The Affine Cipher, The Vigenere Cipher, The Hill Cipher, The Permutation Cipher, Cryptanalysis, Some Cryptanalytic Attacks, Stream ciphers, Synchronous Stream Cipher, Linear Feedback Shift Register (LFSR), Non-Synchronous stream Cipher, Autokey Cipher.

Unit-II:

Block Ciphers: Mode of operations in block cipher: Electronic Codebook (ECB), Ciphertext Chaining (CBC), Ciphertext FeedBack (CFB), Output FeedBack (OFB), Counter (CTR),
DES & AES: The Data Encryption Standard (DES), Feistel Ciphers, Description of DES, Security analysis of DES, Differential & Linear Cryptanalysis of DES, Triple DES, The Advanced Encryption Standard (AES), Finite field GF(28), Description of AES, analysis of AES.

Unit-III:

Shannon's Theory of Perfect Secrecy: Perfect Secrecy, Birthday Paradox, Vernam One Time Pad, Random Numbers, Pseudorandom Numbers. **Prime Number Generation:** Trial Division, Fermat Test, Carmichael Numbers, Miller Rabin Test, Random Primes.

Unit-IV: Public Key Cryptography:

Principle of Public Key Cryptography, RSA Cryptosystem, Factoring problem, Cryptanalysis of RSA, RSA-OAEP, Rabin Cryptosystem, Security of Rabin Cryptosystem, Quadratic Residue Problem, Diffie-Hellman (DH) Key Exchange Protocol, Discrete Logarithm Problem (DLP), ElGamal Cryptosystem, ElGamal& DH, Algorithms for DLP. Elliptic Curve, Elliptic Curve Cryptosystem (ECC), Elliptic Curve Discrete Logarithm Problem (ECDLP).

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Unit-V: Cryptographic Hash Functions:
Hash and Compression Functions, Security of Hash Functions, Modification Detection Code (MDC0. Message Authentication Codes (MAC), Random Oracle Model, Iterated Hash Functions, Merkle-Damgard Hash Function, MD-5, SHA-1, Others Hash Functions.
Digital Signatures: Security Requirements for Signature Schemes, Signature and Hash Functions, RSA Signature, ElGamal Signature, Digital Signature Algorithm (DSA), ECDSA, Undeniable Signature, Blind Signature.

Books and References:

1. J Buchmann, Introduction to Cryptography, Springer (India) 2004
2. S. Padhye, R A Sahu, V Saraswat, Introduction to Cryptography, CRC Press, 2018
3. D R Stinson, Cryptography: Theory and Practice. CRC Press, 2000.
4. Bruce Schenier, Applied cryptography, John Wiley & Sons, 1996.
5. B Forouzan, Cryptography and Network security, Tata McGraw Hill, 2011
6. Wenbo Mao, Modern Cryptography: Theory and Practice. Pearsion Education, 2004
7. W Starling, Cryptography and Network security, Pearson Education, 2004.

Elective-7: Integrated M.Sc. 10th Semester (Mathematics)

Introduction to Nonlinear Optimization

Unit-I: Mathematical Preliminaries, the Space R^n, R^{nxm}, Inner Products and Norms, Eigen values and Eigen vectors, Basic Topological Concepts.

Unit-II: Optimality Conditions for Unconstrained Optimization: Global and Local Optima, Classification of Matrices, Second Order Optimality Conditions, Global Optimality Conditions, Quadratic Functions.

Unit-III: Least Squares: Solution of over determined Systems, Data Fitting, Regularized Least Squares, Denoising, Nonlinear Least Squares. Descent Directions Methods, The Gradient Method, The Condition Number, Diagonal Scaling, The Gauss–Newton Method, The Fermat–Weber Problem, Convergence Analysis of the Gradient Method.

Unit-IV: Newton's Method, Pure Newton's Method, Damped Newton's Method, The Cholesky Factorization. Convex Sets, Algebraic Operations with Convex Sets, The Convex Hull, Convex Cones, Topological Properties of Convex Sets, Extreme Points.

Unit-V: Convex Functions, First Order Characterizations of Convex Functions, Second Order Characterization of Convex Functions, Operations Preserving Convexity, Level Sets of Convex Functions, Maxima of Convex Functions, Convexity and Inequalities, Convex Optimization, The Orthogonal Projection Operator, Optimization over a Convex Set, Stationarity in Convex Problems, The Orthogonal Projection Revisited, The Gradient Projection Method, Sparsity Constrained Problems.

Books and References:

1. Introduction to Nonlinear Optimization Theory, Algorithms, and Applications with MATLAB, Amir Beck, Society for Industrial and Applied Mathematics, 2014.
2. Optimization Theory and Methods: Nonlinear Programming, Wenyu Sun, Ya-Xiang Yuan, Springer, 2006.
3. Nonlinear Optimization, Francisco J. Aragón, Miguel A. Goberna Marco A. López, Margarita M. L. Rodríguez, Springer Undergraduate Texts in Mathematics and Technology, 2019.
4. Nonlinear Optimization: Methods and Applications, H. A. Eiselt, Carl-Louis Sandblom, Springer 2019.

Elective-8: Integrated M.Sc. 10th Semester (Mathematics)

Complex Network

UNIT-I: Fundamentals of Graph Theory; Directed, Weighted and Bipartite Graphs, Trees. Complex Network, Basics, history and importance of Complex Network.

UNIT-II: Centrality Measures: The Importance of Being Central, Connected Graphs and Irreducible Matrices, Degree and Eigenvector Centrality, Measures Based on Shortest Paths, Group Centrality.

Unit –III: **Random Graphs:** Erd˝os and Rényi (ER) Models, Degree Distribution, Trees, Cycles and Complete Sub-graphs, Giant Connected Component, Scientific Collaboration Networks, Characteristic Path Length.

Unit-IV: **Small-World Networks:** Six Degrees of Separation, The Brain of a Worm, Clustering Coefficient, The Watts–Strogatz (WS) Model, Variations to the Theme, Navigating Small-World Networks.

Unit-V: **Generalised Random Graphs:** The World Wide Web, Power-Law Degree Distributions, The Configuration Model, Random Graphs with Arbitrary Degree Distribution, Scale-Free Random Graphs, Probability Generating Functions. Models of Growing Graphs, Degree Correlations.

Books and References:

1. Complex Networks : Principles, Methods and Applications , Vito Latora , Vincenzo Nicosia , Giovanni Russo , Cambridge University Press, 2017
2. Graph Theory and Complex Networks: An Introduction, Maarten van Steen, Maarten van Steen, 2010.
3. Lectures on Complex Networks, S. N. Dorogovtsev, Clarendon Press Oxford, 2010.
4. The Structure Of Complex Networks: Thoery and Applications, Ernesto Estrada, Oxford University Press, 2011

CH101

मूल विज्ञान केन्द्र ,पं. रविशंकर शुक्ल विश्वविद्यालय ,रायपुर (छ.ग.)

रचनात्मक हिंदी भाषा

इकाई I– (1) मानक हिंदी भाषा , वर्तनी लेखन में अशुद्धियॉ , शब्द शुद्धि, वाक्य शुद्धि, हिंदी भाषा के विकास में हिंदीतर एवं विदेशी विद्वानों का योगदान,

(2) उसने कहा था , कहानी– चंद्रधर शर्मा गुलेरी ।

इकाई II– (1) पत्राचार औपचारिक व अनौपचारिक पत्र एवं संप्रेषण कौशल ।

(2) मनुष्य ही साहित्य का लक्ष्य है । (हजारी प्रसाद द्विवेदी)

इकाई III– (1) पारिभाषिक शब्दावली की परिभाषा एवं स्वरुप तथा निर्माण की प्रक्रिया (विज्ञान –तकनीकी), शब्द भंडार ।

(2) सादगी, सत्य और अहिंसा –मोहनदास करमचंद गांधी (आत्मकथांश)

इकाई IV– (1) देवनागरी लिपि, वाग्यंत्र और ध्वनि उत्पादन में उनकी भूमिका , स्वर व्यंजन का वर्गीकरण ,IPA अंतरराष्ट्रीय ध्वनि लिपि ।

(2) नमामि छत्तीसगढ. (छत्तीसगढ. का सांस्कृतिक वैभव) : डॉ हीरालाल शुक्ल (आलेख) ।

इकाई V– (1) अनुवाद , परिभाषा ,प्रक्रिया , अनुवादक के गुण , सफल अनुवाद, हिंदी से अंग्रेजी अनुवाद ।

(2) योग की शक्ति –डॉ. हरिवंश राय बच्चन (डायरी) ।

(3) पृथक छत्तीसगढ. राज्य –विष्णु खरे (कविता) ।

Suggested Texts and References:

Sr.No.	Author	Title	Publisher
1.	तिवारी भोलानाथ	हिन्दी भाषा की संरचना	पाण्डूलिपि प्रकाशन ,दिल्ली
2.	प्रसाद वासुदेवनंदन	आधुनिक हिंदी व्याकरण और रचना	भारती भवन प्रकाशन ,पटना
3.	बाहरी हरदेव	पारिभाषिक शब्दावली कोश	राजकमल प्रकाशन दिल्ली
4.	वधान अमरसिंह	भाषा और सूचना प्रौद्योगिकी	भावना प्रकाशन,दिल्ली
5.	गुरु कामता प्रसाद	हिंदी व्याकरण	लोकभारती प्रकाशन ,इलाहाबाद

ES101-ENVIRONMENTAL STUDIES

UNIT – I THE MULTI DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES :

Definition ,scope and importance

Need for publish awareness.

(5 cr.)

UNIT-II Natural Resources :

Renewable and non-renewable resources:

Natural resources and associated problems .

(a) Forest resources : use and over – exploitation, deforestation, case studies, timber extraction,Mining, dams and their effects on forests and tribal people .

(b) Water resources : use and over-utilization of surface and ground water,floods, drought,Conflicts over water , dams benefits and problems .

(c) Mineral resources : use and explotation, environmental effects of extracting and using Mineral resources, case studies .

(d) Food resources : World food problems , changes caused by agriculture and overgrazing, Effects of modern agriculture , fertilizer –pesticide problems , water logging , salinity Case studies.

(e) Energy resources : Growing energy needs , renewable and non renewable energy sources Use of alternate energy sources ,case studies.

(f) Land resources : land as a resources , land degradation, man induced landslides , soil erosion & desertification.

- Role of an individual in consertification of natural resources.
- Equitable use of resources for sustainable life –styles.

(5 cr.)

UNIT- III Concept of an ecosystems.

Structure and function of an ecosystem.

- Producers , consumers and decomposers .
- Energy flow in the ecosystem .
- Ecological succession.
- Food chains, food webs and ecological pyramids .

(5 cr.)

UNIT-IV Introduction , types ,characteristic features , structure and function of the following

Ecosystem:

a. Forest ecosystem
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystem (ponds , streams, lakes, rivers, oceans,estuaries

(5 cr.)

UNIT- V SOCIAL ISSUES AND THE ENVIRONMENT

- Environment Protection Act.
- Air (prevention and control of pollution) Act.
- Wildlife protection Act.
- Forest conservation Act.
- Issues involved in enforcement of environmental legislation .
- Public awareness.
- Value Education
- HIV/ADIS
- Women and child welfare.
- Role of information technology in Environment and Human Health.
- Case studies.

(5 cr.)

Field work

- Visit to a local area to document environment assets – river / forest/grassland/hill/ Mountain.
- Visit to local polluted site : Urban/Rural/Industrial/Agriculture.

Sr.No.	Author	Title	Publisher
1.	Agarwal K.C.	Environmental Biology 2001	Nidi Publ. Ltd.Bikaner
2.	Bharucha Erach	The Biodiversity of India	Mapin Publishing Pvt. Ltd. Ahmedabad 380013, India .
3.	Bruinner R.C.	Hazardous Waste Incineration, 1989	Mc Graw Hill Inc. 480p.
4.	Bharucha E.	Textbook for Environmental Studies for undergraduate Cources.	UGC, New Delhi & Bharti Vidyapeeth Inst. Of Environment edu. & Research ,Pune.
5.	Begon M.,Town send C.R. ,Harper J.L.	Ecology From Individuals to Ecosystems	4th edition , Blackwell Publishing (TB)

(TB) Textbook.

H 101: Communication Skills(COMMON TO ALL BRANCHES)

Unit-I

An interactive session (with examples) on what is communication, communication in the natural and civilized worlds, types of human communication: visual / non-verbal / verbal, written / spoken, etc

Unit-II

An overview of mass media; a brief discussion of their types (with examples). The concepts of facilitating factors, barriers, and filters in communication; the seven C's of effective communication.

Unit-III

Verbal communication: How to speak / listen effectively (in interpersonal communication), types of publicspeaking, tips for effective public speaking, how to make effective presentations. The role of written text in communication,

Unit-IV

Types of writing (academic/creative/general; formal/informal etc.) with examples of good/bad writing and their analysis. Introduction to letter writing, with stress on formal correspondence; email do's and don'ts.

Unit-V

Academic writing- an overview; explanation of various terms used in academic writing; parts of a paper/thesis;aspects such as formal language, grammatical accuracy, etc. Common grammatical/punctuation errors andhow to avoid them (example-based instruction)

Books Recommended:

S.No	Author	Book	Publication
1	Rajendra Pal and JS Kurlahalli	Essentials of Business Communication	S.Chand& Sons
2	Michael Alley	The Craft of Scientific Writing (3rd Edition)	Springer, Newyork, 1996
3	Philip Reubens (General editor)	Science and Technical Writing – A Manual of Style (2nd Edition)	Routledge, Newyork, 2001
4	Edmond H. Weiss	Writing Remedies – Practical Exercises for Technical Writing	Universities Press (India) Ltd. , Hyderabad,2000
5	M. Ashraf Rizvi	Effective Technical Communication	Tata Mc Graw – Hill New Delhi, 2005
6	DH Menzel ,HM Jones& LGBoyd	Writing Technical Papers	Mc Graw Hill, 1961
7	KL Turbian	A Manual for Writers of Term Papers Thesis and Dissertation	University of Chicago Press, 1973.

ES201: Environmental Studies

Unit-I: Biodiversity and its Conservation: Introduction- Definition: genetics, species and ecosystem diversity. Bio geographical classification of India. Value of biodiversity: consumptive use productive use, social, ethical, aesthetical and option value. Biodiversity at global, National and local levels. India as mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in situ and ex-situ conservation of biodiversity.

Unit-II: Environmental pollution. Definition Causes, effects and control measures of- a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Nuclear hazards.

Unit-III: Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies Disaster management: floods, earthquake, cyclone and landslides.

Unit-IV: Human population and the Environment: Population growth, variation among nation. Population explosion- Family welfare programme. Environment and human health. Human Rights.

Unit-V: Social Issues and the Envionment: From unsustainable to Sustainable development. Urban problens related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people, its problems and concerns. Case studies. Environment ethies: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products.

H201Subject: Communication Skills (Lab)

Course Outcome: After learning the course the students should be able to
1. To know the process of communication and its components.
2. To improve the language skills i.e. Listening Skills, Speaking Skills, Reading Skills and Writing Skills (LSRW).
3. Construct basic and intermediate skills in English / Hindi language.
4. To enhance phonetic competence, comprehension skills, presentation skills, group discussion skills etc.
5. To build confidence for communicating in English /Hindi and create interest for the life-long learning of English/Hindi language.

Unit 1
Elementary Phonetics (Speech Mechanism. The Description of Speech Sounds, The Phoneme the syllable; Intonation and Word Accent)
Formal (Extempore and Mock Interviews) and Informal Speaking(Situational Dialogues and Role play), Telephoning (Telephonic Conversations)

Unit 2
Paralinguistic features of speaking (voice modulation, pitch, tone, etc.)
Paper Presentation (Non-Technical & current Affairs), Use of Audio-Visual aids: Preparation slides, power point presentation etc.

Unit 3
Body Language(Gestures / Postures during Role Play/Speaking and JAM (Just-a-Minute) Session and Group Discussion

Unit 4
Listening and Comprehending spokenmaterial in Standard Indian English, British English and American English;Exercises on Listening Comprehension,Exercises on Reading Comprehension
Effective Writing (Business Letters, Covering Letter, Resume on Word Document. Translation and Precis Writing)

Unit 5
Grammar:(English/ Hindi)
Grammar in use: Errors of Accidence and syntax with reference to Parts of Speech; Agreement of Subject and Verb; Tense and Concord; Use of connectives, Question tags. Voice and Narration.
Indianism in English: Punctuation and Vocabulary, Building (Antonym, Synonym, Verbal Analogy and One Word Substitution.

Second Year Semester – III

H301: World Literature (COMMON TO ALL BRANCHES)

Unit-I

What is Literature? - a discussion; Introduction to literary terms, genres, and forms of various periods, countries, languages, etc.

Unit-II

The Novel: Class study of 'Brave New World' by Aldous Huxley; Group discussions and student presentations on other genres such as the graphic novel, detective fiction, children's literature, etc.

Unit-III

Plays: Introduction to the history of theatre, class study of (mainly) two plays: 'Pygmalion' by G. B. Shaw and 'Fire and Rain' by Girish Karnad, the setting up of play –reading group through which the students can be introduced to several other plays.

Unit-IV

Poetry: Brief introduction; Study of poetic genres, forms, topics, figures of speech, poetic language etc. by analysing various poems from around the world

Unit-V

Short stories, essays and other types of writing by various authors. Screening of films based on literary works, such as Pygmalion (My Fair Lady), Fire and Rain (Agnivarsha), Persepolis (a graphic novel) and a few others.

Books Recommended:

S.No	Author	Book	Publication
1	IforIvans London	A Short History of English Literature	London: Penguin Books, 1976
2	Kettle Arnold	An Introduction to English Novel Vol. I, Vol. II	New. Delhi: Universal Book store, 1993.
3	Eagleton, Terry.	The English Novel: An Introduction	Oxford: Basil Blackwell. 1983
4	M.H. Abrams)	A Glossary of Literary Terms	Wadsworth Publishing; 10th edition (January 10, 2011
5	J.A. Cuddon	Dictionary of Literary Terms and Literary	(London: Penguin, 2004)
6	Girish Karnad	The Fire and the Rain	New Delhi, Oxford University Press, 1998
7	Aldous Huxley	'Brave New World'	New York: Harper Perennial, 1989
8	G. B. Shaw	Pygmalion	Longman Literature. Harlow: Longman, 1991

मूल विज्ञान केंद्र, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)
एम.एस–सी. (इंटीग्रेटेड) तृतीय सेमेस्टर
प्रयोजनमूलक हिंदी (FH301)
Functional Hindi

इकाई I- (1) प्रयोजनमूलक हिंदी का स्वरूप एवं महत्व
(2) भाषा के विविध रूप– बोली, उपभाषा, राजभाषा, राष्ट्रभाषा, संपर्क भाषा, साहित्यिक भाषा।

इकाई II- (1) मीडिया की भाषा– समाचार पत्र, विज्ञापन
(2) श्रव्य माध्यम, दृश्य–श्रव्य माध्यम

इकाई III- (1) पल्लवन– परिभाषा, पल्लवन एवं व्याख्या, आशय कुशल विस्तारक के गुण, सूक्तिपरक वाक्यों का पल्लवन
(2) झलमला पदुमलाल पुन्नालाल बख्शी कहानी

इकाई IV- (1) शब्द रचना– उपसर्ग संस्कृत, हिंदी, उर्दू के उपसर्गों का परिचय
(2) प्रत्यय–परिभाषा, प्रत्यय के भेद

इकाई V- (1) चीफ की दावत – भीष्म साहनी कहानी
(2) मजदूरी और प्रेम – सरदार पूर्ण सिंह

संदर्भ ग्रंथ–

1. प्रयोजनमूलक हिंदी की नयी भूमिका कैलाश नाथ पाण्डेय, लोकभारती प्रकाशन, इलाहाबाद।
2. प्रयोजनमूलक व्यावहारिक हिंदी भाषा कैलाश चंद्र भाटिया, तक्षशिला प्रकाशन, जयपुर।
3. भाषा प्रौद्योगिकी एवं भाषा प्रबंधन सूर्य प्रसाद दीक्षित, किताबघर, नई दिल्ली
4. हिंदी भाषा और संस्कृति म.प्र. हिंदी ग्रंथ अकादमी, भोपाल सं. राजेन्द्र मिश्र
5. कार्यालयी हिंदी, श्री प्रकाशन, रायपुर, प्रो. केशरीलाल वर्मा
6. अच्छी हिंदी, रामचंद्र वर्मा, लोकभारती प्रकाशन, इलाहाबाद (उ.प्र.)
7. अच्छी हिंदी, किशोरी दास वाजपेयी, मीनाक्षी प्रकाशन मेरठ (उ.प्र.)
8. भारतीयता के अमर स्वर प्रधान सं. डॉ. घनंजय वर्मा, म.प्र. हिंदी ग्रंथ अकादमी भोपाल।
9. प्रयोजनमूलक हिंदी डॉ. चितरंजन कर वैभव प्रकाशन रायपुर (छ.ग.)

H401Subject: Communication Skills (Lab)

Course Outcome: After learning the course the students should be able to
1. To know the process of communication and its components.
2. To improve the language skills i.e. Listening Skills, Speaking Skills, Reading Skills and Writing Skills (LSRW).
3. Construct basic and intermediate skills in English / Hindi language.
4. To enhance phonetic competence, comprehension skills, presentation skills, group discussion skills etc.
5. To build confidence for communicating in English /Hindi and create interest for the life-long learning of English/Hindi language.

Unit 1
Elementary Phonetics (Speech Mechanism. The Description of Speech Sounds, The Phoneme the syllable; Intonation and Word Accent)
Formal (Extempore and Mock Interviews) and Informal Speaking(Situational Dialogues and Role play), Telephoning (Telephonic Conversations)

Unit 2
Paralinguistic features of speaking (voice modulation, pitch, tone, etc.)
Paper Presentation (Non-Technical & current Affairs), Use of Audio-Visual aids: Preparation slides, power point presentation etc.

Unit 3
Body Language(Gestures / Postures during Role Play/Speaking and JAM (Just-a-Minute) Session and Group Discussion

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CBS – Five Years Integrated Course, M.Sc. V Semester

Scientific Writing (H501)

Unit 1

Introduction: What is Scientific Writing; Needs and importance, main features and elements of scientific writing. Tools and types of Scientific Writing , Scientific writing Vs other forms of writing, Different methods of Research, Types of Research.

Unit 2

Scientific Writing in Research: Mechanics of writing. How to write a Research Paper, Project Proposal components of a full length research paper, Research/ Project Report writing, Formulation of Hypothesis, Do's and Don'ts of writing a Research Paper.

Unit 3

Technical Writing:
Types of technical documents: Full length research paper, Letters to editor, Book chapter, Review, Conference report, Title/Thesis statement, Abstract/key words, Aims and objectives, Rationale of the paper, Work plan, Materials and methodology, Results and discussion, Key issues and arguments, Acknowledgement, Conflict of interest statement, Reference and Bibliography.

Unit 4

Scientometrics: How to cite and how to do Referencing, Literature Search Technique: using SCOPUS, Google Scholar, PUBMED, Web of Science, Indian Citation Index, and RG Styles of referencing: APA, MLA, Oxford, Harvard, Chicago Annotated bibliography Tools for citing and referencing: Footnote, Endnote etc.

Unit 5

Research Paper and Thesis Designing: Components, Types and Importance Research ethics, Institutional ethics committee, Proof Reading, Studying Peer Review and Impact Factor of Journals, Synopsis Designing, Writing Preface, Acknowledgements, Plagiarism – Pitfall (software to check plagiarism).

Book Recommended :

S. No.	Author	Book	Publication
1	Various	The Oxford Book of Modern Science writing	Oxford University Press
2	Robert A. Day and Barbara	How to write and Publish a Scientific paper	Cambridge University Press
3	Angelika Hofmann	Scientific Writing and Communication: Papers Proposals and Presentations	Oxford University Press
4	Jennifer Peat, Elizabeth-Elliott, Louise Baur and Victoria Keena	Scientific Writing: Easy when you know how	BMJ Books
5	Hans F. Ebel, Claus Bliefert, William E. Russey	The Art of Scientific Writing	WILEY-VCH Publishers

CBS – Five Years Integrated Course, M.Sc. VI Semester

Scientific Writing Lab / Applications of Scientific Writing (H602)

Effective Writing skills: Structuring Scientific Paper for Journals (Category A, B, C and D) Tables, Figures, Equations and Pictures using Excel, Improving Writing Style, Punctuation, Mechanism of Scientific Writing, Capitalization and Spelling, Collecting, organizing and evaluating data, Making deductions and reading conclusions.

Project writing: Technical Resumes & Cover Letters Components of a research proposal: Project summary, Key words, Origin of the proposal, Major Objectives, Methodology, Instrument facility available in the PI's department, Overview of status of Research and Development in the subject, Importance of the proposed project in the context of current status, Bibliography, Making Report of a Project / Research Paper
Formulation of projects, Funding Agencies: their Templates and Assignments on Project Submission.
Presentations: Oral, and Power Point Presentation of Scientific Research Paper in Seminars, Conferences, Research Meetings and gatherings, Audience Analysis in Presentation, Conducting Seminars and Conferences etc.