



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 2018-2019

S. No.	Department	Pg. No.
1	School of Studies in Ancient Indian History Culture and Tourism and Hotel Management	1-44
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3	School of Studies in Biotechnology	136-190
4	School of Studies in Chemistry	191-245
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6	School of Studies in Computer Science & IT	264-355
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15	School of Studies in Life Science	901-988
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18	School of Studies in Mathematics	1234-1291
19	University Institute of Pharmacy	1292-1405
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21	School of Studies in Physics and Astrophysics	1480-1527
22	School of Studies in Psychology	1528-1652
23	School of Regional Studies and Research	1653-1723
24	School of Studies in Sociology & Social Work	1724-1815
25	School of Studies in Statistics	1816-1838
26	Institute of Teacher Education	1839-1972
27	Centre for Women's Studies	1973-1989
28	Renewable Energy Technology & Management	1990-2003
29	Centre for Basic Sciences	2004-2209

MBA

SYLLABUS

TWO YEARS MBA (FULL TIME) PROGRAMME

Academic Session: 2018-2019

**INSTITUTE OF MANAGEMENT
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR**

A handwritten signature in blue ink, appearing to read 'A. S. Sinha', with a long horizontal line extending to the right.

**INSTITUTE OF MANAGEMENT
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR**

**TWO YEAR M.B.A. (FULL TIME) PROGRAMME
COURSE STRUCTURE**

Academic Session: 2018-19

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

			<u>900</u>



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
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900

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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
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• **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.

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MBA - FIRST SEMESTER (Session: 2018-2019)

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 Wehrich, **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
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.

Examiner

- 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 Mifflin 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. Siddiqui, 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, Pledge, 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 (Workmen's) 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: 2018-2019)

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. **Successful 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, Illionis.
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 leverage, 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, Value 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.

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MBA - THIRD SEMESTER (Session: 2018-2019)

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)

- Industrial Marketing: Classification of industrial goods & services, Types of industrial product lines, new product development, industrial product life cycle & strategies, pricing of industrial products.
- Formulating Channel strategies and physical distribution decisions: objectives, nature of industrial distribution channels, Logistics, Promotional Strategies for Industrial goods and services: Sales promotion, publicity and public relations, direct marketing, personal selling, Advertisement
- Concepts, Nature, Emergence, Growth and Importance of Services, Marketing Challenges, Service Classification
- Marketing of 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. Richard M.Hill et, al., **Industrial Marketing**, A.T.B.S, Publishers and Distributors, New Delhi
2. Gross, A.C. etc. **Business Marketing**, Boston, Houghton Mifflin.
3. Michael H.Morris, **Industrial and Organizational Marketing**, Mcmilan Publishing Company, New York
4. David T.Wilson, —Pricing Industrial Products and Services!, Institute for the study of Business Markets, College of Business Administration, Pennsylvania State University.
5. Michael D.Hutt, Thomas W.Speh, **Business Marketing management- A strategic view of industrial and organizational markets**, Thomson south western, Singapore.
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.
11. **Industrial Marketing**, Krishna K Havaladar, 2nd Edition, Tata McGraw Hill
12. **Industrial Marketing Management**, Michael D Hutt and Thomas W Speh, The Dryden 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, FII 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 Catalogue, 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. Hawryskiewyca 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: 2018-2019)

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 organisational Appraisal; Environmental threat and opportunity profile; competitive advantage of a firm, Core competency, strategic advantage profile; SWOT Analysis.
- Strategic Alternatives-merger, acquisition, diversification, modernisation, 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 VII 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, Organisaional 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. Shapiro, **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.

Ajman

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 Manifesto 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**

Signature

Pre-Ph.D. Course Work (Session 2018-19)

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, especially t-test, Z test, ANOVA (F test), Chi square test. Data Analysis and Interpretation of Data. Use of SPSS for Data Analysis, Drawing Inferences.

Unit 4

- Report Writing, Ethical issues in Social Sciences Research, Plagiarism and its prevention, Nuances in publishing process in academic journals: Citation Index, h-Index, i10-Index, JIF and Journal Metrics, References : different styles like APA, Havard, Chicago and MLA.

Unit 5

- Basic knowledge of Microsoft Word, Excel, Power Point, Use of Internet Resources for research: Google & Google Scholar, Infilbnet resources.

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.

Pre-Ph.D. Course Work (Session 2019-20)

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, especially t-test, Z test, ANOVA (F test), Chi square test. Data Analysis and Interpretation of Data. Use of SPSS for Data Analysis, Drawing Inferences.

Unit 4

- Report Writing, Ethical issues in Social Sciences Research, Plagiarism and its prevention, Nuances in publishing process in academic journals: Citation Index, h-Index, i10-Index, JIF and Journal Metrics, References : different styles like APA, Havard, Chicago and MLA.

Unit 5

- Basic knowledge of Microsoft Word, Excel, Power Point, Use of Internet Resources for research: Google & Google Scholar, Infilbnet resources.

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.

Pre-Ph.D. Course Work (Session 2020-21)

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, especially t-test, Z test, ANOVA (F test), Chi square test. Data Analysis and Interpretation of Data. Use of SPSS for Data Analysis, Drawing Inferences.

Unit 4

- Report Writing, Ethical issues in Social Sciences Research, Plagiarism and its prevention, Nuances in publishing process in academic journals: Citation Index, h-Index, i10-Index, JIF and Journal Metrics, References : different styles like APA, Havard, Chicago and MLA.

Unit 5

- Basic knowledge of Microsoft Word, Excel, Power Point, Use of Internet Resources for research: Google & Google Scholar, Inlibnet resources.

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)

2018 - 19 (Examination – Dec. 2018) onwards

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 Algebra, Wiley Eastern Ltd.
3. Vivek Sahai and Vikas Bist: Algebra, Narosa Publishing House, 1999.

References

1. M.Artin, Algebra, 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.I-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, 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, 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 \mathbb{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. I, 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.
- Unit-II** Definition and examples of topological spaces. Bases and sub-bases. Subspaces and relative topology. Alternate methods of defining a topology in terms of Kuratowski Closure Operator and Neighbourhood Systems. Continuous functions and homeomorphism.
- Unit-III** First and Second Countable spaces. Lindelof's theorems. Separable spaces. Second countability and separability. 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. Rouché's theorem Inverse function theorem.
- Unit-III** Residues. Cauchy's residue theorem. Evaluation of integrals. Branches of many valued functions with special reference to $\arg z$, $\log z$ 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.Chandrashekar, Theory of Computer Science PHI(2002)

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-II)

2018 - 19 (Examination – Dec. 2018) onwards

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 form. 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 Algebra, Wiley Eastern Ltd.
3. Quazi Zameeruddin and Surjeet Singh : Modern Algebra

References

1. M.Artin, Algebra, 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.I-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, Uniform convergence and Riemann-Stieltjes integration, 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. Riemann and Lebesgue Integrals.
- Unit-IV** The Four derivatives. Lebesgue Differentiation Theorem. Differentiation and Integration. Functions of Bounded variation.
- Unit-V** 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. 1, 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 and product spaces.

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.Chandrashekar

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 Lipschutz, 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)

2018 - 19 (Examination – Dec. 2018) onwards

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	Fuzzy Set Theory & Its Applications (I)	80	20	--	--
	C	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	--	--

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. Lebesgue 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 Karl 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, 3rd 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 systems. 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 (i) '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 I.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. Ritchie: 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)
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 (C)
Mathematical Biology (I)

Max. Marks - 80

Part-A: Simple Single Species Models

UNIT-I

Continuous Population Models: Phase plane analysis of ODE. Exponential Growth model, the Logistic Population Model, qualitative analysis, Harvesting in Population Models, Constant-yield harvesting, constant-effort harvesting, a case study of eutrophication of a lake.

UNIT-II

Discrete Population Models: Linear Models, graphical solution of difference equations, equilibrium analysis, period-doubling and chaotic behavior, discrete-time metered models, two-age group model and delayed recruitment, a case study of oscillation in flour beetle populations.

Part-B : Models for interacting species

UNIT-III

Introduction and Mathematical preliminaries: The Lotka-Volterra equations, the chemostat, equilibria and linearization, qualitative solutions of linear systems, periodic solutions and limit cycles, models for giving up smoking and retaining of workers by their peers.

UNIT-IV

Continuous Models for Two Interacting Populations: Species in competitions, Predator-Prey system, Kolmogorov Models, Mutualism, The community matrix, the nature of interactions between species, invading species and coexistence, a predator and two competing prey, two predators competing for prey.

UNIT-V

Harvesting in Two-Species Models: Harvesting of species in competition, Harvesting of predator-prey systems, some economic aspects of harvesting, optimization of harvesting returns.

Text Book:

1. Fred Brauer, Carlos Castillo-Chavez, Mathematical Models in Population Biology and Epidemiology, Biology, Springer (2010)

Reference Books:

1. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
2. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3rd Edition.
3. 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.
- Unit-II** Duality and Sensitivity Analysis. Other Algorithms for Linear Programming-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 Problem. Maximum Flow 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 Research (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. Hadley, Nonlinear and Dynamic Programming, Addison-Wesley, Reading Mass.
4. H.A. Taha, Operations Research -An introduction, Macmillan Publishing Co., Inc., New York.
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 Gupta and D.S. Hira, Operations Research-An Introduction. S. Clarendon & 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. UNDO Systems Products (Visit website <http://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 spreadsheet 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 $L^2(\mathbb{R})$.
- 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 $L^2(\mathbb{T})$. Orthonormal bases of periodic splines. Periodization of wavelets defined on the real line.

REFERENCES:

1. Eugenic Hernandez 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, Homeomorphism, 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.

Pt. Ravishankar Shukla University, Raipur

Scheme of Examination

M.A./M.Sc. (MATHEMATICS) (Semester-IV)

2018 - 19 (Examination - Dec. 2018) onwards

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	Fuzzy Set Theory & Its Applications (II)	80	20	--	--
	C	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	--	

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, 4th 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. Lusternik 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, 3rd 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 Condition, 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 I.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 Introduction 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. Ritchie: 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)
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 (C)
Mathematical Biology (II)

Max. Marks - 80

Part-A: Population Models

UNIT-I

Models for population with age structure: Linear discrete models, linear continuous models, the method of characteristics, nonlinear continuous models.

UNIT-II

Models for population with spatial structure: A general metapopulation model, a metapopulation model with residence and travel, the diffusion equation, solution by separation of variables. Linear reaction-diffusion equations, nonlinear reaction-diffusion equations, two-species interactions, diffusion in two dimensions.

Part-B: Disease Transmission Models

UNIT-II

Epidemic models: Introduction to epidemic models, The logistic equation in epidemiology (1.3), simple Kermack-McKendrick epidemic model, network and compartmental epidemic models.

UNIT-IV

More complicated epidemic models: models with exposed period, treatments models, an influenza model, quarantine-isolation models.
An SIR model with a general infectious period, the age of infection epidemic model, models with disease deaths, a vaccination model, the next generation matrix.

UNIT-V

Models for endemic diseases: A model for diseases with no immunity, the SIR model with births and deaths, some applications: Herd immunity, age of infection, the inter-epidemic period, epidemic approach to endemic equilibrium, the SIS model with births and deaths, temporary immunity, diseases population control.

Text Book:

1. Fred Brauer, Carlos Castillo-Chavez, Mathematical Models in Population Biology and Epidemiology, Biology, Springer (2010)

Reference Books:

1. Nicholas F. Britton, Essential Mathematical Biology, Springer-Verlag (2003)
2. J.D.Murray, Mathematical Biology I. An Introduction, Springer-Verlag (2002) 3rd Edition.
3. 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-Pure and Mixed Integer Programming Problem, Gomory's All-I P.P. Method, Construction of Gomory's Constraints, Fractional Cut Method-All Integer LPP, Fractional Cut Method- Mixed Integer LPP, Branch and Bound Technique.
- Unit-IV** Queueing system: Deterministic Queueing system, probability distribution in Queueing, classification of Queueing models, Poission Queueing system.
- 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 Gupta and D.S. Hira, Operations Research-An Introduction. S. Chandra & 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. UNDO Systems Products (Visit website <http://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 spreadsheet 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 Characterizations of MRA wavelets, low-pass filters and scaling functions. Non-existence of smooth wavelets in $H^2(\mathbb{R})$.

Unit-III Frames - The reconstruction formula and the Balian-Low theorem for frames. Frames from translations and dilations. Smooth frames for $H^2(\mathbb{R})$.

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 Hernandez 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

Practical (two)

Viva

Sessional

Time Duration – 3 Hrs.

20 Marks(10 marks each)

05 Marks

05 Marks

M.Sc./M.A. Course (Fourth Semester)
PAPER-V (B)
Graph theory-II

Max. Marks - 80

- Unit-I: Ramsey Theory: Perfectness-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.

Pt. Ravishankar Shukla University, Raipur
M.Phil. (Mathematics)
2018-19 & Onward

Scheme of Examination

There shall be three theory papers, one dissertation and one seminar based on theory 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 150 marks ((Script -75+Ext. - 50+ Viva -Voce 25). Seminar –based on theory will be of 50 marks.

S.No.	Particulars			Max. Marks	
1	Theory Papers	Paper-I	Research Methodology, Quantitative techniques and Computers (Code 101)	100	300
		Paper-II	Cryptography (Code 102A) OR Mathematical Modelling (Code 102B)	100	
			Paper-III	Nonlinear Analysis and Topological Structures (Code 103)	
2	Seminar		Based on Theory	50	50
2	Dissertation		Script	75	150
			Ext.	50	
			Viva-Voce	25	
Grand Total				500	

Guidelines of activities/academic calendar for M.Phil. Students:

1. In order to pass the M.Phil. Examination a student required to obtain a minimum of 25% marks in each theory paper and minimum of 50% marks in aggregate to the theory papers, dissertation and seminars separately.
2. The subject of dissertation will be provided by supervisor in the first week of September.
3. 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.
4. Students are requested to complete the typing work (preferably in AMS-TeX/Latex) of their dissertation by the last week of February.
5. 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 :

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(A)

Cryptography

M.M. 100

Unit I :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 II - 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 III - 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 IV - 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 V- 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 -II(B)

Mathematical Modelling

M.M. 100

Unit I - Unstructured Population Models in Continuous Time:

Modelling population dynamics : Describing a population and its environment , The population or p-state, The individual or i-state , The environmental or E-condition, Population balance equation, Characterizing the population, Population-level and per capita rates, Model building, Exponential population growth, Logistic population growth, Two-sexes population growth, Parameters and state variables, Deterministic and stochastic models

Unit II - Single ordinary differential equations:

Explicit solutions, Numerical integration, Analyzing flow patterns, Steady states and their stability , Units and non-dimensionalization, Existence and uniqueness of solutions, Epilogue

Unit III - Dynamics of Class:

Structured Populations , Introduction , Constructing Class-Structured Models , Analyzing Class-Structured Models , Reproductive Value and Left Eigenvectors , The Effect of Parameters on the Long-Term Growth Rate, Age-Structured Models--The Leslie Matrix,

Unit IV - Equilibria and Stability Analyses--One-Variable Models :

Introduction , Finding an Equilibrium, Determining Stability, Approximations. **General Solutions and Transformations--One-Variable Models**, Introduction, Transformations, Linear Models in Discrete Time, Nonlinear Models in Discrete Time, Linear Models in Continuous Time, Nonlinear Models in Continuous Time.

Unit V - Traffic Flow:

History and scope of traffic flow theory, Model classification, Non-motorized Traffic, Traffic density and hydrodynamic flow-density relation, continuity equation for several Road profiles, continuity equation from the driver's perspective, Lagrangian description. Model based Traffic Flow Optimization: Basic principle, speed limit, Ramp routing, Dynamic routing, efficient driving behaviour and adaptive cruise control, Further local traffic regulation, objective functions for Traffic Flow Optimization.

Books recommended :

1. A Biologist's Guide to Mathematical Modeling in Ecology and Evolution, Sarah P. Otto and Troy Day.
2. Mathematical Models: Mechanical Vibrations, Population Dynamics, and Traffic Flow, Richard Haberman.
3. Traffic Flow Dynamics: Data, Models and Simulation, Martin Treiber, Arne Kesting, Christian Thiemann
4. Human Behaviour and Traffic Networks, Michael Schreckenberg, Reinhard Selten

Paper III

Nonlinear Analysis and Topological Structures

M.M. 100

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 :

Monotone operators, surjectivity theorems, constructive solutions of operator equations, subdifferential and monotonicity, 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. Willard, General Topology, Dover, 2004.
8. R. L. Devaney, An Introduction to Chaotic Dynamical Systems, Persues Publishing Co., 1989.

Pt. Ravishankar Shukla University, Raipur
Ph.D. Course Work (Mathematics)
2018-19 & 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.

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
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 |



पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

दूरभाष : 0771-2262802 (अकादमिक विभाग), 0771-2262540 (कुलसचिव कार्यालय)

क्रमांक 7642/अका./2018

रायपुर, दिनांक 5/12/2018

प्रति,

1. उप कुलसचिव
परीक्षा विभाग
पं.रविशंकर शुक्ल विश्वविद्यालय,
रायपुर (छ.ग.)
2. सहायक कुलसचिव
गोपनीय विभाग
पं.रविशंकर शुक्ल विश्वविद्यालय
रायपुर (छ.ग.)

विषय— शिक्षा सत्र 2018-19 के पाठ्यक्रम प्रेषण।
महोदय,

शिक्षा सत्र 2018-19 में नवप्रवेशित छात्रों के अध्ययन-अध्यापन एवं परीक्षा हेतु नवनिर्मित पाठ्यक्रम संलग्न कर प्रेषित किया जा रहा है।

बी.फार्मेसी में अध्ययनरत पुराने पाठ्यक्रम के छात्रों को पुराने पाठ्यक्रम से ही परीक्षा में सम्मिलित होने की पात्रता है।

संलग्न—उपरोक्तानुसार।

आदेशानुसार,

विशेष कतेव्यस्थ अधिकारी (अका.)

रायपुर, दिनांक 5/12/2018

पृ.क्र. 7643/अका./2018

प्रतिलिपि—

1. डॉ. (श्रीमती) प्रीति के.सुरेश, अध्यक्ष, फार्मेसी अध्ययन मण्डल, आचार्य एवं अध्यक्ष, फार्मेसी संस्थान, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर

कक्ष अधिकारी (अका.)

**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

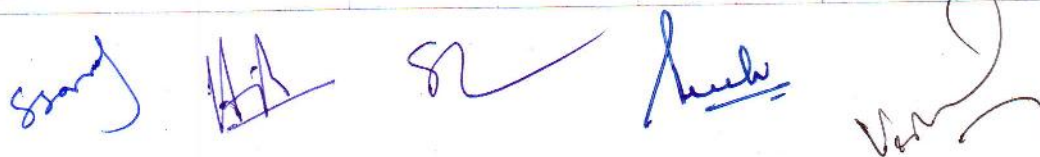
Sr. No.	Subject	Teaching Hrs./Week	Maximum Marks			Minimum Marks for Passing	Time Allowed for Examination Hrs.
			Sessional	Paper	Total		
2-T-1	Physical Pharmacy	3	30	70	100	40	3
2-P-1	Physical Pharmacy	3	30	70	100	40	4
2-T-2	Pharmaceutical Engineering- I	3	30	70	100	40	3
2-T-3	Pharmaceutical Engineering- 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

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

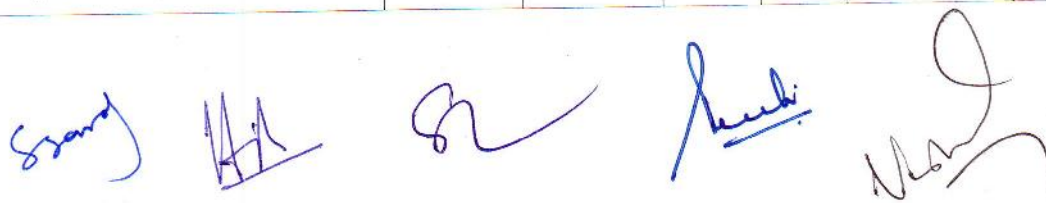


Fifth Semester Examination for the Degree of Bachelor of Pharmacy
SCHEME OF PAPERS

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

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.

The image shows five distinct handwritten signatures in blue ink, arranged horizontally. From left to right: the first is a cursive signature that appears to be 'Sany'; the second is a stylized signature with vertical strokes; the third is a signature with a long horizontal line; the fourth is a signature that looks like 'Sany' with a horizontal line underneath; and the fifth is a signature that appears to be 'Vijay'.

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, ebulliscope 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, cathartics.
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: Iron & 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.

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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, Cruciferae, Apocynaceae, Rutaceae, 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, subtracter.
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.



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. Micromeritics ; 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.

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 conveyers, 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.

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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 underlying 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)

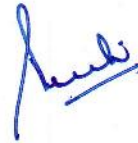
Experiments based on Theory topics of Pharmaceutical Engineering- I and II.



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.



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

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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



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

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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



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, Mohr's 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

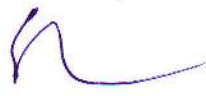


3-T-5 Human Anatomy and Physiology-II

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



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 pharmacopoeial 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

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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, co-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 deoxyribonucleotides.
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

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 form, 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.

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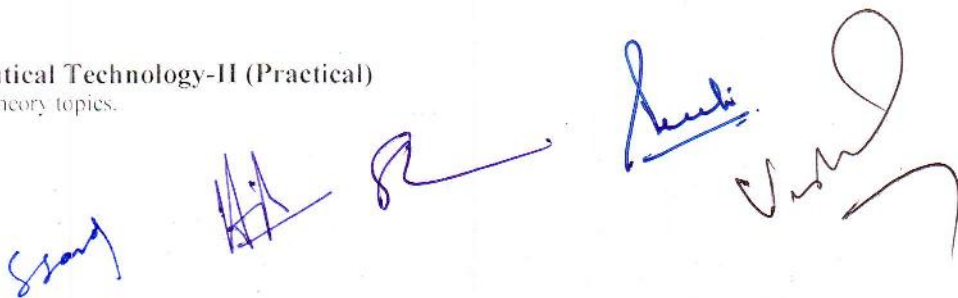
B. Pharm. Fifth Semester

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 kinetics 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.

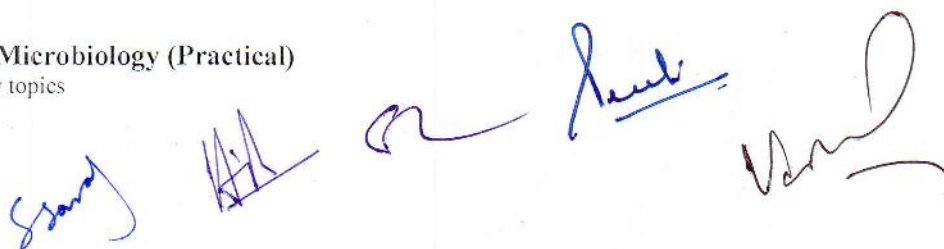


5-T-2 Pharmaceutical Microbiology

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, Hemophilus, 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, urogenital 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. Spectrofluorimetry- 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, Triminopectane 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, Dipeperdon HCl.

5-P-4 Medicinal Chemistry –I (Practical)

Experiments based on Theory topics

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5-T-5 Pharmacology-I

1- General Pharmacology

- Introduction to Pharmacology- Definition, scope and various branches, source of drugs, dosage form and routes of drug administration, Factors affecting absorption from gut
- Pharmacodynamics-Mechanism of drug action, Receptors, classification and drug receptors interaction, combined effect of drugs, factors modifying drug action, drug dose and response.
- Pharmacokinetics-Mechanism and principle of Absorption, Distribution, Metabolism and Excretion of drugs, Principles of basic and clinical pharmacokinetics, Bioavailability and bioequivalence studies.
- Pharmacogenetics
- Adverse drug reactions, Drug interactions
- Discovery and development of new drugs-Preclinical and clinical studies.

2. Pathophysiology of common diseases

- Basic Principles of Cell Injury and Adaptations- Causes of Cellular injury, pathogenesis, morphology of cell injury, adaptations and cell death.
- 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.
- Immunopathophysiology- T and B cells, MHC proteins, antigen presenting cells, immune tolerance, pathogenesis of hypersensitivity reactions, autoimmune diseases, AIDS, Amyloidosis.
- 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

- Definition for acute, sub acute and chronic toxicity, genotoxicity, carcinogenicity, teratogenicity and mutagenicity studies.
 - Definition of poison, general principles of treatment of poisoning with particular reference to barbiturates, opioids, organophosphorous and atropine poisoning.
 - 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:
- Neurohumoral transmission (Autonomic and somatic).
 - Parasympathomimetics, Parasympatholytics, Sympathomimetics, Sympatholytics, Ganglionic stimulants and blockers.
 - Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).
 - Local anesthetic agents.
 - Drugs used in Myasthenia Gravis and Alzheimer's disease.

5-P-5 Pharmacology-I (Practical)

Experiments based on Theory topics

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 elegance 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



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, amitriptyline, Doxepine, Trimipramine, clomipramine, Desipramine, Nortriptyline, Maprofilline, 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

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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:

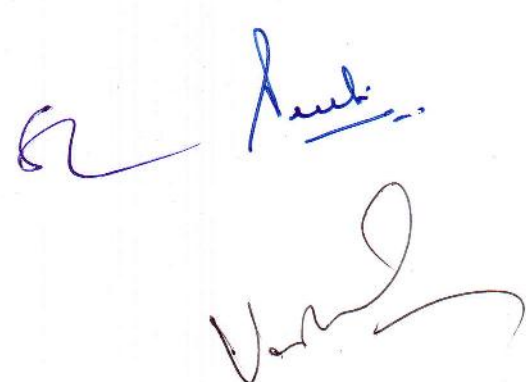
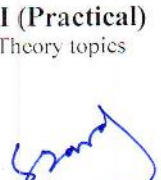
- a. General Principles of peptide pharmacology.
- b. Biosynthesis and regulation of peptides.
- c. Peptide antagonists.
- d. Protein and peptide as drugs.

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



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

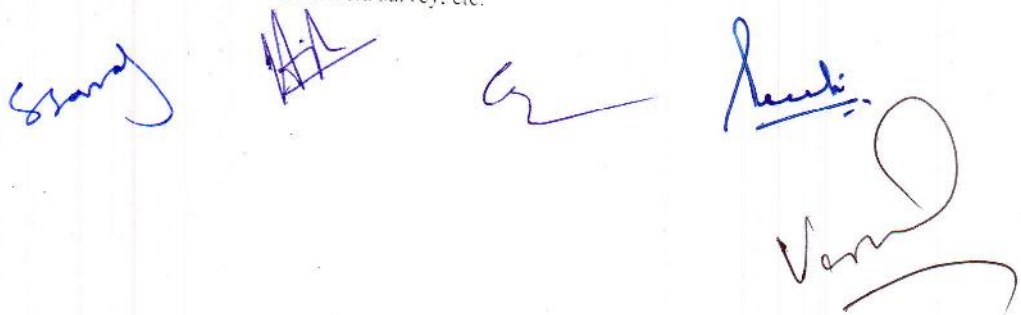
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6-T-5 Hospital and Community Pharmacy

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.



B. Pharm. Seventh Semester

7-T-1 Biopharmaceutics and Pharmacokinetics

1. Introduction to biopharmaceutics and pharmacokinetics: definition, historical development, fundamental principles, 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, Ehaerynic 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, Pyrilaminemaleate, 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, Quinaerine, proguanil and pyrimethamine.
10. **Antiviral including anti HIV agents**
11. **Anthelmintics:** A study of santonin, Ascaridol, Filicid, Antimalarial & antibiotics & anthelminitics, Synthesis of Diethyl carbamazine, Mebandazole, Piperazine citrate, Tetramisole, Levamisole
12. **Anti-amoebs:** Factors affecting the efficiency of antiameobic drugs, Drug combination. A study of Emetine, conesine-9-quinolinal and antibiotics as antiameobics, synthesis and uses of Bially-lunical, Mantomide and Dihydroxy quinoline, Metronidazole, Tinidazole.

7-P-2 Medicinal Chemistry –III (Practical)

Experiments based on Theory topics



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-secretory 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, Quinolones and Fluoroquinolones, 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



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



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.

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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 Athlete'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

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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.

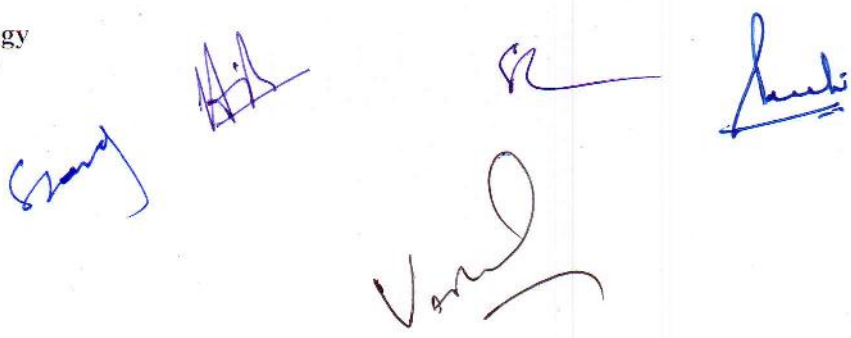
3. **Fermentation:** Fermenter, its design, control of different parameters. Isolation of mutants, factors influencing rate of mutation. Design of fermentation process. Isolation of fermentation products with special reference to penicillins, streptomycins, tetracyclines and vitamin B₁₂, etc.

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

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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 dexamethasone acetate, hydrocortisone acetate, prednisolone & prednisone, dexamethasone, betamethasone.
3. **Non-Steroidal hormones:** Adrenaline & Thyroxin.
4. **Antidiabetic agents:** Insulin, Carbutamide, Chloropamide, Tolbutamide.
5. **Vitamins:** Constitution & physiological importance, vitamin A, thiamine, riboflavin, ascorbic acid, folic acid, pantothenic acid & pyridoxin.
6. **Medicinal Dyes:** Synthesis & uses of gentian violet, malachite green, brilliant green, amaranth, resochin brown, 9-aminoacridine, acriflavin, methylene blue and diloxinate furoate.
7. **Diagnostic agents:** General survey of important compounds.

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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 semosides, 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.

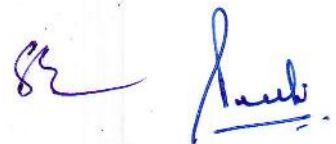
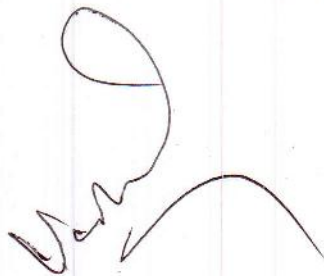
8-T-4 Pharmacognosy –IV

Experiments based on Theory topics



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



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Pt. Ravishankar Shukla University, Raipur (CG)

Revised Ordinance -131

**(Adoption of Pharmacy Council of India (New Delhi) Rules and Syllabus for the
Bachelors of Pharmacy (B.Pharm.) Course
(w.e.f the year 2018-2019)**

1. Short Title

The first degree in Pharmacy of four years (Eight Semester) Course hereinafter called four year Degree Course shall be designated as Bachelor in Pharmacy in short B. Pharm.

2. Minimum qualification for admission

2.1 First year B. Pharm:

Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

2.2. B. Pharm lateral entry (to third semester):

A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

3. Duration of the program

The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

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7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

7.2. Minimum credit requirements

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

8. Academic work

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.

9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table – I to VIII.

Table-I: Course of study for semester I

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology- I-Theory	3	1	4
BP102T	Pharmaceutical Analysis- I – Theory	3	1	4
BP103T	Pharmaceutics- I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory *	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology-I – Practical	4	-	2
BP108P	Pharmaceutical Analysis- I – Practical	4	-	2
BP109P	Pharmaceutics- I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
Total		32/34^s/36[#]	4	27/29^s/30[#]

Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

§ Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

* Non University Examination (NUE)

Table-II: Course of study for semester II

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology- II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry- I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory *	3	-	3
BP206T	Environmental Sciences – Theory *	3	-	3
BP207P	Human Anatomy and Physiology- II –Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry- I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
Total		32	4	29

*Non University Examination (NUE)

Table-III: Course of study for semester III

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry- II Theory	3	1	4
BP302T	Physical Pharmaceutics- I Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry- II – Practical	4	-	2
BP306P	Physical Pharmaceutics- I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering –Practical	4	-	2
Total		28	4	24

Table-IV: Course of study for semester IV

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry- III- Theory	3	1	4
BP402T	Medicinal Chemistry- I – Theory	3	1	4
BP403T	Physical Pharmaceutics- II – Theory	3	1	4
BP404T	Pharmacology- I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry- I– Theory	3	1	4
BP406P	Medicinal Chemistry- I – Practical	4	-	2
BP407P	Physical Pharmaceutics- II – Practical	4		2
BP408P	Pharmacology- I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry- I – Practical	4	-	2
Total		31	5	28

Table-V: Course of study for semester V

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry- II – Theory	3	1	4
BP502T	Industrial Pharmacy-I– Theory	3	1	4
BP503T	Pharmacology- II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry- II– Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial Pharmacy-I – Practical	4	-	2
BP507P	Pharmacology- II – Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry- II – Practical	4	-	2
Total		27	5	26

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Table-VI: Course of study for semester VI

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry- III – Theory	3	1	4
BP602T	Pharmacology- III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics –Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance –Theory	3	1	4
BP607P	Medicinal Chemistry- III – Practical	4	-	2
BP608P	Pharmacology- III – Practical	4	-	2
BP609P	Herbal Drug Technology – Practical	4	-	2
Total		30	6	30

Table-VII: Course of study for semester VII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial Pharmacy-II – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705P	Instrumental Methods of Analysis – Practical	4	-	2
BP706PS	Practice School*	12	-	6
Total		28	5	24

* Non University Examination (NUE)

Table-VIII: Course of study for semester VIII

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP801T	Biostatistics and Research Methodology – Theory	3	1	4
BP802T	Social and Preventive Pharmacy– Theory	3	1	4
BP803ET	Pharma Marketing Management –Theory	3 + 3 = 6	1 + 1 = 2	4 + 4 = 8
BP804ET	Pharmaceutical Regulatory Science– Theory			
BP805ET	Pharmacovigilance– Theory			
BP806ET	Quality Control and Standardization of Herbals – Theory			
BP807ET	Computer Aided Drug Design– Theory			
BP808ET	Cell and Molecular Biology– Theory			
BP809ET	Cosmetic Science– Theory			
BP810ET	Experimental Pharmacology– Theory			
BP811ET	Advanced Instrumentation Techniques– Theory			
BP812ET	Dietary Supplements and Nutraceuticals– Theory			
BP813PW	Project Work	12	-	6
Total		24	4	22

Table-IX: Semester wise credits distribution

Semester	Credit Points
I	27/29 ^{\$} /30 [#]
II	29
III	26
IV	28
V	26
VI	26
VII	24
VIII	22
Extracurricular/ Co curricular activities	01*
Total credit points for the program	209/211^{\$}/212[#]

*The credit points assigned for extracurricular and or co-curricular activities shall be given by the Head of the Institute and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the Institute from time to time.

^{\$}Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

[#]Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.

10. Program Committee

1. The B. Pharm. program shall have a Program Committee constituted by the Head of the institution in consultation with all the Heads of the departments.

2. The composition of the Program Committee shall be as follows:
A senior teacher shall be the Chairperson; One Teacher from each department handling B.Pharm courses; and four student representatives of the program (one from each academic year), nominated by the Head of the institution.

3. Duties of the Program Committee:

- i. Periodically reviewing the progress of the classes.
- ii. Discussing the problems concerning curriculum, syllabus and the conduct of classes.
- iii. Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.
- iv. Communicating its recommendation to the Head of the institution on academic matters.
- v. The Program Committee shall meet at least thrice in a semester preferably at the end of each Sessional Exam (Internal Assessment) and before the end semester exam.

11. Examinations/Assessments

The scheme for internal assessment and end semester examinations is given in Table – X.

11.1 End semester examinations

The End Semester Examinations for each theory and practical course through semesters I to VIII shall be conducted by the university except for the subjects with asterix symbol (*) in table I and II for which examinations shall be conducted by the subject experts at Institute level and the marks/grades shall be submitted to the university.






Tables-X: Schemes for internal assessments and end semester examinations semester wise
Semester I

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP101T	Human Anatomy and Physiology- I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP102T	Pharmaceutical Analysis- I –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP103T	Pharmaceutics -I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP104T	Pharmaceutical Inorganic Chemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP105T	Communication skills –Theory *	5	10	1 Hr	15	35	1.5 Hrs	50
BP106RBT BP106RMT	Remedial Biology/ Mathematics – Theory*	5	10	1 Hr	15	35	1.5 Hrs	50
BP107P	Human Anatomy and Physiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP108P	Pharmaceutical Analysis- I –Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP109P	Pharmaceutics- I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP110P	Pharmaceutical Inorganic Chemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP111P	Communication skills –Practical*	5	5	2 Hrs	10	15	2 Hrs	25
BP112RBP	Remedial Biology –Practical*	5	5	2 Hrs	10	15	2 Hrs	25
Total		70/75^{\$}/80[#]	115/125^{\$}/130[#]	23/24^{\$}/26[#] Hrs	185/200^{\$}/210[#]	490/525^{\$}/ 540[#]	31.5/33^{\$}/ 35[#] Hrs	675/725^{\$}/ 750[#]

Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

\$ Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

* Non University Examination (NUE)

Semester II

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP201T	Human Anatomy and Physiology-II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP202T	Pharmaceutical Organic Chemistry- I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP203T	Biochemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP204T	Pathophysiology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP205T	Computer Applications in Pharmacy – Theory*	10	15	1 Hr	25	50	2 Hrs	75
BP206T	Environmental Sciences – Theory*	10	15	1 Hr	25	50	2 Hrs	75
BP207P	Human Anatomy and Physiology- II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP208P	Pharmaceutical Organic Chemistry-I– Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP209P	Biochemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP210P	Computer Applications in Pharmacy – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
Total		80	125	20 Hrs	205	520	30 Hrs	725

* The subject experts at institute level shall conduct examinations

Semester III

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP301T	Pharmaceutical Organic Chemistry- II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP302T	Physical Pharmaceutics-I –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP303T	Pharmaceutical Microbiology –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP304T	Pharmaceutical Engineering –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP305P	Pharmaceutical Organic Chemistry- II – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP306P	Physical Pharmaceutics- I –Practical	5	10	4 Hr	15	35	4 Hrs	50
BP307P	Pharmaceutical Microbiology –Practical	5	10	4 Hr	15	35	4 Hrs	50
BP308P	Pharmaceutical Engineering –Practical	5	10	4 Hr	15	35	4 Hrs	50
Total		60	100	20	160	440	28Hrs	600

Semester IV

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP401T	Pharmaceutical Organic Chemistry- III- Theory	10	15	1 Hr	25	75	3 Hrs	100
BP402T	Medicinal Chemistry-I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP403T	Physical Pharmaceutics- II –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP404T	Pharmacology -I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP405T	Pharmacognosy and Phytochemistry- I- Theory	10	15	1 Hr	25	75	3 Hrs	100
BP406P	Medicinal Chemistry- I – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP407P	Physical Pharmaceutics -II –Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP408P	Pharmacology- I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP409P	Pharmacognosy and Phytochemistry- I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		70	115	21 Hrs	185	515	31 Hrs	700

Semester V

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP501T	Medicinal Chemistry- II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP502T	Industrial Pharmacy-I– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP503T	Pharmacology- II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP504T	Pharmacognosy and Phytochemistry- II– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP505T	Pharmaceutical Jurisprudence – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP506P	Industrial Pharmacy-I– Practical	5	10	4 Hr	15	35	4 Hrs	50
BP507P	Pharmacology- II – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP508P	Pharmacognosy and Phytochemistry- II – Practical	5	10	4 Hr	15	35	4 Hrs	50
Total		65	105	17 Hr	170	480	27 Hrs	650

Semester VI

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP601T	Medicinal Chemistry- III – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP602T	Pharmacology- III – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP603T	Herbal Drug Technology –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP605T	Pharmaceutical Biotechnology– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP606T	Quality Assurance– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP607P	Medicinal Chemistry -III –Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP608P	Pharmacology- III – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP609P	Herbal Drug Technology –Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		75	120	18 Hrs	195	555	30 Hrs	750

Semester VII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP701T	Instrumental Methods of Analysis – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP702T	Industrial Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP703T	Pharmacy Practice – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP704T	Novel Drug Delivery System – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP705 P	Instrumental Methods of Analysis – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP706 PS	Practice School*	25	-	-	25	125	5 Hrs	150
Total		70	70	8Hrs	140	460	21 Hrs	600

* The subject experts at institute level shall conduct examinations

Semester VIII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP801T	Biostatistics and Research Methodology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP802T	Social and Preventive Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP803ET	Pharma Marketing Management – Theory	10 + 10 = 20	15 + 15 = 30	1 + 1 = 2 Hrs	25 + 25 = 50	75 + 75 = 150	3 + 3 = 6 Hrs	100 + 100 = 200
BP804ET	Pharmaceutical Regulatory Science – Theory							
BP805ET	Pharmacovigilance – Theory							
BP806ET	Quality Control and Standardization of Herbals – Theory							
BP807ET	Computer Aided Drug Design – Theory							
BP808ET	Cell and Molecular Biology – Theory							
BP809ET	Cosmetic Science – Theory							
BP810ET	Experimental Pharmacology – Theory							
BP811ET	Advanced Instrumentation Techniques – Theory							
BP812ET	Dietary Supplements and Nutraceuticals – Theory							
BP812PW	Project Work	-	-	-	-	150	4 Hrs	150
Total		40	60	4 Hrs	100	450	16 Hrs	550

11.2 Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table-XI: Scheme for awarding internal assessment: Continuous mode

Theory		
Criteria	Maximum Marks	
Attendance (Refer Table – XII)	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
Total	10	5
Practical		
Attendance (Refer Table – XII)	2	
Based on Practical Records, Regular viva voce, etc.	3	
Total	5	

Table- XII: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

11.2.1 Sessional Exams

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the institute. The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in tables – X.

Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

Question paper pattern for theory Sessional examinations For subjects having University examination

- I. Multiple Choice Questions (MCQs) OR =10 x 1 = 10
- Objective Type Questions (5 x 2) OR
- =05 x 2 = 10
- (Answer all the questions)
- I. Long Answers (Answer 1 out of 2) =10 x 1 = 10
- OR
- II. Short Answers (Answer 2 out of 3) =05 x 2 = 10
- Total** =30 marks

3

For subjects having Non University Examination

I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10
II. Short Answers (Answer 4 out of 6)	=	4 x 5 = 20

Total	=	30 marks

Question paper pattern for practical sessional examinations

I. Synopsis	=	10
II. Experiments	=	25
III. Viva voce	=	05

Total	=	40 marks

12. Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of B.Pharm. program if he/she secures at least 50% marks in each subject (theory and practical) of the course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal assessment and end semester practical examination.

13. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

14. Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of next end semester theory examinations.

15. Re-examination of end semester examinations

Reexamination of end semester examination shall be conducted as per the schedule given in table XIII. The exact dates of examinations shall be notified from time to time.

Table-XIII: Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
I, III, V and VII	November / December	May / June
II, IV, VI and VIII	May / June	November / December

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Question paper pattern for end semester theory examinations

For 75 marks paper

I. Multiple Choice Questions(MCQs) OR	=	20 x 1	=	20
Objective Type Questions (10 x 2)		OR		
		10 x 2	=	20

(Answer all the questions)

II. Long Answers (Answer 2 out of 3) = 2 x 10 = 20

III. Short Answers (Answer 7 out of 9) = 7 x 5 = 35

Total = 75 marks

For 50 marks paper

I. Long Answers (Answer 2 out of 3) = 2 x 10 = 20

II. Short Answers (Answer 6 out of 8) = 6 x 5 = 30

Total = 50 marks

For 35 marks paper

I. Long Answers (Answer 1 out of 2) = 1 x 10 = 10

II. Short Answers (Answer 5 out of 7) = 5 x 5 = 25

Total = 35 marks

Question paper pattern for end semester practical examination

I. Synopsis = 5

II. Experiments = 25

III. Viva voce = 5

Total = 35 marks

16. Academic Progression:

No student shall be admitted to any examination unless he/she fulfills the norms given in 6. Academic progression rules are applicable as follows:

A student shall be eligible to carry forward all the courses of I, II and III semesters till the IV semester examinations. However, he/she shall not be eligible to attend the courses of V semester until all the courses of I and II semesters are successfully completed.

A student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of I, II, III and IV semesters are successfully completed.

A student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.

A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.

A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.

A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.

Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.

Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

17. Grading of performances

Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XII.

Table – XII: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C1, C2, C3, C4 and C5 and the student's grade points in these courses are G1, G2, G3, G4 and G5, respectively, and then students'

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SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

19. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$CGPA = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4 + C_5S_5 + C_6S_6 + C_7S_7 + C_8S_8}{C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8}$$

Where, C₁, C₂, C₃, is the total number of credits for semester I, II, III and S₁, S₂, S₃, is the SGPA of semester I,II,III.

20. Declaration of class

The class shall be awarded on the basis of CGPA as follows:
First Class with Distinction = CGPA of 7.50 and above
First Class = CGPA of 6.00 to 7.49
Second Class = CGPA of 5.00 to 5.99

21. Project work

All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation Book:

Objective(s) of the work done	15 Marks
Methodology adopted	20 Marks
Results and Discussions	20 Marks
Conclusions and Outcomes	20 Marks
Total	<hr/> 75 Marks
Evaluation of Presentation: Presentation of work	25 Marks






Communication skills
Question and answer skills

20 Marks
30 Marks

Total

75 Marks

Explanation: The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.

22. Industrial training (Desirable)

Every candidate shall be required to work for at least 150 hours spread over four weeks in a Pharmaceutical Industry/Hospital. It includes Production unit, Quality Control department, Quality Assurance department, Analytical laboratory, Chemical manufacturing unit, Pharmaceutical R&D, Hospital (Clinical Pharmacy), Clinical Research Organization, Community Pharmacy, etc. After the Semester – VI and before the commencement of Semester – VII, and shall submit satisfactory report of such work and certificate duly signed by the authority of training organization to the head of the institute.

23. Practice School

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time.

At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.

24. Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

25. Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

26. Duration for completion of the program of study

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

27. Re-admission after break of study

Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condonation fee.

No condonation is allowed for the candidate who has more than 2 years of break up period and he/she has to rejoin the program by paying the required fees.

28. Condonation of Deficiency in Marks

28.1 With a view to moderate hard line cases in the examination, the following rules shall be observed:





28.1.1 Deficiency up to 5 marks be condoned to the best advantage of the candidate for passing the examination, provided the candidate fails in maximum of two theory or one theory and one practical or two practicals.

28.1.2. While declaring result of the candidate no marks shall be added to or subtracted from the aggregate for the deficiency condoned as above. However, he/she will pass the subjects cleared through clause 16. After condoning the deficiency the candidate's result shall be declared in the class, which the aggregate entitled him/her.

28.1.3. One grace mark will be given to the candidate who is failing/missing distinction/missing first division by one mark, on behalf of the Vice-Chancellor in the B.Pharm. Examination. The benefit will not, however, be available to a candidate getting advantage under Clause 28.1.1.

29. If a candidate has passed a semester examination in full he/she shall not be permitted to reappear in that examination for improvement of division/marks or any other purpose,

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भारत का राजपत्र The Gazette of India

असाधारण
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भारतीय भेषजी परिषद् अधिसूचना

नई दिल्ली, 10 दिसम्बर, 2014

भेषजी स्नातकोत्तर (एम.फार्म) पाठ्यक्रम विनियम, 2014

सं. 14-136/2014-भा.भे.परि.-भेषजी अधिनियम, 1948 (1948 का 8) की धारा 10 और 18 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए भारतीय भेषजी परिषद्, केन्द्रीय सरकार के अनुमोदन से निम्नलिखित विनियम बनाती है, अर्थात्

भेषजी स्नातकोत्तर (एम.फार्म.) पाठ्यक्रम विनियम, 2014

अध्याय-I

1. संक्षिप्त नाम और प्रारंभ :

- इन विनियमों का नाम भेषजी स्नातकोत्तर (एम.फार्म.) पाठ्यक्रम विनियम, 2014 है।
- ये सरकारी राजपत्र में प्रकाशन की तारीख से प्रवृत्त होंगे।
- भेषजी स्नातकोत्तर (एम.फार्म.) में भेषजी अधिनियम, 1948 के अधीन वृत्ति का व्यवसाय करने के लिए भेषजज्ञ के रूप में पंजीकरण/अर्हता अभिवृद्धि के प्रयोजनार्थ इन विनियमों में यथा विहित पाठ्यक्रम और परीक्षा उत्तीर्ण करने पर एक प्रमाण-पत्र दिया जाएगा।

2. पाठ्यक्रम की अवधि :

- स्नातकोत्तर पाठ्यक्रम की अवधि दो पूर्णकालिक शैक्षणिक वर्ष होगी और प्रत्येक शैक्षणिक वर्ष कम से कम दो सौ कार्य दिवस का होगा।
- एम.फार्म. का अध्ययन वार्षिक पद्धति का होगा जिसके अंतर्गत शैक्षणिक अवधि के प्रारंभ से 12 मास तक विस्तारित एम.फार्म (भाग-1) और अगले 12 मास की अवधि का एम.फार्म (भाग-2) होगा।
- एम.फार्म. (भाग-1) के अंत में एम.फार्म (भाग-1) की विश्वविद्यालय परीक्षा होगी। एम.फार्म. (भाग-2) के अंत में अभ्यर्थी विश्वविद्यालय द्वारा अनुमोदित विषय पर एक शोध निबंध (डेजरटेशन) प्रस्तुत करेगा।

4899 GI/2014

(1)

अधिसूचना

नई दिल्ली, 10 दिसम्बर, 2014

भेषजी स्नातक (बी.फार्म) पाठ्यक्रम विनियम, 2014

संख्या 14-154/2010-भा.भे.परि.-भेषजी अधिनियम, 1948 (1948 का 8) की धारा 10 और 18 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए भारतीय भेषजी परिषद्, केन्द्रीय सरकार के अनुमोदन से निम्नलिखित विनियम बनाती है, अर्थात्

अध्याय - I

1. संक्षिप्त नाम और प्रारंभ -

- (1) इन विनियमों का नाम भेषजी स्नातक (बी.फार्म) पाठ्यक्रम विनियम, 2014 है।
- (2) ये राजपत्र में प्रकाशन की तारीख से प्रवृत्त होंगे।

2. भेषजी स्नातक के लिए भेषजी अधिनियम, 1948 के अधीन भेषजी वृत्ति का व्यवसाय करने के लिए भेषजज्ञ के रूप में पंजीकरण के प्रयोजन के लिए इन विनियमों में यथा विहित पाठ्यक्रम का अध्ययन और परीक्षा उत्तीर्ण करने पर एक प्रमाणपत्र जारी किया जाएगा।

अध्याय - II

3. पाठ्यक्रम की अवधि -

भेषजी स्नातक : पाठ्यक्रम की अवधि पूर्णकालिक चार शैक्षणिक वर्ष (वार्षिक/सेमेस्टर) होगी। प्रत्येक शैक्षणिक वर्ष वार्षिक पद्धति के लिए कम से कम दो सौ कार्य दिवस और प्रत्येक सेमेस्टर के लिए एक सौ कार्य दिवस की अवधि का होगा।

4. प्रवेश के लिए न्यूनतम अर्हता -

क. प्रथम वर्ष भेषजी स्नातक - निम्नलिखित परीक्षाओं में से किसी में उत्तीर्ण -

- i) अभ्यर्थी ने भारतीय विश्वविद्यालय संघ द्वारा 10+2 परीक्षा के समकक्ष मान्यता प्राप्त संबंधित राज्य/केन्द्रीय सरकार के प्राधिकरणों द्वारा संचालित 10+2 परीक्षा उत्तीर्ण की हो जिसमें एक विषय अंग्रेजी हो तथा भौतिकी, रसायन विज्ञान, गणित/जीव विज्ञान पृथक-पृथक वैकल्पिक विषय हो। तथापि, जिन छात्रों के पास अनौपचारिक और गैर कक्षा आधारित विद्यालयी संस्था जैसे, राष्ट्रीय मुक्त विद्यालयी परीक्षा शिक्षण संस्थान, राज्यों की मुक्त विद्यालय पद्धति आदि की 10+2 अर्हता है, वे भेषजी स्नातक पाठ्यक्रम में प्रवेश के लिए पात्र नहीं होंगे।

- ii) भारतीय भेषजी परिषद् द्वारा उपर्युक्त परीक्षाओं में से किसी के समकक्ष अनुमोदित कोई अन्य अर्हता।

तथापि, पाठ्यक्रम में प्रवेश के वर्ष के 31 दिसम्बर या उससे पूर्व छात्र की आयु 17 वर्ष होनी चाहिए।

तथापि, यह कि अनुसूचित जातियों, अनुसूचित जन-जातियों और अन्य पिछड़े वर्गों के छात्रों के लिए सीटों का आरक्षण केन्द्रीय सरकार/राज्य सरकार/संघ क्षेत्र प्रशासन, जो भी हो, द्वारा समय-समय पर जारी किए गए अनुदेशों के अनुसार होगा।

- ख. भेषजी स्नातक में बाद में प्रवेश (दूसरे वर्ष/तीसरे सेमेस्टर में)
भेषजी अधिनियम की धारा 12 के अधीन भारतीय भेषजी परिषद् द्वारा अनुमोदित संस्थान से डी.फार्म. पाठ्यक्रम में उत्तीर्ण ।
5. भेषजी स्नातक पाठ्यक्रम में प्रवेश संख्या उतनी होगी जो भारतीय भेषजी परिषद् द्वारा समय-समय पर निर्धारित की जाएगी।
6. अध्ययन पाठ्यक्रम - भेषजी स्नातक के अध्ययन पाठ्यक्रम के विषय तथा सिद्धांत पक्ष, व्यवहार पक्ष और अनुशिक्षणीय पक्ष में शिक्षण के प्रत्येक विषय के लिए एक सप्ताह में उतने घण्टे होंगे जितने भारतीय भेषजी द्वारा समय-समय पर निर्धारित किए जाएंगे।
7. व्यावहारिक प्रशिक्षण : छात्र से अपेक्षित है कि वह 150 घण्टों का व्यावहारिक प्रशिक्षण प्राप्त करे
(क) भेषजी व्यवहार (अस्पताल/सामुदायिक भेषजी) अथवा
(ख) भेषजीय और सम्बद्ध उद्योगों में जो दूसरे वर्ष के पश्चात् अध्ययन क्रम के दौरान कम से कम एक मास की अवधि का हो।
8. पाठ्य विवरण - अध्ययन के हर विषय के लिए पाठ्य विवरण वह होगा जो भारतीय भेषजी परिषद् द्वारा समय-समय पर निर्धारित करेगी।
9. अध्ययन पाठ्यक्रम संचालित करने वाले प्राधिकरण का अनुमोदन -
1) कोई व्यक्ति, संस्थान, सोसायटी, न्यास या विश्वविद्यालय भारतीय भेषजी परिषद् के पूर्व अनुमोदन के बिना भेषजी स्नातक कार्यक्रम प्रारंभ और संचालित नहीं करेगा।
2) भेषजी अधिनियम की धारा 12 की उपधारा (1) के अधीन अनुमोदन प्राप्त करने के प्रयोजन हेतु कोई व्यक्ति या भेषजी महाविद्यालय ऐसी स्कीम प्रस्तुत करेगा जो भारतीय भेषजी परिषद् द्वारा निर्धारित की गई हो।
3) ऊपर उपविनियम (2) में उल्लेखित स्कीम ऐसे प्रारूप में होगी और उसमें ऐसा विवरण होगा तथा ऐसी रीति से प्रस्तुत की जाएगा तथा उसके साथ ऐसी फीस संलग्न होगी जो निर्धारित की गई हो :
तथापि, भारतीय भेषजी परिषद् इन विनियमों के अधीन किसी संस्थान को तब तक अनुमोदित नहीं करेगी जब तक कि उसने इन विनियमों के परिशिष्ट 'क' में यथा निर्दिष्ट भवन, वास-सुविधा, प्रयोगशाला, उपकरण, शिक्षण कर्मचारीवृंद, गैर-शिक्षण कर्मचारीवृंद आदि के संबंध में अध्यापन के पर्याप्त इंतजाम न कर लिए हों।
10. परीक्षा -
1. भेषजी स्नातक के प्रत्येक शैक्षणिक वर्ष/सेमेस्टर के अंत में परीक्षा होगी।
2. प्रत्येक परीक्षा हर वर्ष दो बार अर्थात् नियमित और अनुपूरक परीक्षा आयोजित की जाएगी।
3. परीक्षा लिखित और व्यावहारिक (मौखिक परीक्षा समेत) होगी, प्रत्येक भाग के लिए अधिकतम अंक होंगे जो भारतीय भेषजी परिषद् द्वारा समय-समय पर निर्धारित किए जाएंगे
11. परीक्षा में बैठने की पात्रता : परीक्षा में बैठने के लिए केवल वही छात्र पात्र होंगे जो उस संस्थान के प्रमुख का प्रमाण-पत्र प्रस्तुत करेंगे जिसमें उन्होंने हर विषय में सिद्धांत पक्ष और व्यवहार पक्ष दोनों में अलग-अलग आयोजित कम से कम 80 प्रतिशत कक्षाओं में हाजिर होकर अध्ययन पाठ्यक्रम पूरा किया हो।
12. परीक्षा का ढंग :
(1) सैद्धांतिक परीक्षा तीन घण्टे तथा व्यावहारिक परीक्षा चार घण्टे की होगी।
(2) जो छात्र किसी विषय की सैद्धांतिक या व्यावहारिक परीक्षा में उत्तीर्ण नहीं होगा वह यथास्थिति सैद्धांतिक या व्यावहारिक परीक्षा में दोबारा बैठेगा।
(3) व्यावहारिक परीक्षा में मौखिक परीक्षा भी शामिल होगी।

13. सत्र परीक्षा में अंक देना तथा अभिलेख का रख रखाव -

- (1) भेषजी स्नातक पाठ्यक्रम का प्रशिक्षण देने वाले संस्थान में सैद्धांतिक और व्यावहारिक कक्षा कार्य और परीक्षाओं का नियमित अभिलेख हर छात्र के लिए रखा जाएगा तथा हर सैद्धांतिक विषय के लिए 25 अंक और हर व्यावहारिक विषय के लिए 25 अंक सत्रीय अंक के रूप में रखे जाएंगे।
- (2) प्रत्येक शैक्षणिक वर्ष के दौरान कम से कम तीन आवधिक सत्र परीक्षाएं होंगी तथा सत्रीय अंकों की गणना किन्हीं दो प्रदर्शनों के सर्वोच्च औसत पर आधारित होगी।
- (3) व्यावहारिक विषयों में सत्रीय अंक निम्नलिखित आधार पर दिए जाएंगे :-
 - (i) सत्र परीक्षा में वास्तविक प्रदर्शन (15 अंक),
 - (ii) व्यावहारिक कक्षा कार्य, तत्परता, मौखिक परीक्षा, अभिलेख रखने आदि का दैनिक मूल्यांकन (10 अंक)

14. परीक्षा उत्तीर्ण करने के लिए न्यूनतम अंक - कोई छात्र तब तक परीक्षा में उत्तीर्ण घोषित नहीं किया जाएगा जब तक कि उसने सत्र अंकों समेत सैद्धांतिक या व्यावहारिक परीक्षाओं में हर विषय में पृथक-पृथक कम से कम 50% अंक प्राप्त न किए हों। भेषजी स्नातक में एक ही प्रयास में सब विषयों में कुल 60% या इससे अधिक अंक प्राप्त करने वाले छात्रों को प्रथम श्रेणी में उत्तीर्ण घोषित किया जाएगा। किसी विषय या किन्हीं विषयों में 75% या इससे अधिक अंक प्राप्त करने वाले छात्रों की उस विषय या उन विषयों में विशेष योग्यता के साथ उत्तीर्ण घोषित किया जायेगा बशर्ते कि सब विषय एक ही प्रयास में उत्तीर्ण किए हों।

14(क). अगले वर्ष में प्रौन्नति के लिए पात्रता - वे सभी छात्र, जो सभी विषयों में बैठे हैं और प्रथम वर्ष की वार्षिक परीक्षा में उत्तीर्ण हुए हैं, दूसरे वर्ष में प्रौन्नति के लिए पात्र हैं आदि आदि। फिर भी दो से अधिक विषयों में असफल छात्र अगले वर्ष की कक्षा में प्रौन्नति से वंचित हो जाएंगे।

15. परीक्षाओं का अनुमोदन - विनियम 10 से 12 और 14 में वर्णित परीक्षाएं उस परीक्षा प्राधिकरण द्वारा आयोजित की जाएंगी जो भेषजी अधिनियम 1948 की धारा 12 की उपधारा (2) के अधीन भारतीय भेषजी परिषद् द्वारा अनुमोदित हो। ऐसा अनुमोदन तभी दिया जाएगा जब संबंधित परीक्षा प्राधिकरण इन विनियमों के परिशिष्ट (ख) में विनिर्दिष्ट शर्तों को पूरा करता हो।

16. परीक्षा उत्तीर्ण करने का प्रमाण-पत्र - हर छात्र जो भेषजी स्नातक की परीक्षाएं उत्तीर्ण कर लेगा उसे परीक्षा प्राधिकरण द्वारा प्रमाण-पत्र दिया जाएगा।

परिशिष्ट (क)

(विनियम 9 देखिए)

शैक्षणिक प्रशिक्षण संस्था द्वारा पूरी की जाने वाली शर्तें

1. भेषजी अधिनियम 1948 की धारा 12 की उपधारा (1) के अधीन भेषजी स्नातक के लिए अध्ययन पाठ्यक्रम के अनुमोदन के लिए भारतीय भेषजी परिषद् में आवेदन करने वाला कोई प्राधिकरण या संस्था भारतीय भेषजी परिषद् द्वारा समय-समय पर निर्धारित अवसररचनात्मक सुविधाओं का अनुपालन करेगा।
2. भेषजी स्नातक कार्यक्रम केवल उन्हीं संस्थाओं द्वारा संचालित किए जाएंगे जो भेषजी अधिनियम 1948 की धारा 12 के उपबन्धों के अनुसार भेषजी स्नातक के लिए भारतीय भेषजी परिषद् द्वारा अनुमोदित है।
3. शिक्षण कर्मचारी वृन्द
 - (i) कर्मचारी प्रतिरूप (पैटर्न) : सभी शिक्षक पूर्णकालिक होंगे
 - (ii) निदेशक/प्रधानाचार्य/संस्था प्रमुख - 1

(iii) विभाग/प्रभाग वार शिक्षण कर्मचारीवृंद

विभाग/प्रभाग	पदनाम	संख्या (60 दाखिलों के लिए)	संख्या (100 दाखिलों के लिए)
फार्मास्यूटिक्स विभाग	प्रोफेसर/सह प्रोफेसर	1	1
	सहायक प्रोफेसर	1	2
	प्राध्यापक	2	3
फार्मास्यूटिकल कैमिस्ट्री विभाग (फार्मास्यूटिकल एनालेसिस सहित)	प्रोफेसर/सह प्रोफेसर	1	1
	सहायक प्रोफेसर	1	2
	प्राध्यापक	3	3
फार्माकोलॉजी विभाग	प्रोफेसर/सह प्रोफेसर	1	1
	सहायक प्रोफेसर	1	1
	प्राध्यापक	2	3
फार्माकोग्नोसी विभाग	प्रोफेसर/सह प्रोफेसर	1	1
	सहायक प्रोफेसर	1	1
	प्राध्यापक	1	1
फार्मेसी प्रैक्टिस तथा संबंधित विषय विभाग	प्रोफेसर/सह प्रोफेसर	-	1
	सहायक प्रोफेसर	1	1
	प्राध्यापक	1	1

(iv) निदेशक/प्रधानाचार्य/संस्था प्रमुख/विभागाध्यक्ष सहित शिक्षकों की अर्हताएं और अनुभव "भेषजी संस्थानों में शिक्षकों की न्यूनतम योग्यता विनियम, 2014" में निहित न्यूनतम अर्हता के अनुरूप होंगे।

(v) शिक्षकों का कार्यभार :-

प्रोफेसर/सह प्रोफेसर	-	8 घण्टे प्रति सप्ताह
सहायक प्रोफेसर	-	12 घण्टे प्रति सप्ताह
प्राध्यापक	-	16 घण्टे प्रति सप्ताह

4. गैर - शिक्षण कर्मचारी

क्रमांक	पदनाम	अपेक्षित संख्या (न्यूनतम)	अपेक्षित अर्हता
1	प्रयोगशाला तकनीशियन	प्रत्येक विभाग के लिए एक	डी.फार्म.
2	प्रयोगशाला सहायक या प्रयोगशाला परिचर	प्रत्येक प्रयोगशाला के लिए एक (कम से कम)	एस.एस.एल.सी.
3	कार्यालय अधीक्षक	1	डिग्री
4	लेखापाल	1	डिग्री
5	भंडारी	1	किसी विश्वविद्यालय या संस्था द्वारा मान्यता प्राप्त डी.फार्म. या स्नातक डिग्री
6	कंप्यूटर डाटा आपरेटर	1	बी.सी.ए. अथवा कंप्यूटर पाठ्यक्रम में स्नातक
7	कार्यालय कर्मचारी I	1	डिग्री
8	कार्यालय कर्मचारी II	2	डिग्री
9	चपरासी	2	एस.एस.एल.सी.
10	सफाई कार्मिक	यथोचित	-
11	माली	यथोचित	-

5. आवास

प्रधानाचार्य अथवा विभागाध्यक्ष के कक्षों, कार्यालय, कक्षाओं, पुस्तकालय, कर्मचारीवृंद, स्टाफ कामन कक्ष, छात्र कामन कक्ष, संग्रहालय, प्रयोगशालाओं, भंडारों आदि के लिए पर्याप्त संवातन, प्रकाश और अन्य स्वास्थ्यकर अवस्थाओं से युक्त उपयुक्त और पर्याप्त आवास की व्यवस्था होनी चाहिए।

निम्नांकित के लिए आठ प्रयोगशालाओं के साथ-साथ कम से कम दो व्याख्यान कक्ष होने चाहिए -

1. फार्मास्यूटिक्स एण्ड फार्माकोकिनेटिक्स प्रयोगशाला	-	2
2. लाइफ साइंस (फार्माकोलॉजी, फिजियोलॉजी, पैथोफिजियोलॉजी)	-	2

3. फार्मास्यूटिकल कैमिस्ट्री	-	2
4. फार्माकोग्नोसी	-	1
5. फार्मास्यूटिकल एनालेसिस	-	1
	योग	8

प्रयोगशालाओं के अलावा, तुला कक्ष, सेप्टिकरोधी कक्ष या केबिनेट, पशुशाला और मशीन कक्ष की भी व्यवस्था होनी चाहिए।

प्रयोगशाला का फर्श क्षेत्रफल किसी भी समय प्रयोगशाला में कार्य करने के लिए प्रतिछात्र कम से कम 30 वर्ग फुट होना चाहिए जो तैयारी कक्ष सहित कम से कम 900 वर्ग फुट अवश्य हो।

प्रयोगशालाओं की फिटिंग और उसका निर्माण ऐसी रीति से किया गया हो कि उन्हें ठीक से स्वच्छ रखा जा सके। जहां आवश्यक हो वहां गैस और पानी की फिटिंग, शैल्फ, फ्यूमिंग अलमारियों की व्यवस्था होनी चाहिए।

6. उपस्कर और उपकरण

विभिन्न विभागों के लिए अपेक्षित उपस्कर और उपकरण वह होंगे जो भारतीय भेषजी परिषद् द्वारा समय-समय पर निर्धारित किए जाएंगे।

परिशिष्ट (ख)

(विनियम 15 देखिए)

परीक्षा प्राधिकरण द्वारा पूरी की जाने वाली शर्तें

1. परीक्षा प्राधिकरण केन्द्रीय सरकार/राज्य सरकार/संघ-क्षेत्र प्रशासन द्वारा गठित विश्वविद्यालय अथवा डीम्ड यूनिवर्सिटी होगी जिसके द्वारा यह सुनिश्चित किया जाए कि परीक्षा केन्द्रों पर परीक्षाओं में अनुशासन और शालीनता का कड़ाई से पालन हो।
2. वह भारतीय भेषजी परिषद् के निरीक्षक या निरीक्षकों को परीक्षाओं में जाने और उनका निरीक्षण करने देगा।
3. वह निम्नलिखित व्यवस्थाएं भी करेगा -
 - (क) लिखित परीक्षाएं आयोजित करने के लिए आवश्यक फर्नीचर युक्त पर्याप्त कक्ष ;
 - (ख) प्रायोगिक परीक्षा लेने के लिए साधन संपन्न प्रयोगशालाएं ;
 - (ग) परीक्षा संचालित करने और अन्वीक्षण करने के लिए पर्याप्त योग्य और जिम्मेदार परीक्षक ; तथा
 - (घ) ऐसी अन्य सुविधाएं जो परीक्षाओं के दक्षतापूर्ण तथा उचित संचालन के लिए आवश्यक हों।
4. यदि किसी अभ्यर्थी द्वारा ऐसा अपेक्षित हो तो वह परीक्षा प्राधिकरण को विहित शुल्क, यदि कोई है, लेने के बाद परीक्षा में अभ्यर्थी द्वारा प्राप्त अंकों का विवरण देगा।
5. वह ऐसे परीक्षकों की नियुक्ति करेगा जिनकी अर्हताएं संबंधित विषयों के शिक्षकों की अर्हताओं के समकक्ष हों जो भेषजी संस्थाओं में शिक्षकों की न्यूनतम योग्यता विनियम 2014 में निहित है।
6. भेषजी अधिनियम 1948 की धारा 12 की उपधारा (3) के अनुसरण में परीक्षा प्राधिकरण भारतीय भेषजी परिषद् के सचिव को परीक्षाओं के लिए नियत तारीखें ऐसी परीक्षाओं की समय-सारणी, परीक्षा से कम से कम 6 सप्ताह पहले संसूचित करेगा जिससे कि परिषद् ऐसी परीक्षाओं में उपस्थित रहने के लिए निरीक्षण दल का इंतजाम कर सके।
7. परीक्षा प्राधिकरण यह सुनिश्चित करेगा कि भेषजी स्नातक कार्यक्रम के लिए परीक्षा आयोजित करने के लिए परीक्षक ऐसे व्यक्ति हों जिनके पास भेषजी अर्हता हो और जो किसी अनुमोदित संस्था में भेषजी स्नातक कार्यक्रम के शिक्षण में भाग लेते हों।

अर्चना मुद्गल, निबंधक-एवं-सचिव

[विज्ञापन III/4/असा./101/14]

NOTIFICATION

New Delhi, the 10th December, 2014

The Bachelor of Pharmacy (B.Pharm.) Course Regulations, 2014

No. 14-154/ 2010- PCI.—In exercise of the powers conferred by Section 10 and 18 of the Pharmacy Act, 1948 (8 of 1948), the Pharmacy Council of India, with the approval of the Central Government hereby makes the following regulations; namely—

CHAPTER-I1. **Short title and commencement –**

- (1) These regulations may be called the Bachelor of Pharmacy (B.Pharm) Course Regulations, 2014.
 - (2) They shall come into force from the date of their publication in the official Gazette.
2. B. Pharm shall consist of a certificate, having passed the course of study and examination as prescribed in these regulations, for the purpose of registration as a pharmacist to practice the profession under the Pharmacy Act, 1948.

CHAPTER-II3. **Duration of the course. –**

B. Pharm: The duration of the course shall be four academic years (annual/semester) full time with each academic year spread over a period of not less than two hundred working days for annual pattern and hundred working days for each semester.

4. **Minimum qualification for admission to –**A. **First year B. Pharm – A pass in any of the following examinations -**

- i. Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics/Biology as optional subjects individually. "However, the students possessing 10+2 qualification from non-formal and non-class rooms based schooling such as National Institute of Open Schooling, open school systems of States etc. shall not be eligible for admission to B.Pharm Course."
- ii. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

Provided that a student should complete the age of 17 years on or before 31st December of the year of admission to the course.

Provided that there shall be reservation of seats for the students belonging to the Scheduled Castes, Scheduled Tribes and other Backward Classes in accordance with the instructions issued by the Central Government/State Government/Union Territory Administration as the case may be from time to time.

B. **B. Pharm lateral entry (to second year/third semester) -**

A pass in D. Pharm course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

5. Number of admissions in B. Pharm course shall be as prescribed by the Pharmacy Council of India from time to time.
6. Course of study. – The course of study for B. Pharm shall include the subjects, number of hours in a week devoted to each subject for its teaching in theory, practical and tutorial as may be prescribed by the Pharmacy Council of India from time to time.
7. Practical Training: The student is required to undergo practical training of 150 hrs either in (A) Pharmacy Practice (Hospital/Community pharmacy) or (B) Pharmaceutical and allied Industries spread over a period of not less than one month during the course of study after second year.
8. Syllabus. – The syllabus for each subject of study shall be as prescribed by the Pharmacy Council of India from time to time.
9. Approval of the authority conducting the course of study. –
 1. No person, institution, society, trust or university shall start and conduct B. Pharm programme without the prior approval of the Pharmacy Council of India.

2. Any person or pharmacy college for the purpose of obtaining permission under sub-section (1) of section 12 of the Pharmacy Act, shall submit a scheme as may be prescribed by the Pharmacy Council of India.
3. The scheme referred to in sub-regulation (2) above, shall be in such form and contain such particulars and be preferred in such manner and be accompanied with such fee as may be prescribed:

Provided that the Pharmacy Council of India shall not approve any institution under these regulations unless it provides adequate arrangements for teaching in regard to building, accommodation, labs., equipments, teaching staff, non-teaching staff, etc., as specified in Appendix-A to these regulations.

10. Examination. –

1. There shall be an examination at the end of each academic year/semester of B.Pharm.
2. Each examination may be held twice every year namely regular and supplementary examination.
3. The examinations shall be of written and practical (including oral nature) carrying maximum marks for each part as may be prescribed by the Pharmacy Council of India from time to time.

11. Eligibility for appearing Examination.— Only such students who produce certificate from the Head of the Institution in which he or she has undergone the course of study by attending not less than 80% of the classes held both in theory and practicals separately in each subject shall be eligible for appearing at examination.

12. Mode of examinations.—

- (1) Theory examination shall be of three hours and practical examination shall be of four hours duration.
- (2) A candidate who fails in theory or practical examination of a subject shall re-appear in theory or practical as the case may be.
- (3) Practical examination shall also consist of a viva –voce (Oral) examination.

13. Award of sessional marks and maintenance of records—

- (1) A regular record of both theory and practical class work and examinations conducted in an institution imparting training for B. Pharm course, shall be maintained for each student in the institution and 25 marks for each theory and 25 marks for each practical subject shall be allotted as sessional marks.
- (2) There shall be at least three periodic sessional examinations during each academic year and the highest aggregate of any two performances shall form the basis of calculating sessional marks.
- (3) The sessional marks in practicals shall be allotted on the following basis:-
 - (i) Actual performance in the sessional examination (15 marks);
 - (ii) Day to day assessment in the practical class work, promptness, viva-voce, record maintenance, etc. (10 marks).

14. Minimum marks for passing examination.— A student shall not be declared to have passed examination unless he or she secures at least 50% marks in each of the subjects separately in the theory and practical examinations, including sessional marks. **The students securing 60% marks or above in aggregate in all subjects in a single attempt at B. Pharm shall be declared to have passed in the First Class. Students securing 75% marks or above in any subject or subjects shall be declared to have passed with distinction in the subject or those subjects provided he / she passes in all the subjects in a single attempt.**

14 (a). **Eligibility for the promotion to the next year. – All the students who have appeared for all the subjects and passed the First year Annual Examination are Eligible for promotion to the second year and so on. However, failure in more than two subjects shall debar him /her from promotion to the next year classes.**

15. Approval of examinations.— Examinations mentioned in regulations 10 to 12 and 14 shall be held by the examining authority which shall be approved by the Pharmacy Council of India under sub-section (2) of section 12 of the Pharmacy Act, 1948. Such approval shall be granted only if the examining authority concerned fulfills the conditions as specified in Appendix-(B) to these regulations.

16. Certificate of passing examination.— Every student who has passed the examinations for the B. Pharm shall be granted a certificate by the examining authority.

APPENDIX- (A)**(See regulation 9)****CONDITIONS TO BE FULFILLED BY THE ACADEMIC TRAINING INSTITUTION**

- 1) Any authority or institution in India applying to the Pharmacy Council of India for approval of courses of study for B. Pharm. under sub-section (1) of section 12 of the Pharmacy Act, 1948 shall comply with the infrastructural facilities as prescribed by the Pharmacy Council of India from time to time.
- 2) B. Pharm. programmes shall be conducted only in those institutions which are approved by the Pharmacy Council of India for B.Pharm course as provided under section 12 of the Pharmacy Act, 1948;
- 3) **TEACHING STAFF REQUIREMENT**
 - (i) Staff Pattern: All faculty shall be full time.
 - (ii) Director/Principal/HOI - 1
 - (iii) Department/Division-Wise Teaching Staff:

Department/Division	Name of the post	No.(for 60 admissions)	No.(for 100 admissions)
Department of Pharmaceutics	Professor/Associate Professor	1	1
	Asst. Professor	1	2
	Lecturer	2	3
Department of Pharmaceutical Chemistry (Including Pharmaceutical Analysis)	Professor/Associate Professor	1	1
	Asst. Professor	1	2
	Lecturer	3	3
Department of Pharmacology	Professor/Associate Professor	1	1
	Asst. Professor	1	1
	Lecturer	2	3
Department of Pharmacognosy	Professor/Associate Professor	1	1
	Asst. Professor	1	1
	Lecturer	1	1
Department of Pharmacy Practice & related subjects	Professor/Associate Professor	-	1
	Asst. Professor	1	1
	Lecturer	1	1

- iii) Qualification and experience for teaching faculty including Director/Principal/ Head of Instt./Head of Deptt. shall be as per the Minimum Qualification for Teachers in Pharmacy Institutions Regulations, 2014.
- iv) Workload of Faculty :
 - Professor/Associate Professor – 8 hrs. per week
 - Assistant Professor – 12 hrs. per week
 - Lecturers – 16 hrs. per week

4) NON-TEACHING STAFF :

Sl.No.	Designation	Required (Minimum)	Required Qualification
1	Laboratory Technician	1 for each Dept	D. Pharm
2	Laboratory Assistants or Laboratory Attenders	1 for each Lab (minimum)	SSLC
3	Office Superintendent	1	Degree
4	Accountant	1	Degree
5	Store keeper	1	D.Pharm or a Bachelor degree recognized by a University or institution.
6	Computer Data Operator	1	BCA or Graduate with Computer Course
7	Office Staff I	1	Degree
8	Office Staff II	2	Degree
9	Peon	2	SSLC
10	Cleaning personnel	Adequate	---
11	Gardener	Adequate	---

5) ACCOMMODATION :

Suitable and sufficient accommodation with adequate ventilation, lighting and other hygienic conditions should be provided to the rooms for Principal or the Head of the department, office, class rooms, library, staff, staff common room, students' common room, museum, laboratories, stores, etc.

At least two lecture halls along with eight laboratories as specified below should be provided for: —

1. Pharmaceutics and Pharmacokinetics Lab	- 2
2. Life Science (Pharmacology, Physiology, Pathophysiology)	- 2
3. Pharmaceutical Chemistry	- 2
4. Pharmacognosy	- 1
5. Pharmaceutical Analysis	- 1

	Total = 8

In addition to the laboratories, balance room, aseptic room or cabinet, animal house and a machine room shall also be provided.

Floor area of the laboratory should not be less than 30 square feet per student required to work in the laboratory at any given time subject to a minimum of 900 square feet including Preparation Room.

Laboratories should be fitted and constructed in a manner that these can be kept reasonably clean. Gas and water fittings, shelves, fuming cupboards be provided wherever necessary.

6. EQUIPMENT AND APPARATUS :

The details of equipments and apparatus required for various departments shall be as prescribed by the Pharmacy Council of India from time to time.

APPENDIX - B

(See regulation 15)

**CONDITIONS TO BE FULFILLED BY
THE EXAMINING AUTHORITY**

- The Examining Authority shall be a Indian University constituted by the Central Government/State Government/Union Territory Administration or a Deemed to be University. It shall ensure that discipline and decorum of the examinations are strictly observed at the examination centers.
- It shall permit the Inspector or Inspectors of the Pharmacy Council of India to visit and inspect the examinations.
- It shall provide:-
 - adequate rooms with necessary furniture for holding written examinations;
 - well-equipped laboratories for holding practical examinations;
 - an adequate number of qualified and responsible examiners and staff to conduct and invigilate the examinations; and
 - such other facilities as may be necessary for efficient and proper conduct of examinations.
- It shall, if so required by a candidate, furnish the statement of marks secured by a candidate in the examinations after payment of prescribed fee, if any, to the Examining Authority.
- It shall appoint examiners whose qualifications should be similar to those of the teachers in the respective subjects as prescribed in the Minimum Qualification for Teachers in Pharmacy Institutions Regulations, 2014.
- In pursuance of sub-section (3) of section 12 of the Pharmacy Act, 1948, the Examining Authority shall communicate to the Secretary, Pharmacy Council of India, not less than six weeks in advance the dates fixed for examinations, the time-table for such examinations, so as to enable the Council to arrange for inspection teams to attend at such examinations.
- The Examining Authority shall ensure that examiners for conducting examination for B. Pharm. programme shall be persons possessing pharmacy qualification and are actually involved in the teaching of the B. Pharm. programme in an approved institution.

ARCHNA MUDGAL, Registrar-cum-Secy.

[ADVT. III/4/Exty./101/14]

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 2019-2020)

**Ordinance
&
Syllabus**

(W. E. F. Academic Session 2019-2020)

[Type text]

Approved in meeting of Board of Studies in Faculty of Technology, Sub: Pharmacy Dt. May15, 2019

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CHAPTER – I: REGULATIONS

1. Short Title and Commencement

These regulations shall be called as "The Revised Regulations for the Master of Pharmacy (M. Pharm.) Degree Program - Credit Based Semester System (CBSS) of the Pharmacy Council of India, New Delhi". They shall come into effect from the Academic Year 2019-20. The regulations framed are subject to modifications from time to time by the authorities of the university.

2. Minimum qualification for admission

A Pass in the following examinations

a) B. Pharm Degree examination of an Indian university established by law in India from an institution approved by Pharmacy Council of India and has scored not less than 55 % of the maximum marks (aggregate of 4 years of B.Pharm.)

b) Every student, selected for admission to post graduate pharmacy program in any PCI approved institution should have obtained registration with the State Pharmacy Council or should obtain the same within one month from the date of his/her admission, failing which the admission of the candidate shall be cancelled.

Note: It is mandatory to submit a migration certificate obtained from the respective university where the candidate had passed his/her qualifying degree (B.Pharm.)

3. Duration of the program

The program of study for M.Pharm. shall extend over a period of four semesters (two academic years). The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from the month of December/January to May/June in every calendar year.

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6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.

7. Program/Course credit structure

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, practical classes, seminars, assignments, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week/per activity.

7.1. Credit assignment

7.1.1. Theory and Laboratory courses

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having four lectures per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

The contact hours of seminars, assignments and research work shall be treated as that of practical courses for the purpose of calculating credits. i.e., the contact hours shall be multiplied by 1/2. Similarly, the contact hours of journal club, research work presentations and discussions with the supervisor shall be considered as theory course and multiplied by 1.

7.2. Minimum credit requirements

The minimum credit points required for the award of M. Pharm. degree is 95. However based on the credit points earned by the students under the head of co-curricular activities, a student shall earn a maximum of 100 credit points. These credits are divided into Theory courses, Practical, Seminars, Assignments, Research work, Discussions with the supervisor, Journal club and Co-Curricular activities over the duration of four semesters. The credits are distributed semester-wise as shown in Table 1. Courses generally

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progress in sequence, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

8. Academic work

A regular record of attendance both in Theory, Practical, Seminar, Assignment, Journal club, Discussion with the supervisor, Research work presentation and Dissertation shall be maintained by the department / teaching staff of respective courses.

9. Course of study

The specializations in M.Pharm program is Pharmaceutics.

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Table – 1: Course of study for M. Pharm. (Pharmaceutics)

Course Code	Course	Credit Hours	Credit Points	Hrs./week	Marks
Semester I					
MPH101T	Modern Pharmaceutical Analytical Techniques	4	4	4	100
MPH102T	Drug Delivery System	4	4	4	100
MPH103T	Modern Pharmaceutics	4	4	4	100
MPH104T	Regulatory Affair	4	4	4	100
MPH105P	Pharmaceutics Practical I	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650
Semester II					
MPH201T	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	4	4	4	100
MPH202T	Advanced Biopharmaceutics & Pharmacokinetics	4	4	4	100
MPH203T	Computer Aided Drug Delivery System	4	4	4	100
MPH204T	Cosmetic and Cosmeceuticals	4	4	4	100
MPH205P	Pharmaceutics Practical II	12	6	12	150
-	Seminar/Assignment	7	4	7	100
Total		35	26	35	650

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Table – 2: Course of study for M. Pharm. III Semester

Course Code	Course	Credit Hours	Credit Points
MRM 301T	Research Methodology and Biostatistics*	4	4
-	Journal club	1	1
-	Discussion / Presentation (Proposal Presentation)	2	2
-	Research Work	28	14
Total		35	21

* Non University Exam

Table – 3: Course of study for M. Pharm. IV Semester

Course Code	Course	Credit Hours	Credit Points
-	Journal Club	1	1
-	Research Work	31	16
-	Discussion/Final Presentation	3	3
Total		35	20

Table –4: Semester wise credits distribution

Semester	Credit Points
I	26
II	26
III	21
IV	20
Co-curricular Activities (Attending Conference, Scientific Presentations and Other Scholarly Activities)	Minimum=02 Maximum=07*
Total Credit Points	Minimum=95 Maximum=100*

*Credit Points for Co-curricular Activities

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Table – 5: Guidelines for Awarding Credit Points for Co-curricular Activities

Name of the Activity	Maximum Credit Points Eligible / Activity
Participation in National Level Seminar/Conference/Workshop/Symposium/ Training Programs (related to the specialization of the student)	01
Participation in international Level Seminar/Conference/Workshop/Symposium/ Training Programs (related to the specialization of the student)	02
Academic Award/Research Award from State Level/National Agencies	01
Academic Award/Research Award from International Agencies	02
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	01
Research / Review Publication in International Journals (Indexed in Scopus / Web of Science)	02

Note: International Conference: Held Outside India

International Journal: The Editorial Board Outside India

*The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

10. Program Committee

1. The M. Pharm. programme shall have a Programme Committee constituted by the Head of the institution in consultation with all the Heads of the departments.
2. The composition of the Programme Committee shall be as follows:
A teacher at the cadre of Professor shall be the Chairperson; One Teacher from each M.Pharm specialization and four student representatives (two from each academic year), nominated by the Head of the institution.
3. Duties of the Programme Committee:
 - i. Periodically reviewing the progress of the classes.
 - ii. Discussing the problems concerning curriculum, syllabus and the conduct of classes.
 - iii. Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.

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- iv. Communicating its recommendation to the Head of the institution on academic matters.
- v. The Programme Committee shall meet at least twice in a semester preferably at the end of each sessionalexam and before the end semester exam.

11. Examinations/Assessments

The schemes for internal assessment and end semester examinations are given in Table – 6.

11.1. End semester examinations

The End Semester Examinations for each theory and practical coursethrough semesters I to IVshall beconducted by the respective university except for the subject with asterix symbol (*) in table I and II for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.

Tables – 6: Schemes for internal assessments and end semester examinations
(Pharmaceutics- MPH)

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
SEMESTER I								
MPH 101T	Modern Pharmaceutical Analytical Techniques	10	15	1 Hr	25	75	3 Hrs	100
MPH 102T	Drug Delivery System	10	15	1 Hr	25	75	3 Hrs	100
MPH 103T	Modern Pharmaceutics	10	15	1 Hr	25	75	3 Hrs	100
MPH 104T	Regulatory Affair	10	15	1 Hr	25	75	3 Hrs	100
MPH 105P	Pharmaceutics Practical I	20	30	6 Hrs	50	100	6 Hrs	150
-	Seminar /Assignment	-	-	-	-	-	-	100
Total								650
SEMESTER II								
MPH 201T	Molecular Pharmaceutics(Nano Tech and Targeted DDS)	10	15	1 Hr	25	75	3 Hrs	100
MPH 202T	Advanced Biopharmaceutics & Pharmacokinetics	10	15	1 Hr	25	75	3 Hrs	100
MPH 203T	Computer Aided Drug Delivery System	10	15	1 Hr	25	75	3 Hrs	100
MPH	Cosmetic	10	15	1 Hr	25	75	3 Hrs	100

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204T	and Cosmeceutic als								
MPH 205P	Pharmaceuti cs Practical I	20	30	6 Hrs	50	100	6 Hrs	150	
	Seminar /Assignment	-	-	-	-	-	-	100	
Total									650

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Tables – 7: Schemes for internal assessments and end semester examinations
(Semester III& IV)

Course Code	Course	Internal Assessment				End Semester Exams		Total Marks
		Continuou s Mode	Sessional Exams		Total	Mark s	Durati on	
			Mark s	Durati on				
SEMESTER III								
MRM30 1T	Research Methodology and Biostatistics*	10	15	1 Hr	25	75	3 Hrs	100
-	Journal club	-	-	-	25	-	-	25
-	Discussion / Presentation (Proposal Presentation)	-	-	-	50	-	-	50
-	Research work*	-	-	-	-	350	1 Hr	350
Total								525
SEMESTER IV								
-	Journal club	-	-	-	25	-	-	25
-	Discussion / Presentation (Proposal Presentation)	-	-	-	75	-	-	75
-	Research work and Colloquium	-	-	-	-	400	1 Hr	400
Total								500

*Non University Examination

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11.2. Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

Table – 8: Scheme for awarding internal assessment: Continuous mode

Theory	
Criteria	Maximum Marks
Attendance (Refer Table – 28)	8
Student – Teacher interaction	2
Total	10
Practical	
Attendance (Refer Table – 28)	10
Based on Practical Records, Regular viva voce, etc.	10
Total	20

Table – 9: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	8	10
90 – 94	6	7.5
85 – 89	4	5
80 – 84	2	2.5
Less than 80	0	0

11.2.1. Sessional Exams

Two sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical sessional examinations is given in the table. The average marks of two sessional exams shall be computed for internal assessment as per the requirements given in tables.

12. Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of M.Pharm. programme if he/she secures at least 50% marks in that particular course including internal assessment.

13. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

14. Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the sessional exam component of the internal assessment. The re-conduct of the sessional exam shall be completed before the commencement of next end semester theory examinations.

15. Reexamination of end semester examinations

Reexamination of end semester examination shall be conducted as per the schedule given in table 10. The exact dates of examinations shall be notified from time to time.

Table – 10: Tentative schedule of end semester examinations

Semester	For Regular Candidates	For Failed Candidates
I and III	November / December	May / June
II and IV	May / June	November / December

16. Allowed to keep terms (ATKT):

No student shall be admitted to any examination unless he/she fulfills the norms given in 6. ATKT rules are applicable as follows:

A student shall be eligible to carry forward all the courses of I and II semesters till the III semester examinations. However, he/she shall not be eligible to attend the courses of IV semester until all the courses of I, II and III semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to IV semesters within the stipulated time period as per the norms.

Note: Grade AB should be considered as failed and treated as one head for deciding ATKT. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

17. Grading of performances

17.1. Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – 11



Table – 11: Letter grades and grade points equivalent to Percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C1, C2, C3 and C4 and the student's grade points in these courses are G1, G2, G3 and G4, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4}{C_1 + C_2 + C_3 + C_4}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and ABS grade awarded in that semester. For example if a learner has a F or ABS grade in course 4, the SGPA shall then be computed as:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 * ZERO}{C_1 + C_2 + C_3 + C_4}$$

19. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the IV semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all IV semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA

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shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4}{C_1 + C_2 + C_3 + C_4}$$

where C_1, C_2, C_3, \dots is the total number of credits for semester I, II, III, and S_1, S_2, S_3, \dots is the SGPA of semester I, II, III,

20. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

- First Class with Distinction = CGPA of 7.50 and above
- First Class = CGPA of 6.00 to 7.49
- Second Class = CGPA of 5.00 to 5.99

21. Project work

All the students shall undertake a project under the supervision of a teacher in Semester III to IV and submit a report. 4 copies of the project report shall be submitted (typed & bound copy not less than 75 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation Book:

Objective(s) of the work done	50 Marks
Methodology adopted	150 Marks
Results and Discussions	250 Marks
Conclusions and Outcomes	50 Marks
Total	500 Marks

Evaluation of Presentation:

Presentation of work	100 Marks
Communication skills	50 Marks
Question and answer skills	100 Marks
Total	250 Marks

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22. Award of Ranks

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the M.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the M. Pharm program in minimum prescribed number of years, (two years) for the award of Ranks.

23. Award of degree

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

24. Duration for completion of the program of study

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

25. Revaluation / Retotaling of answer papers

There is no provision for revaluation of the answer papers in any examination. However, the candidates can apply for retotaling by paying prescribed fee.

26. Re-admission after break of study

Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condonation fee.

PHARMACEUTICS (MPH)

**MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
(MPH 101T)**

Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

Objectives

After completion of course student is able to know,

- Chemicals and Excipients
- The analysis of various drugs in single and combination dosage forms
- Theoretical and practical skills of the instruments

THEORY

60 HOURS

1. a. **UV-Visible spectroscopy:** Introduction, Theory, Laws, 11 Hrs
Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy.
- b. **IR spectroscopy:** Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy
- c. **Spectrofluorimetry:** Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.
- d. **Flame emission spectroscopy and Atomic absorption spectroscopy:** Principle, Instrumentation, Interferences and Applications.
2. **NMR spectroscopy:** Quantum numbers and their role in NMR, 11 Hrs
Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and ¹³C NMR. Applications of NMR spectroscopy.

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- 3 **Mass Spectroscopy:** Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy 11 Hrs
- 4 **Chromatography:** Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following: 11 Hrs
 a) Paper chromatography b) Thin Layer chromatography
 c) Ion exchange chromatography d) Column chromatography
 e) Gas chromatography f) High Performance Liquid chromatography
 g) Affinity chromatography
- 5 a. **Electrophoresis:** Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following: 11 Hrs
 a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Iso electric focusing
 b. **X ray Crystallography:** Production of X rays, Different X ray diffraction methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X-ray diffraction.
- 6 **Immunological assays :** RIA (Radio immuno assay), ELISA, Bioluminescence assays. 5 Hrs

REFERENCES

1. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
4. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis- Modern methods – Part B - J W Munson, Volume 11, Marcel Dekker Series

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**DRUG DELIVERY SYSTEMS
(MPH 102T)**

SCOPE

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

OBJECTIVES

Upon completion of the course, student shall be able to understand

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers for the development of delivering system
- The formulation and evaluation of Novel drug delivery systems..

THEORY

60 Hrs

- | | |
|---|-----------|
| 1. Sustained Release(SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing, Physicochemical & biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application 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. | 10
Hrs |
| 2. Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems; Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles & Fundamentals. | 10
Hrs |
| 3. Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems: Principle of muco adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations. | 10
Hrs |
| 4. Ocular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers. | 06
Hrs |

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| 5 | Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems, Formulation and evaluation. | 10
Hrs |
| 6 | Protein and Peptide Delivery: Barriers for protein delivery. Formulation and Evaluation of delivery systems of proteins and other macromolecules. | 08
Hrs |
| 7 | Vaccine delivery systems: Vaccines, uptake of antigens, single shot vaccines, mucosal and transdermal delivery of vaccines. | 06
Hrs |

REFERENCES

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of controlled delivery, Editor- Edith Mathiowitz, Published by WileyInterscience Publication, John Wiley and Sons, Inc, New York! Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002

JOURNALS

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian drugs (IDMA)
3. Journal of controlled release (Elsevier Sciences) desirable
4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable

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**MODERN PHARMACEUTICS
(MPH 103T)**

Scope

Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries

Objectives

Upon completion of the course, student shall be able to understand

- The elements of preformulation studies.
- The Active Pharmaceutical Ingredients and Generic drug Product development
- Industrial Management and GMP Considerations.
- Optimization Techniques & Pilot Plant Scale Up Techniques
- Stability Testing, sterilization process & packaging of dosage forms.

THEORY

60 HRS

1. a. **Preformation Concepts** – Drug Excipient interactions - 10 Hrs
different methods, kinetics of stability, Stability testing. Theories of dispersion and pharmaceutical Dispersion (Emulsion and Suspension, SMEDDS) preparation and stability Large and small volume parental – physiological and formulation consideration, Manufacturing and evaluation.
- b. **Optimization techniques in Pharmaceutical Formulation:** 10 Hrs
Concept and parameters of optimization, Optimization techniques in pharmaceutical formulation and processing. Statistical design, Response surface method, Contour designs, Factorial designs and application in formulation
2. **Validation** : Introduction to Pharmaceutical Validation, Scope & merits of Validation, Validation and calibration of Master plan, ICH & WHO guidelines for calibration and validation of equipments, Validation of specific dosage form, Types of validation. Government regulation, Manufacturing Process Model, URS, DQ, IQ, OQ & P.Q. of facilities. 10 Hrs
3. **cGMP & Industrial Management:** Objectives and policies of current good manufacturing practices, layout of buildings, services, equipments and their maintenance Production management: Production organization, , materials management, handling and transportation, inventory management and control, production and planning control, Sales forecasting, budget and cost control, industrial and personal relationship. Concept of Total Quality Management. 10 Hrs

- 4 **Compression and compaction:** Physics of tablet compression, 10
compression, consolidation, effect of friction, distribution of Hrs
forces, compaction profiles. Solubility.
- 5 **Study of consolidation parameters;** Diffusion parameters, 10
Dissolution parameters and Pharmacokinetic parameters, Heckel Hrs
plots, Similarity factors – f2 and f1, Higuchi and Peppas plot,
Linearity Concept of significance, Standard deviation , Chi square
test, students T-test , ANOVA test.

REFERENCES

1. Theory and Practice of Industrial Pharmacy By Lachmann and Libermann
2. Pharmaceutical dosage forms: Tablets Vol. 1-3 by Leon Lachmann.
3. Pharmaceutical Dosage forms: Disperse systems, Vol, 1-2; By Leon Lachmann.
4. Pharmaceutical Dosage forms: Parenteral medications Vol. 1-2; By Leon Lachmann.
5. Modern Pharmaceutics; By Gillbert and S. Banker.
6. Remington's Pharmaceutical Sciences.
7. Advances in Pharmaceutical Sciences Vol. 1-5; By H.S. Bean & A.H. Beckett.
8. Physical Pharmacy; By Alfred martin
9. Bentley's Textbook of Pharmaceutics – by Rawlins.
10. Good manufacturing practices for Pharmaceuticals: A plan for total quality control, Second edition; By Sidney H. Willig.
11. Quality Assurance Guide; By Organization of Pharmaceutical producers of India.
12. Drug formulation manual; By D.P.S. Kohli and D.H. Shah. Eastern publishers, New Delhi.
13. How to practice GMPs; By P.P. Sharma. Vandhana Publications, Agra.
14. Pharmaceutical Process Validation; By Fra. R. Berry and Robert A. Nash.
15. Pharmaceutical Preformulations; By J.J. Wells.
16. Applied production and operations management; By Evans, Anderson, Sweeney and Williams.
17. Encyclopaedia of Pharmaceutical technology, Vol I – III.















**REGULATORY AFFAIRS
(MPH 104T)**

Scope

Course designed to impart advanced knowledge and skills required to learn the concept of generic drug and their development, various regulatory filings in different countries, different phases of clinical trials and submitting regulatory documents : filing process of IND, NDA and ANDA

- To know the approval process of
- To know the chemistry, manufacturing controls and their regulatory importance
- To learn the documentation requirements for
- To learn the importance and

Objectives:

Upon completion of the course, it is expected that the students will be able to understand

- The Concepts of innovator and generic drugs, drug development process
- The Regulatory guidance's and guidelines for filing and approval process
- Preparation of Dossiers and their submission to regulatory agencies in different countries
- Post approval regulatory requirements for actives and drug products
- Submission of global documents in CTD/ eCTD formats
- Clinical trials requirements for approvals for conducting clinical trials
- Pharmacovigilence and process of monitoring in clinical trials.

THEORY

60 Hrs

1. a. **Documentation in Pharmaceutical industry:** Master formula record, DMF (Drug Master File), distribution records. Generic drugs product development Introduction , Hatch-Waxman act and amendments, CFR (CODE OF FEDERAL REGULATION) ,drug product performance, in-vitro, ANDA regulatory approval process, NDA approval process, BE and drug product assessment, in -vivo, scale up process approval changes, post marketing surveillance, outsourcing BA and BE to CRO. 12 Hrs
- b. **Regulatory requirement for product approval:** API, biologics, novel, therapies obtaining NDA, ANDA for generic drugs ways and means of US registration for foreign drugs

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|---|--|-----------|
| 2 | CMC, post approval regulatory affairs. Regulation for combination products and medical devices. CTD and ECTD format, industry and FDA liaison. ICH - Guidelines of ICH-Q, S E, M. Regulatory requirements of EU, MHRA, TGA and ROW countries. | 12
Hrs |
| 3 | Non clinical drug development: Global submission of IND, NDA, ANDA. Investigation of medicinal products dossier, dossier (IMPD) and investigator brochure (IB). | 12
Hrs |
| 4 | 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. | 12
Hrs |

REFERENCES

1. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and IsaderKaufer, Marcel Dekker series, Vol.143
2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences, Vol.185, Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences, Vol.190.
4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc.
5. FDA regulatory affairs: a guide for prescription drugs, medical devices, and biologics/edited By Douglas J. Pisano, David Mantus.
6. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
7. www.ich.org/
8. www.fda.gov/
9. europa.eu/index_en.htm
10. <https://www.tga.gov.au/tga-basics>

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PHARMACEUTICS PRACTICALS - I
(MPH 105P)

1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. To perform *In-vitro* dissolution profile of CR/ SR marketed formulation
8. Formulation and evaluation of sustained release matrix tablets
9. Formulation and evaluation osmotically controlled DDS
10. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS
11. Formulation and evaluation of Muco adhesive tablets.
12. Formulation and evaluation of trans dermal patches.
13. To carry out preformulation studies of tablets.
14. To study the effect of compressional force on tablets disintegration time.
15. To study Micromeritic properties of powders and granulation.
16. To study the effect of particle size on dissolution of a tablet.
17. To study the effect of binders on dissolution of a tablet.
18. To plot Heckal plot, Higuchi and peppas plot and determine similarity factors.



**MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY &
TARGETED DDS) (NTDS)
(MPH 201T)**

Scope

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

Objectives

Upon completion of the course student shall be able to understand

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers for the development of NTDS
- The formulation and evaluation of novel drug delivery systems.

THEORY

60 Hrs

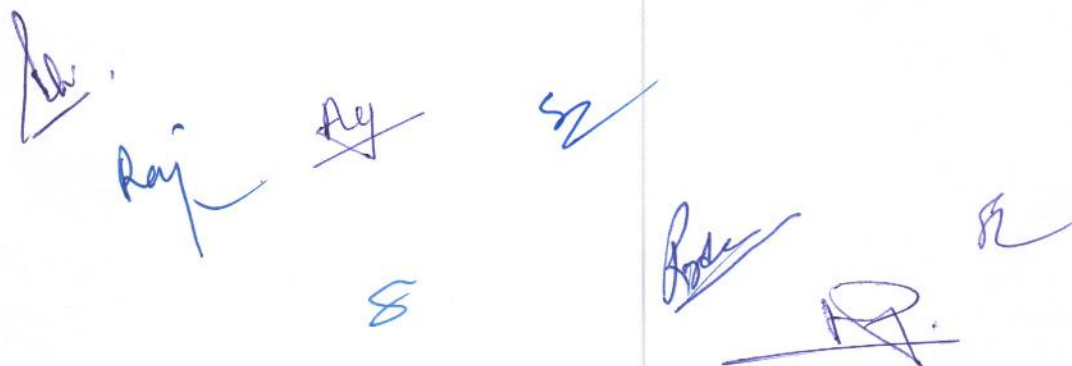
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|--|-----------|
| 1. Targeted Drug Delivery Systems: Concepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery. | 12
Hrs |
| 2. Targeting Methods: introduction preparation and evaluation. Nano Particles & Liposomes: Types, preparation and evaluation. | 12
Hrs |
| 3. Micro Capsules / Micro Spheres: Types, preparation and evaluation , Monoclonal Antibodies ; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes. | 12
Hrs |
| 4. Pulmonary Drug Delivery Systems : Aerosols, propellents, ContainersTypes, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation. | 12
Hrs |
| 5. Nucleic acid based therapeutic delivery system : Gene therapy, introduction (ex-vivo & in-vivo gene therapy). Potential target diseases for gene therapy (inherited disorder and cancer). Gene expression systems (viral and nonviral gene transfer). Liposomal gene delivery systems.
Biodistribution and Pharmacokinetics. knowledge of therapeutic antisense molecules and aptamers as drugs of future. | 12
Hrs |

REFERENCES

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, VallabhPrakashan, New Delhi, First edition 2002.
3. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).

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**ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS
(MPH 202T)**

Scope

This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students' to clarify the concepts.

Objectives

Upon completion of this course it is expected that students will be able understand,

- The basic concepts in biopharmaceutics and pharmacokinetics.
- The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.
- The critical evaluation of biopharmaceutic studies involving drug product equivalency.
- The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
- The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

THEORY

60 Hrs

1. **Drug Absorption from the Gastrointestinal Tract:** 12 Hrs
Gastrointestinal tract, Mechanism of drug absorption, Factors affecting drug absorption, pH-partition theory of drug absorption. Formulation and physicochemical factors: Dissolution rate, Dissolution process, Noyes-Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form, Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form, Dissolution methods, Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data. Transport model: Permeability-Solubility-Charge State and the pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT), pH Microclimate Intracellular pH Environment, Tight-Junction Complex.



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|---|--|-----------|
| 2 | Biopharmaceutic considerations in drug product design and In Vitro Drug Product Performance: Introduction, biopharmaceutic factors affecting drug bioavailability, rate-limiting steps in drug absorption, physicochemical nature of the drug formulation factors affecting drug product performance, <i>in vitro</i> : dissolution and drug release testing, compendial methods of dissolution, alternative methods of dissolution testing, meeting dissolution requirements, problems of variable control in dissolution testing performance of drug products. <i>In vitro-in vivo</i> correlation, dissolution profile comparisons, drug product stability, considerations in the design of a drug product. | 12
Hrs |
| 3 | Pharmacokinetics: Basic considerations, pharmacokinetic models, compartment modeling: one compartment model- IV bolus, IV infusion, extra-vascular. Multi compartment model: two compartment - model in brief, non-linear pharmacokinetics: cause of non-linearity, Michaelis – Menten equation, estimation of k_{max} and v_{max} . Drug interactions: introduction, the effect of protein-binding interactions, the effect of tissue-binding interactions, cytochrome p450-based drug interactions, drug interactions linked to transporters. | 12
Hrs |
| 4 | Drug Product Performance, In Vivo: Bioavailability and Bioequivalence: drug product performance, purpose of bioavailability studies, relative and absolute availability. methods for assessing bioavailability, bioequivalence studies, design and evaluation of bioequivalence studies, study designs, crossover study designs, evaluation of the data, bioequivalence example, study submission and drug review process. biopharmaceutics classification system, methods. Permeability: In-vitro, in-situ and In-vivo methods. generic biologics (biosimilar drug products), clinical significance of bioequivalence studies, special concerns in bioavailability and bioequivalence studies, generic substitution. | 12
Hrs |
| 5 | Application of Pharmacokinetics: Modified-Release Drug Products, Targeted Drug Delivery Systems and Biotechnological Products. Introduction to Pharmacokinetics and pharmacodynamic, drug interactions. Pharmacokinetics and pharmacodynamics of biotechnology drugs. Introduction, Proteins and peptides, Monoclonal antibodies, Oligonucleotides, Vaccines (immunotherapy), Gene therapies. | 12
Hrs |

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REFERENCES

1. Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi, 4th edition, Philadelphia, Lea and Febiger, 1991
2. Biopharmaceutics and Pharmacokinetics, A. Treatise, D .M. Brahmarkar and Sunil B. Jaiswal., VallabPrakashan, Pitampura, Delhi
3. Applied Biopharmaceutics and Pharmacokinetics by Shargel. Land YuABC, 2nd edition, Connecticut Appleton Century Crofts, 1985
4. Textbook of Biopharmaceutics and Pharmacokinetics, Dr. Shobha Rani R. Hiremath, Prism Book
5. Pharmacokinetics by Milo Gibaldi and D. Perrier, 2nd edition, Marcel Dekker Inc., New York, 1982
6. Current Concepts in Pharmaceutical Sciences: Biopharmaceutics, Swarbrick. J, Lea and Febiger, Philadelphia, 1970
7. Clinical Pharmacokinetics, Concepts and Applications 3rd edition by Malcolm Rowland and Thom~ N. Tozer, Lea and Febiger, Philadelphia, 1995
8. Dissolution, Bioavailability and Bioequivalence, Abdou. H.M, Mack Publishing Company, Pennsylvania 1989
9. Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, 4th edition, revised and expanded by Robert. E. Notari, Marcel Dekker Inc, New York and Basel, 1987.
10. Biopharmaceutics and Relevant Pharmacokinetics by John. G Wagner and M. Pamarowski, 1st edition, Drug Intelligence Publications, Hamilton, Illinois, 1971.
11. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G. Boylan, Marcel Dekker Inc, New York, 1996.
12. Basic Pharmacokinetics, 1st edition, Sunil S Jambhekar and Philip J Breen, pharmaceutical press, RPS Publishing, 2009.
13. Absorption and Drug Development- Solubility, Permeability, and Charge State, Alex Avdeef, John Wiley & Sons, Inc, 2003.

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**COMPUTER AIDED DRUG DEVELOPMENT
(MPH 203T)**

Scope

This course is designed to impart knowledge and skills necessary for computer Applications in pharmaceutical research and development who want to understand the application of computers across the entire drug research and development process. Basic theoretical discussions of the principles of more integrated and coherent use of computerized information (informatics) in the drug development process are provided to help the students to clarify the concepts.

Objectives

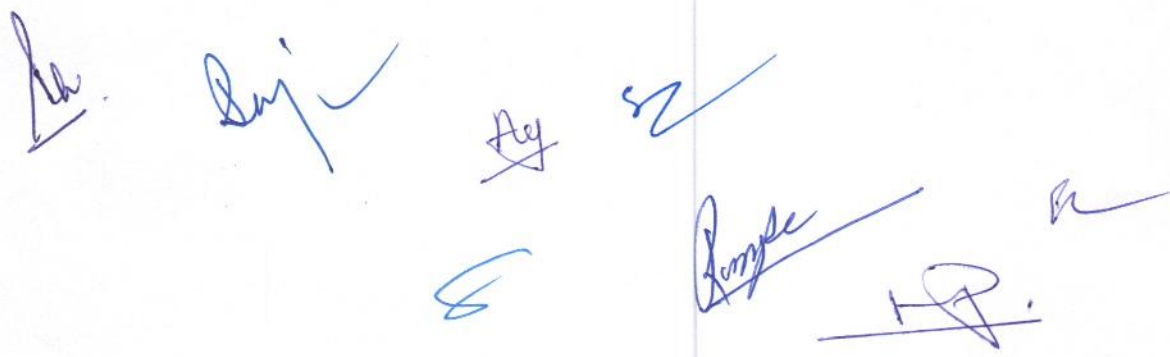
Upon completion of this course it is expected that students will be able to understand,

- History of Computers in Pharmaceutical Research and Development
- Computational Modeling of Drug Disposition
- Computers in Preclinical Development
- Optimization Techniques in Pharmaceutical Formulation
- Computers in Market Analysis
- Computers in Clinical Development
- Artificial Intelligence (AI) and Robotics
- Computational fluid dynamics(CFD)

THEORY

60 Hrs

1. a. **Computers in Pharmaceutical Research and Development:** A General Overview: History of Computers in Pharmaceutical Research and Development. Statistical modeling in Pharmaceutical research and development: Descriptive versus Mechanistic Modeling, Statistical Parameters, Estimation, Confidence Regions, Nonlinearity at the Optimum, Sensitivity Analysis, Optimal Design, Population Modeling
b. **Quality-by-Design In Pharmaceutical Development:** Introduction, ICH Q8 guideline, Regulatory and industry views on QbD, Scientifically based QbD - examples of application. 12 Hrs
2. **Computational Modeling Of Drug Disposition:** Introduction ,Modeling Techniques: Drug Absorption, Solubility, Intestinal Permeation, Drug Distribution ,Drug Excretion, Active Transport; P-gp, BCRP, Nucleoside Transporters, hPEPT1, ASBT, OCT, OATP, BBB-Choline Transporter. 12 Hrs



- 3 **Computer-aided formulation development:** Concept of optimization, Optimization parameters, Factorial design, Optimization technology & Screening design. Computers in Pharmaceutical Formulation: Development of pharmaceutical emulsions, microemulsion drug carriers Legal Protection of Innovative Uses of Computers in R&D, The Ethics of Computing in Pharmaceutical Research, Computers in Market analysis 12 Hrs
- 4 a. **Computer-aided biopharmaceutical characterization:** Gastrointestinal absorption simulation. Introduction, Theoretical background, Model construction, Parameter sensitivity analysis, Virtual trial, Fed vs. fasted state, In vitro dissolution and *in vitro-in vivo* correlation, Biowaiver considerations 12 Hrs
- b. **Computer Simulations in Pharmacokinetics and Pharmacodynamics:** Introduction, Computer Simulation: Whole Organism, Isolated Tissues, Organs, Cell, Proteins and Genes.
- c. **Computers in Clinical Development:** Clinical Data Collection and Management, Regulation of Computer Systems
- 5 **Artificial Intelligence (AI), Robotics and Computational fluid dynamics:** General overview, Pharmaceutical Automation, Pharmaceutical applications, Advantages and Disadvantages. Current Challenges and Future Directions. 12 Hrs

REFERENCES

1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons.
2. Computer-Aided Applications in Pharmaceutical Technology, 1st Edition, Jelena Djuris, Woodhead Publishing
3. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G.Boylan, Marcel Dekker Inc, New York, 1996.

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COSMETICS AND COSMECEUTICALS
(MPH 204T)

Scope

This course is designed to impart knowledge and skills necessary for the fundamental need for cosmetic and cosmeceutical products.

Objectives

Upon completion of the course, the students shall be able to understand

- Key ingredients used in cosmetics and cosmeceuticals.
- Key building blocks for various formulations.
- Current technologies in the market
- Various key ingredients and basic science to develop cosmetics and cosmeceuticals
- Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

THEORY

60 Hrs

1. **Cosmetics – Regulatory** : Definition of cosmetic products as per Indian regulation. Indian regulatory requirements for labeling of cosmetics. Regulatory provisions relating to import of cosmetics., Misbranded and spurious cosmetics. Regulatory provisions relating to manufacture of cosmetics – Conditions for obtaining license, prohibition of manufacture and sale of certain cosmetics, loan license, offences and penalties. 12 Hrs
2. **Cosmetics - Biological aspects** : Structure of skin relating to problems like dry skin, acne, pigmentation, prickly heat, wrinkles and body odor. Structure of hair and hair growth cycle. Common problems associated with oral cavity. Cleansing and care needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and under-arm. 12 Hrs
3. **Formulation Building blocks**: Building blocks for different product formulations of cosmetics/cosmeceuticals. Surfactants – Classification and application. Emollients, rheological additives: classification and application. Antimicrobial used as preservatives, their merits and demerits. Factors affecting microbial preservative efficacy. Building blocks for formulation of a moisturizing cream, vanishing cream, cold cream, shampoo and toothpaste. Soaps and syndetbars. 12 Hrs
Perfumes; Classification of perfumes. Perfume ingredients listed as allergens in EU regulation.
Controversial ingredients: Parabens, formaldehyde liberators,

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dioxane.

- 4 **Design of cosmeceutical products:** Sun protection, sunscreens 12
classification and regulatory aspects. Addressing dry skin, acne, Hrs
sun-protection, pigmentation, prickly heat, wrinkles, body odor.,
dandruff, dental cavities, bleeding gums, mouth odor and
sensitive teeth through cosmeceutical formulations.
- 5 **Herbal Cosmetics :** Herbal ingredients used in Hair care, skin 12
care and oral care. Review of guidelines for herbal cosmetics by Hrs
private bodies like cosmos with respect to preservatives,
emollients, foaming agents, emulsifiers and rheology modifiers.
Challenges in formulating herbal cosmetics.

REFERENCES

1. Harry's Cosmeticology. 8th edition.
2. Poucher's perfume cosmetics and Soaps, 10th edition.
3. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma, 4th
edition
4. Handbook of cosmetic science and Technology A.O.Barel, M.Paye and
H.I. Maibach. 3rd edition
5. Cosmetic and Toiletries recent suppliers catalogue.
6. CTFA directory.



PHARMACEUTICS PRACTICALS - II

(MPH 205P)

1. To study the effect of temperature change , non solvent addition, incompatible polymer addition in microcapsules preparation
2. Preparation and evaluation of Alginate beads
3. Formulation and evaluation of gelatin /albumin microspheres
4. Formulation and evaluation of liposomes/niosomes
5. Formulation and evaluation of spherules
6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique.
7. Comparison of dissolution of two different marketed products /brands
8. Protein binding studies of a highly protein bound drug & poorly protein bound drug
9. Bioavailability studies of Paracetamol in animals.
10. Pharmacokinetic and IVIVC data analysis by Winnoline[®] software
11. *In vitro* cell studies for permeability and metabolism
12. DoE Using Design Expert[®] Software
13. Formulation data analysis Using Design Expert[®] Software
14. Quality-by-Design in Pharmaceutical Development
15. Computer Simulations in Pharmacokinetics and Pharmacodynamics
16. Computational Modeling Of Drug Disposition
17. To develop Clinical Data Collection manual
18. To carry out Sensitivity Analysis, and Population Modeling.
19. Development and evaluation of Creams
20. Development and evaluation of Shampoo and Toothpaste base
21. To incorporate herbal and chemical actives to develop products
22. To address Dry skin, acne, blemish, Wrinkles, bleeding gums and dandruff

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Semester III
MRM 301T - Research Methodology & Biostatistics

UNIT – I

General Research Methodology: Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.

UNIT – II

Biostatistics: Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests, parametric tests (students "t" test, ANOVA, Correlation coefficient, regression), non-parametric tests (wilcoxon rank tests, analysis of variance, correlation, chi square test), null hypothesis, P values, degree of freedom, interpretation of P values.

UNIT – III

Medical Research: History, values in medical ethics, autonomy, beneficence, non-maleficence, double effect, conflicts between autonomy and beneficence/non-maleficence, euthanasia, informed consent, confidentiality, criticisms of orthodox medical ethics, importance of communication, control resolution, guidelines, ethics committees, cultural concerns, truth telling, online business practices, conflicts of interest, referral, vendor relationships, treatment of family members, sexual relationships, fatality.

UNIT – IV

CPCSEA guidelines for laboratory animal facility: Goals, veterinary care, quarantine, surveillance, diagnosis, treatment and control of disease, personal hygiene, location of animal facilities to laboratories, anesthesia, euthanasia, physical facilities, environment, animal husbandry, record keeping, SOPs, personnel and training, transport of lab animals.

UNIT – V

Declaration of Helsinki: History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.

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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	6L	10
	Definition of research, Applications of research and types, Research process and steps.		
	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	12L	20
	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 <i>t</i> -test, <i>F</i> -test, <i>Chi-square</i> test, <i>P</i> -value, Confidence Intervals, Paired <i>t</i> -test.		
	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	12L	20
	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		
	Writing a research report: General consideration, Prewriting considerations, Thesis writing, Formats of report writing, Formats of publications in Research journals		
4	DRUG REGULATORY AFFAIRS	12L	20
	Indian Patent Act 1970, its amendments, concepts of IPR, criteria for granting patents and filing a Indian patent, Introduction to Patent Search.		
	. 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	12L	20
	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.		
6	COMPUTATIONAL ANALYSIS	6L	10
	Introduction to the creation and advancement of databases, algorithms, computational and statistical techniques for data analysis.		
	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)

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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.




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SCHEME OF EXAMINATION
SEMESTER - I

Paper	Subject	Internal	External	Total Marks
	<u>THEORY (400)</u>			
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
	<u>PRACTICAL (400)</u>			
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
	<u>THEORY (400)</u>			
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
	<u>PRACTICAL (300)</u>			
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
	<u>TEACHING PRACTICE (100)</u>			
TP-201	Teaching Practice (Classroom and outdoor)	30	70	100
	Total	240	560	800

SEMESTER –III

Paper	Subject	Internal	External	Total Marks
	<u>THEORY (400)</u>			
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
	<u>PRACTICAL (300)</u>			
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
	<u>TEACHING PRACTICE (100)</u>			
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
	<u>THEORY (400)</u>			
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
	<u>PRACTICAL (200)</u>			
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
	<u>TEACHING PRACTICE (200)</u>			
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 – IV Natural 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 – II Modern 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 relaxative, meditative posture on various system of the body
- Types of Bandhas and mudras
- Type of kriyas

Unit – IV Yoga 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.
- Gharote, M. L. &Ganguly, H. (1988). *Teaching methods for yogic practices*.Lonawala: Kaixydahmoe.
- Rajjan, S. M. (1985). *Yoga strenthening ofrelexation for sports man*. New Delhi:Allied Publishers.
- Shankar,G.(1998). *Holistic approach of yoga*. New Delhi:Aditya Publishers.
- Shekar,K. C. (2003). *Yoga for health*. Delhi: Khel Sahitya Kendra.

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 ORGANIZATION AND ADMINISTRATION IN PHYSICAL EDUCATION

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. Louis: The C.V. Mosby Co.
- Kozman, H.C. Cassidy, R. & Jackson, C. (1960). *Methods in Physical Education*. London: W.B. Saunders Co.
- Pandy, L.K. (1977). *Methods in Physical Education*. Delhi: Metropolitan Book Depo.

- Sharma, V.M. & Tiwari, R.H.: (1979). *Teaching Methods in Physical Education*. Amaravati: Shakti Publication.
- Thomas, J. P.(1967). *Organization & administration of Physical Education*. Madras: Gyanodayal Press.
- 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.

Butryn, M.L., Phelan, S., & Hill, J. O. (2007). Consistent self-monitoring of weight: a key component of successful weight loss maintenance. *Obesity(Silver Spring)*. 15(12), 3091-3096.

Chu, S.Y. & Kim, L. J. (2007). Maternal obesity and risk of stillbirth: a metaanalysis. *Am J ObstetGynecol*, 197(3), 223-228.

DeMaria, E. J. (2007). Bariatric surgery for morbid obesity. *N Engl J Med*, 356(21), 2176-2183.

Dixon, J.B., O'Brien, P.E., Playfair, J. (n.d.). Adjustable gastric banding and conventional therapy for type 2 diabetes: a randomized controlled trial. *JAMA*. 299(3), 316-323.

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.
- Matvyew, L.P. (1981). *Fundamental of sports training*. Moscow: Progress Publishers.
- Singh, H. (1984). *Sports training, general theory and methods*. Patials: NSNIS.
- 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.
- Cratty, B. J.(1968). *Psychology and physical activity*. Eaglewood Cliffs. Prentice Hall.

- Kamlesh, M.L. (1998). *Psychology in physical education and sport*. New Delhi: Metropolitan Book Co.
- Loy, J. W., Kenyon, G. S. & McPherson, B. D. (1978). *Sport and social system*. London: Addison Wesley Publishing Company Inc.
- Loy, J. W., Kenyon, G. S. & McPherson, B. D. (1981). *Sports culture and society*. Philadelphia: Lea & Febiger.
- Mathur, S.S., (1962). *Educational psychology*. Agra. Vinod Pustak Mandir.
- Skinner, C. E., (1984.). *Education psychology*. New Delhi: Prentice Hall of India.
- 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.
- David, R. M. (2005). *Drugs in sports*, (4th Ed). Routledge Taylor and Francis Group.
- Hunter, M. D. (1979). *A dictionary for physical educators*. In H. M. Borrow & R. McGee, (Eds.), *A Practical approach to measurement in Physical Education* (pp. 573-74). Philadelphia: Lea &Febiger.

- Jeyaprakash, C. S., Sports Medicine, J.P. Brothers Pub., New Delhi, 2003.
- Khanna, G.L., (1990). *Exercise physiology & sports medicine*. Delhi:Lucky Enterprises.
- Mathew, D.K. & Fox, E.L, (1971). *Physiological basis of physical education and athletics*. Philadelphia:W.B. Saunders Co.
- 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-II Basic Guide line for curriculum construction; contest (selection and expansion).

- Focalization
- Socialization
- Individualization
- Sequence and operation
- Steps in curriculum construction.

UNIT-III Curriculum-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.

- Cowell, C.C. & Hazelton, H.W. (1965). *Curriculum designs in physical education*. Englewood Cliffs: N.J. prentice Hall Inc.
- 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- I Introduction 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- II Criteria; Classification and Administration 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:

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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.
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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- IV Statistical 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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Semester – IV
Theory Courses

EC-401 THEORY OF SPORTS AND GAMES (ELECTIVE)

UNIT-I-INTRODUCTION

General Introduction of specialized 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.
- Bucher, C.A. *Administration of physical education and athletic programme*. 7th Edition, St. Louis: The C.V. Mosby Co.
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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-Variou 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, Uhhakpavitra, 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**Dumbbells/ Wands/ Hoop/ Umbrella/ Tipri: Fundamentals skills**

- Apparatus/ Light apparatus Grip
- Attention with apparatus/ Light apparatus
- Stand – at – ease with apparatus/ light apparatus
- Exercise 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 Shot, 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, Hammer 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 Techniques (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 pinning: Wing lock series, Double 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 prticing 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 prticing 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 cariculum. 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. Coop's 12 minute continuous run / walk test.**
 - b. Tuttle's 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 Questionnaire**
- 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. Proprioception and kinesthesia. 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 altitude.**
- 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 (Filing), 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. Fisher's Z distribution

c. F distribution, ANOVA, Post hoc test.

d. 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. Counselor of 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 return to sports.**
- (d) Various factors to be considered during injury-psychological nutrition, time, economic.**

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 2018**



School of Studies in Physics & Astrophysics
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Approved by Board of Studies in Physics on 11, December 2017
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

11/12/17 *11/12/2017* *gh* *nm* *Ambedkar*
M *Asigle*

M. Sc. - PHYSICS

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.

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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.

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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** Bremsstrahlung: emission from single-speed electrons, thermal Bremsstrahlung 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 Alfvén waves, Magnetic viscosity and magnetic pressure, plasma confinement schemes.

REFERENCE BOOK:

1. Jackson, classical electrodynamics.
2. Rybicki & Lightman: Radiative Processes in Astrophysics
2. Panofsky and Phillips: Classical electricity and magnetism.
3. Bittencourt, Plasma physics.
4. Chen: Plasma physics.

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11/12/2017

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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 microprocessor. 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)

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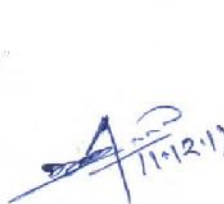
Laboratory Course

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 Feby -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.


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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, general formalism of wave mechanics, representation of states and dynamical variables, stationary states, one-dimensional problems; walls and barriers, Schrödinger equation for harmonic oscillator and its solution.
- Unit -II** Superposition principle, uncertainty relations, states with minimum uncertainty product, 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 stationary 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.

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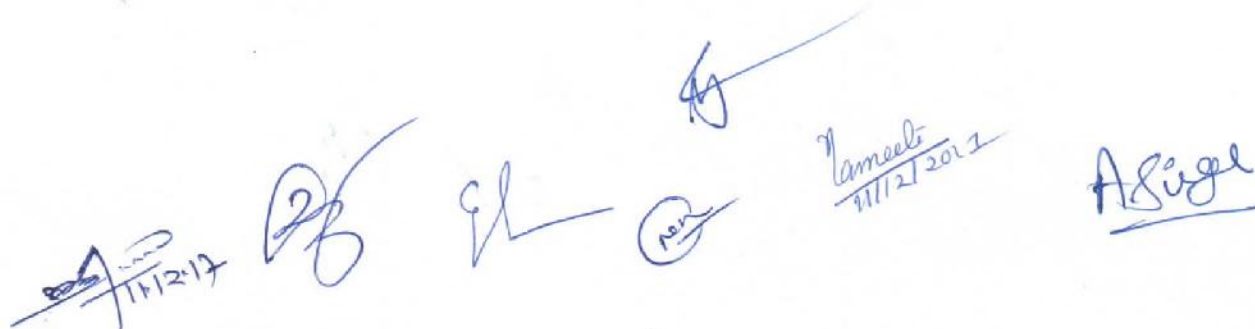
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PAPER – II: STATISTICAL MECHANICS

- Unit-I** Foundation of statistical mechanics : macroscopic and microscopic states, contact between statistics and thermodynamics, physical significance of $\Omega(N, V, E)$, 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).

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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:** Unipolar 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).

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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 Runge-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.

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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 1st 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 data 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/Subtractor.

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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 : Relativistic Quantum Mechanics.

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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, 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 anharmonic 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. Berman.
9. Modern spectroscopy, J.M. Hollas.

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, Electron degeneracy pressure, 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.
Einstein's field equations, Observational test of General Relativity, Precession of Perihelion, Gravitational red-shift and bending of light, Gravitational Wave.

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. The Physical Universe: An introduction to astronomy, F.Shu, Mill valley : University science books.
5. Textbook of astronomy and astrophysics with elements of cosmology, V.B.Bhatia, Pb -New Delhi, Narosa publishing house.

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6. The new cosmos, A.Unsold and B.Baschek, Newyork, Springer Velas.
7. Theoretical Astrophysics, vol. I: Astrophysical processes T.Padmanabhan, Cambridge university press.
8. General relativity and cosmology, J.V. Narlikar-Delhi: Macmillan Company of India ltd.
9. Theoretical Astrophysics, vol. – II: Stars and stellar systems, T. Padmanabhan, Cambridge university press.
10. General relativity, I.R. Kenyon, Oxford univ. press.
11. Classical theory of fields, vol. 2, L.D. Landau and E.M. Lifshitz, Oxford: Pergamon press.
12. First course general relativity, B.P. Schutz – Cambridge univ. press.

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 cavities: 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

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REFERENCE BOOKS

- 1) "Microwaves" by K.L. Gupta Wiley Eastern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Toms 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.

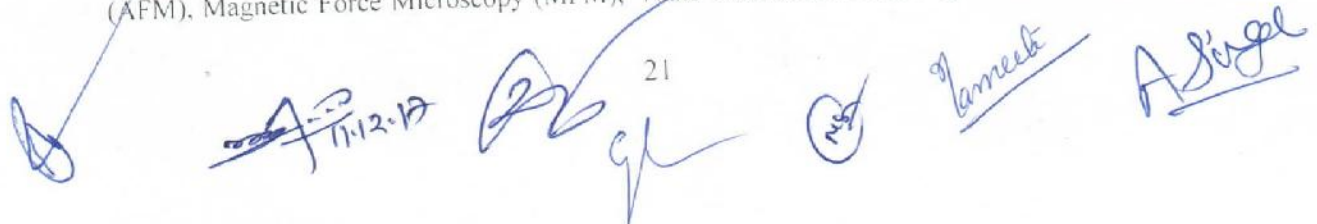
UNIT IV: Characterization of Nano-materials (a)

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), Magnetic Force Microscopy (MFM), Nano indentation, Scanning Electron Microscopy

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(SEM), Transmission electron microscopy (TEM), High resolution TEM Field emission SEM, Electron Energy Loss Spectroscopy (EELS).

Spectrophotometry: UV-Vis spectrophotometers, IR spectrophotometers, Fourier Transform Infrared Radiation (FTIR), Photoluminescence (PL), electroluminescence 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 :Marie 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. Nanotechnology: 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

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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)

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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. Flamm
32. The Earth's Ionosphere: Plasma Physics and Electrodynamics, Michael C. Kelley, Academic Press
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. Fundamentals 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 Astrophysics, 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

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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. Harwit, Springer-Verlag
52. Galactic Astronomy, J. Binney and M. Merrifield, 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 Demorgan'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 $100^\circ C$.
13. To determine the average size of nanoparticles using Zetasizer.

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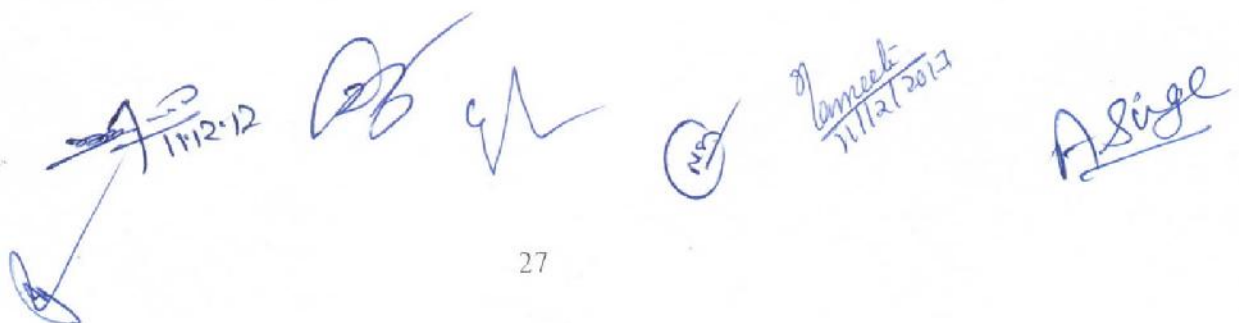
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14. To measure the change of dielectric constant and dielectric loss of nanoparticle with the change of signal frequency by impedance analyzer.
15. To characterize the mechanical properties by tensile testing.
16. To estimate the particle size by SEM.
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 Fraunhofer spectrum of the sun.
7. The transit of Venus and Mercury.
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.

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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. Krane, 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-holland 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-Eastern 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 monochromaticity, 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 field, E_1 ; local electric field at an atom, Lorentz field E_2 , fields of dipoles inside cavity E_3 ; 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, susceptibility 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, Schottky 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.

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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, 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, Quantitative 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 University Press, 2010.
2. Modern Astrophysics, B.W. Carroll and D.A. Ostlie, Addison-Wesley 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.

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8. Quasars and active galactic nuclei, 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, Flat-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, linear 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, BFSK, 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 noise ratio in DM


Text and Reference Books:


- 1) "Microwaves" by K.L. Gupta Wiley Estern Ltd. Delhi.
- 2) Advanced Electronic communication system by Wayne Toms 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.

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Paper – IV (C) PHYSICS OF NANO MATERIALS- II

UNIT I: Electrical transport in nano-structure

Crystal bonding, structure, growth and symmetries; Band structure and density of states at nano-scale; Electrical transport in nano-structure- Electrical conduction in metals, classical and quantum theory, Conduction in Insulator and Ionic crystal, electron transport in semiconductors, various conduction mechanism in 3D (bulk) and 2D (thin film) and low dimensional systems, thermoionic emission, Field-enhanced thermoionic emission, Arrhenius type thermally activated conduction, variable range hopping and Polaron conduction.

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.

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 Edelman and R.C Cammaratra



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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 Sensors, Materials and Amplifiers, G. Gautschi.
11. Block Copolymers in Nanoscience Massimo Lazzari Supramolecular Chemistry, Jonathan W. Steed, Jerry L. Atwood
12. Nanotechnology: Importance and Application by M.H. Fulekar, IK International, 2010.
13. Nanotechnology in Biology and Medicine: Methods, Devices and Application by Tuan Vo-Dinh, CRC press, 2007.
14. Nanosystem characterization tools in the life sciences by Challa Kumar. Wiley-VCH, 2006.
15. Nanolithography M.Gentili et al.(edits),Springer. Environanotechnology by Mao Hong fan, Chin-pao Huang, Alan E Bland, Z Honglin
16. Wang, Rachid Sliman, Ian Wright. Elsevier, 2010.
17. Nanotechnologies, Hazards and Resource efficiency by M. Steinfeldt, Avon Gleich, U. Petschow, R. Haum. Springer, 2007.
18. Nanotechnology: Health and Environmental risk by Jo Anne Shatkin. CRC press, 2008.
19. An Introduction to Quantum Computing Phillip Kaye, Raymond Laflamme, Michele Mosca
20. The Physics of Quantum Information: Quantum Cryptography, Quantum Teleportation, Quantum Computation by Dirk Bouwmeester, Artur K. Ekert, Anton Zeilinger
21. Problems And Solutions in Quantum Computing And Quantum Information Yorick Hardy Willi-Hans Steeb
22. Introduction to Nano Science and Nano Technology- K.K. Chatopadhyay and A. N. Banerjee




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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 Interactions

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)

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2018-19

**SCHEME OF EXAMINATION
&
SYLLABUS OF
M.Phil. (PHYSICS)**

**UNDER
FACULTY OF SCIENCE**

**Approved by Board of Studies in Physics
EFFECTIVE FROM JULY 2018**



**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 11, December 2017
PT. RAVISHANKAR SHUKLA UNIVERSITY, RAIPUR

M. Jaisankar
25/06/2018

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

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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 Materials

Solid State Ionic Materials: Characterization of ion transport properties; AC Impedance Spectroscopy (IS) for conductivity (σ) measurements; DC polarization methods viz, Tubandt's method, Wagner'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.

Thermal analysis: Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC), Thermal Gravimetric Analysis (TGA).

UNIT-III

Luminescence Techniques

Basic mechanisms of Photoluminescence (PL) :- Excitation & Emission spectra, radiative & non-radiative transition, up & down conversion, Multiphonon and cross relaxation, Crystal field splitting, Energy transfer processes, Measurement techniques to study Photoluminescence response, Techniques for ML measurement, TL measurement techniques- Basic TL apparatus, Heating system, Light detection, recording and display, TL glow curve, UV-visible spectrometry.

UNIT – IV

Astronomical Techniques

Photometry: Instrumental magnitudes and colors, seeing and atmospheric effects, extinction correction. Standard photometric systems: UBV and other systems. Transformation to 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 – V

(I) Programming in C

Position of C Language, A comparison of learning English Language and C Language, C Instructions: Type declaration instruction, Arithmetic instruction; Reasons of language C getting popular, Tokens: Keywords, Identifiers, Variable, Integer Variables, Character Variables, Float Variables; Data Types: A logical Statements; Important statements regularly used.

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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.

Recommended Text and Reference books:

1. Characterization of Materials: Wachtman J B (Butterworth-Heinemann)
2. Condensed Matter Physics by Michal P. Marder (Willy Inter. Science Pub., 2000)
3. Superionic Solids- Principle and applications by S. Chandra (NH Pub., 1980)
4. Luminescence of Solids : R Vij (Plenum Press)
5. Digital Image processing: Gonzalez R. C. and Woods R. E. (Addision-Wesley)
6. Astronomical Photometry: Henden A. A. and Kaitchuck R H (Willmann-Bell)
7. Astrophysical techniques: Kitchin C R , third edition (IOP publishing)
8. Optical Astronomical Spectroscopy: Kitchin C R (IOP Publishing).
9. Let us C by Yaswant Kanitkar
10. C Programming by Dennis Riche and Brian Karnighan
11. C Programming by Schauam Series
12. Physics through C-programming by S. Palaniswamy

Concepts

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, C₆₀ 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; microelectromechanical systems (MEMSs), nanoelectromechanical systems (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 (Wiley 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 (Wiley Int., 1981).
- [7] **Photoconductivity of Solids** by R.H.Bube (Wiley Int., 1967).
- [8] **Luminescence of Solids**: R Vij (Plenum Press)

Amelia

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 OVV's, 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, photoionization 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, 4th 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).

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SCHEME OF EXAMINATION
&
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

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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 (σ) measurements; DC polarization methods viz, Tubandt's method, Wagner'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 Preprocessor, 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

2018-19

School of Studies in Psychology
Pt. Ravishankar Shukla University, Raipur
M. A. Psychology Syllabus
w.e.f. July, 2018

VISION

To prepare competent psychologists who would excel in knowledge, orientation and practice of psychology, with high ethical standards and social relevance.

OBJECTIVES

1. To create a strong research oriented theoretical foundation in consonance with recent advances in the discipline of psychology.
2. To enable students to take a creative, empirical and ethical approach to the program that combines conceptual repertoire and research practices in both quantitative and qualitative traditions.
3. To provide an opportunity to extend the knowledge base to the world of practice with a view to promote healthy interface between academia and society.

Programme Structure

The M. A. Psychology Programme divided into two Semesters to be known as Semester -1 and Semester- 2.

		Semester – 1	Semester – 2
Part I	First Year	Semester – I – 1	Semester – 1- 2
Part II	Second Year	Semester – II – 1	Semester – II – 2

The schedule of papers prescribed for all semesters shall be as follows:

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SEMESTER -I & SEMESTER - II

NOTE:

1. Each paper will carry 100 marks (80 marks for theory and 20 marks for internal assessment).
2. Each practicum course shall consist of 100 marks, which would include written record 25 marks, conduction of lab practical in exam 50 marks and viva-voce 25 marks.

SCHEME OF EXAMINATION

1. English and Hindi shall be the medium of instruction and examination.
2. Examinations shall be conducted at the end of each Semester as per the Academic Calendar notified by the University.
3. The System of evaluation shall be as follows:
 - Each paper will carry 80 marks, and 20 marks for the Internal Assessment based on classroom participation, seminar, **class tests**, viva-voce, field and laboratory work, practical and attendance. The weightage given to each of these components shall be decided and announced at the beginning of the semester by the individual teacher responsible for the course.
 - Any student who fails to participate in classes, seminars, tests, viva-voce, practical, field and laboratory work will be debarred from appearing in the end semester examination in the specific course and no Internal Assessment marks will be awarded.
 - His/her Internal Assessment marks will be awarded as and when he/she attends regular classes and unit tests in the course in the next applicable semester.
 - No special classes will be conducted for him/her during other semesters.
 - The duration of written examination for each paper shall be of three hours.
 - The duration of Practicum examination shall be of four hours.


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PASS PERCENTAGE

However, a candidate who has secured the minimum marks to pass in each paper but has not secured the minimum marks to pass in aggregate may reappear in any of the paper/s of his choice in the concerned semester in order to be able to secure the minimum marks prescribed to pass the semester in aggregate. No student would be allowed to avail of more than 3 chances to pass any paper inclusive of the first attempt.

DIVISION CRITERIA

Successful candidates will be classified on the basis of the combined results of Part-I and Part-II examinations as follows:

Candidates securing 60% and above: Ist Division

Candidates securing between 50% to 59.99 %: IInd Division

Candidates securing 40 to 49.99%: IIIrd Division

39.99% and less: Failed

ATTENDANCE REQUIREMENT

No student shall be considered to have pursued a regular course of study unless he/she is certified by the Head, School of Studies in Psychology, Ravishankar Shukla University, to have attended 75% of the total number of lectures, tutorials and seminars conducted in each semester, during his/her course of study.

Note: M. A. Psychology students will opt for 1 Choice-Based Course (CBC) of 100 marks each, in Semester II, & III with at least one from the other Department of the University.

M. A. PSYCHOLOGY
FIRST SEMESTER
(w.e.f. JULY 2018)

Paper No.	Title of the Paper	Theory	Internal
PSM 101 (I)	Basic Psychological Processes	80	20
PSM 102 (II)	Social Psychology	80	20
PSM 103 (III)	Basic Research Methodology	80	20
PSM 104 (IV)	Psychopathology	80	20
PSM 105 (V)	Practicum: (Experiment)	100	
		420	80

Note: All are compulsory papers

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

Psychophysics: Nature, problems and Methods. Signal Detection Theory, Subliminal Perception and related factors.

Unit 2. Perceptual Processes

Approaches to study Perception: Gestalt, Physiological, Information Processing and Ecological Approaches. Perceptual Organization: Gestalt, Figure and Ground. Laws of Organization. Perceptual Constancy: Size, Shape and Brightness. Depth Perception: Monocular and Binocular cues Movement Perception: Nature, Types and Theories.


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Unit 3. Attention

Nature, concept and Mechanism of Attention. Selective Attention. Types, Theories and Applications.

Unit 4. Motivation

Nature and properties; origin, development and present status. Basic Motivational Concepts: Instincts, Needs, Drives, Incentives, Motivational Cycle. Theoretical framework: Murray and Maslow, Intrinsic and Extrinsic Framework. Biogenic Motive, Sociogenic Motive: Achievement, Affiliation and Approval.

Unit 5 Emotion

Emotion: Nature and concept. Physiological correlates of Emotions. Theories of Emotions: James-Lange, Canon-Bard, Schachter-Singer. Emotional Intelligence Conflict: Sources and Types.

BOOKS RECOMMENDED

1. Averill, J. R., Chon, K. K., & Hahn, D. W. (2001). Emotions and Creativity, East and West. *Asian Journal of Social Psychology*, 4(3), 165-183.
2. Barrett, L. F., Niedenthal, P. M. & Winkielman, P. (2007). Emotion and Consciousness. Guilford Press.
3. Best, J. B. (1989). Cognitive Psychology. II Edition. West Publishing Company, New York.
4. Carr, A. (2011). Positive Psychology: The Science of Happiness and Human Strengths. Routledge; 2 edition.
5. Ciccarelli, S. K. & Meyer, G. E. (2008). Psychology: South Asian Edition 1st Edition. Pearson.
5. Snyder (2011). Positive Psychology: The Scientific and Practical Explorations of Human Strengths Edition-Second. Sage South Asia.

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7. Feldman, R. (2009). *Essentials of Understanding Psychology*. Tata McGraw-Hill Education Pvt. Ltd.
8. Galotti, K. M. (1999). *Cognitive Psychology in and Outside Laboratory*. Mumbai: Thompson, Asia.
9. Iyer, S. (2006). *Introduction to Psychology*. Premier Publishing Company, India.
10. Menon, S., Nagaraj, N. & Binoy, V. V. (Editors) (2017). *Self, Culture and Consciousness: Interdisciplinary Convergences on Knowing and Being*. Springer.
11. Menon, S., Sinha, A. & Sreekantan, B. V. (2014). *Interdisciplinary Perspectives on Consciousness and the Self*. Springer.
12. Misra, G. & Baron, R. A. (2014). *Psychology: Indian Subcontinent Edition 5th Edition*, Pearson.
13. Rao, R. K. (2005). Perception, Cognition, and Consciousness in Classical Hindu Psychology. *Journal of Consciousness Studies*, 12, 3-30.
14. Rao, R. K. (2011). *Cognitive Anomalies, Consciousness and Yoga*. New Delhi, Matrix Publishers.
15. Sen, *Anima: Attention and Distraction*, New Delhi.
16. Snodgrass, J. G., Berger, G. L. & Haydon, M. (1985). *Human Experimental Psychology*. New York: Oxford University Press.
17. Solso, R. L. (2004). *Cognitive Psychology*. Sixth Edition. Pearson Education Pvt. Ltd., New Delhi
18. Stevens, S. (1959). *Handbook of Experimental Psychology*. A Wiley Publication in Psychology.
19. Wessells, M. G. (1982). *Cognitive Psychology*. Harper and Row Publishers, New York.
20. Wood, G. (1983). *Cognitive Psychology - A Skills Approach*. Cole Publishing Company, California.






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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 Introduction and Social Psychological Perspectives

Nature and Scope of Social Psychology. Historical Background. Methods of Social Psychology. Theoretical Perspective: Cognitive Dissonance, Attribution, Field, Psychodynamic, Symbolic Interactions, Socio-Biology.

UNIT – II Social Cognition and Person Perception

Sources of Errors in Social Cognition. Social Perception, Person Perception. Determinants of Person Perception. Impression Formation and Management. Role of Stereotypes in Person Perception.

UNIT – III Social Influence Process

Meaning and nature of Social Influence. Social Facilitation, Conformity, Compliance and Obedience, Social Power, Reactance.

UNIT – IV Attitude

Nature and Characteristics. Development, Functions and Formation of Attitudes. Influence of Attitude on Behaviour. Theories of Attitude Change. Barriers in Changing Attitudes.

UNIT – V Social Psychology and Social Situation

Prosocial Behaviour, Aggression: Nature, Characteristics Determinants and Theories. Controlling and Management of Aggression. Violence, Categories of Violence, Self-directed (Suicide), Domestic Violence.

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BOOKS RECOMMENDED

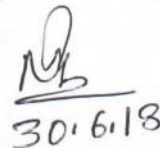
1. Baron, R. A. & Byrne, D. (2000) Social Psychology 12th edition. Pearson, New Delhi.
2. Billing, M. (1976). Social Psychology and Intergroup Relations. New York, Academic Press.
3. Crisp, R. J. & Turner, R. N. (2014). Essential Social Psychology: 3rd Edition. SAGE Publications Ltd.
4. Dalal, A. K. (1989). Attribution: Theory and Research. New Delhi, Wiley Limited.
5. Dalal, A. K. & Misra, G. (Ed.) (2001). New Directions in Indian Psychology, Vol. 1 Social Psychology.
6. Eiser, J. R. (1986). Social Psychology. London: Cambridge University Press.
7. Feldman, R. S. (1985). Social Psychology. New York, Mc Graw Hill.
8. Lindsey, G. & Aronson, E. (Eds) (1985). The Handbook of Social Psychology. New York. Random House.
9. Mathur, S. S. (2004). Social Psychology. Vinod Pustak Mandir, Agra.
10. Mishra, G. (1990). Applied Social Psychology in India. New Delhi, Sage.
11. Mishra, G. (Ed.) (2009). Psychology in India, Vol. 2. Social and Organizational Processes. New Delhi, Pearson.
12. McGarty, C. & Haslam, S. A. (Eds.) (1997). The Message of Social Psychology. Oxford, U K, Blackwell.
13. Pandey, J. (1988). Psychology in India; the State – 7 the Art Vol – 2 ND. Sage.
14. Tajfel, H. (1981). Human Groups and Social Categories. London: Cambridge University Press.
15. Taylor, M. & Moghaddam, F. M. (1987). Theories of Intergroup Relations. New York: Praeger

समाज मनोविज्ञान (2004): अरुण कुमार सिंह, मोतीलाल बनारसी दास।

समाज मनोविज्ञान: गिरीश्वर मिश्रा

समाज मनोविज्ञान: लालबचन त्रिपाठी




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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 Introduction to Psychological Research

Meaning, Purpose and Dimensions of Research. Types of Psychological Research: Qualitative and Quantitative. Parametric and Non-Parametric Statistics. Methods of Psychological Research: Experimental, Quasi-Experimental, Case Studies, Field Studies. Variables: Nature and Types. Techniques of experimental manipulation, control in experiment.

UNIT – II Research Process

Research Process: Consideration of Research Problem and Hypothesis, Operationalization. Sampling: Probability and Nonprobability Sampling. Sources of Bias. Ethical Issues in Psychological Research.

UNIT – III Research Designs

Cross Sectional and Longitudinal, Experimental, Correlational. Single Factor, Quasi – Experimental.

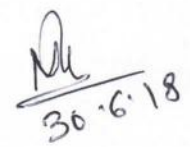
UNIT – IV Central Tendencies

Measures of Dispersion, Normal Probability Curve, its properties and utility. Null Hypothesis, Type-I and Type-II Errors, Level of Significance. Inferential Statistics: t -Test.

UNIT – V Method of Data Collection

Survey and Observation Method: Questionnaire, Interview. Tests and Scales.








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BOOKS RECOMMENDED

1. Black, T. R. (1988). Quantitative Research Designs for Social Sciences. Thousand Oaks: Sage.
2. Broota, K. D. (1992). Experimental Design in Behavioural Research. Wiley Eastern Ltd. New Delhi.
3. Edwards, A. K. (1976). Experimental Designs in Psychological Research. New York Holt Rinehart.
4. Kerlinger, F. N. (1999). Foundation of Behavioural Research. S. Chand (G/L) & Company Ltd; 4th edition.
5. Kothari C. R. (1986). Research Methodology: Methods and Techniques. Wiley Eastern Ltd. New Delhi.
6. Mangal, S. K. (2012). Statistics in Psychology and Education (2nd Ed.). New Delhi: PHI Learning Pvt. Ltd.
7. Mason, J. (1997). Qualitative Researching. Thousand Oaks: Sage.
8. Miles, J. & Banyard, P. (2007). Understanding and Using Statistics in Psychology A Practical Introduction. Sage Publications.
9. Siegal, S. (2002). Non-Parametric Statistics for Behavioural Sciences. New Delhi: Tata McGraw Hill.
10. Winer, B. J. (1971). Statistical Principles in Experimental Design. New York, McGraw Hill.

   
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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 and Classification System

Diagnosis: Purpose, Diagnostic System: Mental Status Examination (MSE).
Clinical Interview and Diagnostic Tools. Classification Systems: ICD and
DSM. Evaluation of Classification System.

UNIT – II Theoretical Models of Psychopathology

Psychodynamic, Behavioural, Cognitive, Humanistic, Biological
and Socio-Cultural.

UNIT – III Disorders of Anxiety, Somatoform, and Behavioural Syndromes

Panic, Phobic, OCD, Post-Traumatic, GAD, Somatoform Disorders,
Impulse Control Disorder, Eating Disorder, Sleep Disorder.
Dissociative Disorder: Types, Characteristics, Etiology and
Management.

UNIT – IV Psychotic Spectrum Disorders

Schizophrenia, Mood Disorder. Personality Disorders: Clinical
Characteristics, Etiology and Management.



**UNIT – V Substance Related Disorders and Developmental Disorders of
- Childhood**

Mental Retardation. Developmental Disorders of Childhood: Autism
Spectrum Disorder (ASD), Attention Deficit Disorder (ADD),
Attention Deficit and Hyperactive Disorder (ADHD). Learning
Disabilities.

BOOKS RECOMMENDED

1. Adams, H. E. & Sutker, P. B. (2004). Comprehensive Handbook of Psychopathology. New York, Plenum Press.
2. Aboud, T. D. (1988). Health Psychology in Global Perspective. Thousand Oaks, C.A: Sage.
3. Carson, C.R. & Butcher, J. N. (1992). Abnormal Psychology and Modern Life (9th Ed), Harper Collins Publisher.
4. Davison, G. C. & Neal, J. N. (2000). Abnormal Psychology – 8th Ed. Wiley, Publishers.
5. Page, J. D. (1975). Psychopathology: The Science of Understanding Deviance. (2nd Ed.). Chicago, IL, Aldine
6. Prokap, C. R. & Bradly, L.A. (1991). Medical Psychology: Contribution to Behavioural Medicine. Academic Press.

असामान्य मनोविज्ञान (2004): अरुण कुमार सिंह, मोतीलाल बनारसी दास।

 
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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)**

1. Constancy- Size/Shape/Brightness
2. Biofeedback
5. Mental Fatigue
6. Learning
7. Verbal Learning
8. Selective Attention
9. Knowledge of Results
10. Problem Solving
11. RI / PI

Field Work

- | | |
|---------------------|--------------------------|
| 1. Motivation | 2. D.A.T./ Personality |
| 3. Mental Health | 4. Frustration Tolerance |
| 5. Stress / Anxiety | 6. Depression |

Note: Field Studies topics would be allotted by the Departmental Committee.

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COURSE STRUCTURE
M. A. PSYCHOLOGY
SECOND SEMESTER
(w.e.f. JULY 2018)

Paper No.	Title of the Paper	Theory	Internal
PSM 201 (VI)	Basic Psychological Processes – II	80	20
PSM 202 (VII)	Group Processes and Cultural Psychology	80	20
PSM 203 (VIII)	Advanced Research Methodology	80	20
PSM 204 (IX)	Physiological Psychology and Health Behaviour	80	20
PSM 205 (X)	Practicum	100	---
		420	80

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.

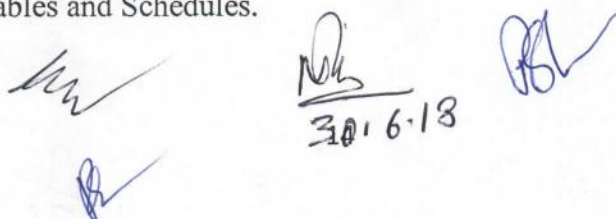
Unit I Learning Process

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.



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UNIT II Experimental Analysis of Behaviour

Behaviour Modification, Shaping, Discrimination Learning. Neurophysiology of Learning.

Unit III Verbal Learning

Verbal Learning: Methods and Materials, Organizational Processes

UNIT IV Learning Theories

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 Forgetting: Nature and causes of Forgetting.


Theories of Forgetting: Interference, Decay, Retrieval. Improving Memory.


BOOKS RECOMMENDED

1. Baddley, A. (1997). *Human Memory: Theory and Practice*. New York: Psychology Press.
2. Baron, R. & Misra, G. (2013). *Psychology*. New Delhi: Pearson.
3. Chadha, N. K. & Seth, S. (2014). *The Psychological Realm: An Introduction*. New Delhi: Pinnacle Learning.
4. Ciccarelli, S. K., & Meyer, G. E. (2010). *Psychology*. South Asian Edition. New Delhi: Pearson Education.
5. Coon, D., & Mitterer, J. O. (2007). *Introduction to Psychology: Gateway to Mind and Behaviour*. New Delhi: Cengage.
6. DAmato, M. R. (1970). *Experimental Psychology*, New York, Mc. Graw Hill.
7. Feldman, R. (2009). *Essentials of Understanding Psychology*. New Delhi: Tata McGraw Hill.

8. Galotti, K. M. (1999). *Cognitive Psychology in and outside Laboratory*. Mumbai: Thompson, Asia.
9. Gerrig, R. J., & Zimbardo, P. G. (2006). *Psychology and Life* (17th Ed.). New Delhi: Pearson Education.
10. Passer, M. W. & Smith, R. E. (2010). *Psychology: The Science of Mind and Behaviour*. New Delhi: Tata McGraw-Hill.
11. Sen Anima: *Attention & Distraction*. New Delhi.
12. Smith, E.E. & Kosslyn, S. M. (2007). *Cognitive Psychology: Mind and Brain*. Prentice Hall.
13. Snodgrass, J. G., Berger, G. L. & Haydon, M. (1985). *Human Experimental Psychology*, New York, Oxford University Press.
14. Tripathi, A. N. & Babu, N. (2008). *Cognitive Processes*. In Misra, G. (Ed.). *Psychology in India: Advances in Research*, Vol. 1. New Delhi: Pearson Education.





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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 Inter Group Relations

Group Dynamics and Group Behaviour, Group Effectiveness, and Group Cohesiveness: meaning, formation, Decision Making, Problem Solving and Group Level Behaviours.

UNIT – II Leadership

Meaning nature and Function of Leadership. Styles and Effectiveness of Leadership. Psychology of Followers.

UNIT – III Social Issues

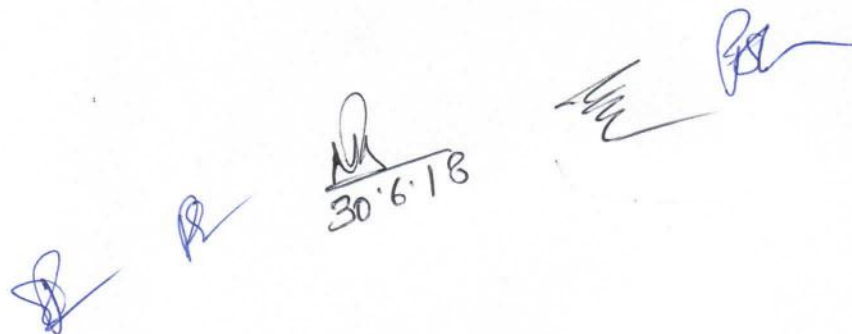
Poverty, Caste, Gender, Population Issues in India. Unemployment. Communal Tension and Harmony.

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. Health, Environment and Law.

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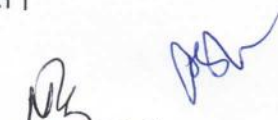
BOOKS RECOMMENDED

1. Ahuja, R. (2012). Social Problems in India. Rawat Publication.
2. Alcock, P. (1997). Understanding Poverty (2nd Ed). Great Britain: Palgrave.
3. Aronson, E (Eds). (1985). The Handbook of Social Psychology. N Y: Random House.
4. Baron, A.B. & Byrne, D. (1991). Social Psychology, - Boston Allyn & Bacon.
5. Billing, M. (1976). Social Psychology and Inter Group Relations, NY: Academic Press.
6. Dalal, A. K. (1989). Attribution Theory and Research. New Delhi, Wiley Limited.
7. Dalal, A. K. & Misra, G. (2001) New Directions in Indian Psychology. New Delhi: Sage Publications.
8. Eiser, J. R. (1986). Social Psychology. London: Cambridge University Press.
9. Feldman R.S. (1985) Social Psychology. New York, McGraw Hill.
10. Jai Prakash, I. & Bhogle, S. (1998). (Eds.) Psychology and Changing World. Bangalore, Prasaranga, Bangalore University.
11. Kakkar, S. (1996). Indian Psyche. New Delhi: Penguin.
12. Mishra, G. (1990). Applied Social Psychology in India. New Delhi, Sage.
13. Misra, G. & Nagpal, A. (1999). (Eds.). Psychology of Poverty and Disadvantages. New Delhi. Concept Publishing Company.
14. Pandey, J. (1988). Psychology in India; the State – 7 the Art Vol – 2. New Delhi: Sage.

समाज मनोविज्ञान (2004): अरुण कुमार सिंह, मोतीलाल बनारसी दास।

समाज मनोविज्ञान: गिरीश्वर मिश्रा।




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PAPER – VIII

ADVANCED 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

Randomized groups, Matched Groups, Factorial Designs: Between and Within Groups, Repeated Measures (One Factor).

UNIT – II Analysis of Variance

ANOVA: One -Way and Two - Way, ANCOVA, a-priory and Post-Hoc Comparisons.

UNIT – III Measures of Relationships

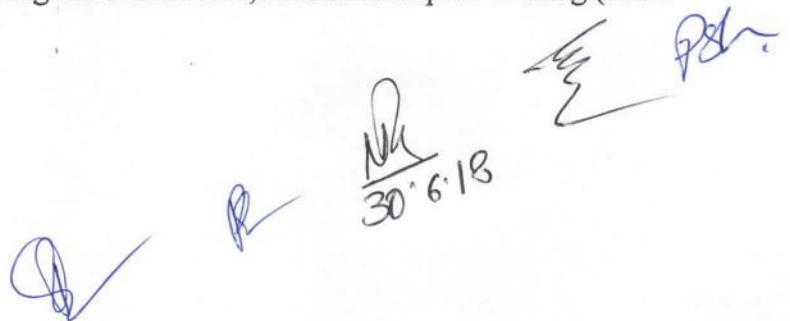
Bi-serial, Point Bi-serial, Tetrachoric and Phi.
Multiple and Partial Correlations.

UNIT – IV Regression and Factor Analysis

Simple and Multiple, Factor Analysis: Assumptions, Methods
Rotation and Interpretation.

UNIT – V Report Writing

Use of Computer in Psychological Researches, Research Report Writing (APA Style)

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BOOKS RECOMMENDED

1. Black T. R. (1988). *Quantitative Research Designs for Social Sciences*. Thousand Oaks: Sage.
2. Breakwell, G. M., Smith, J. A., & Wright, D. B. (2012). *Research Methods in Psychology* (4th ed.). Sage.
3. Bridget, S. & Cathy, L. (Eds.) (2008). *Research Methods in the Social Sciences*. Vistaar Publication New Delhi.
4. Broota, K. D. (1992). *Experimental Design in Behavioural Research*. New Delhi, Wiley Eastern Ltd.
5. Edwards, A. L. (1984). *Experimental Design in Psychological Research*. Harpercollins College Div; Subsequent edition.
6. Elmes, D., Kantowitz, B., & Roediger, H. (2011). *Research Methods in Psychology* (9th ed.). Cengage Learning.
7. Kerlinger, F. N. (1983). *Foundation of Behavioural Research* (2nd ed) Surjeet Publication, Kamla Nagar, New Delhi, 1983.
8. Kothari, C. R. (1986). *Research Methodology: Methods and Techniques*. Wiley Eastern Ltd. New Delhi.
9. Mason, J. (1997). *Qualitative Researching*, Thousand Oaks: Sage.
10. Nestor, P.G. & Schutt, R. K. (2011). *Research Methods in Psychology: Investigating Human Behaviour*. Sage.
11. Winer, B. J., Brown, D. R. & Michels, K. M. (1991). *Statistical Principles in Experimental Design*. New York: McGraw Hill.

    
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PAPER – IX

PHYSIOLOGICAL PSYCHOLOGY AND HEALTH 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 **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.
Structure of Neuron; The different parts of a Neuron; Types of Neurons
Functions of Neuron; generation of IPSP and EPSP, Conduction and
generation of Action Potential, Ionic Exchanges and Refractory Periods

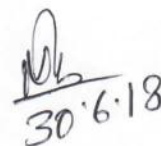
UNIT – III **Sleep, Waking and Endocrine System**

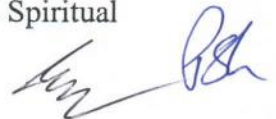
Sleep and Waking: Stages of Sleep, Disorders of Sleep and Physiological
Mechanisms of Sleep and Waking. Drinking and its Neural Mechanism;
Hunger and its Neural Mechanism. Endocrine System: Structure and Function.
Abnormalities of major Glands: Thyroid, Adrenal, Gonads, Pituitary, Pancreas
and Pineal

UNIT - IV **Approaches to Therapy**

Psychoanalytic, Biological, Behavioural, Behavioural Medicine and Spiritual
Therapy.




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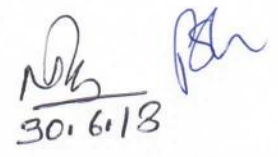


UNIT – V Health Assessments and Promotion

Quality of Life Scales, Health Indices Checklist, Lifestyle Evaluation and Coping Scales, Health Promotion Strategies, Psychological Intervention, Lifestyle Modification Techniques, Utility of Relaxation and Bio-Feedback Methods. Mental Health Promotion and Maintenance. Current Issues and Trends in Health Psychology.

BOOKS RECOMMENDED

1. Aboud, T. D. (1998). Health Psychology in Global Perspective. Thousand Oaks, C.A: Sage.
2. Adams, H. E. & Sutker, P. B. (2001). Comprehensive Handbook of Psychopathology. Kluwer Academic / Plenum Publishers, New York.
3. Brannon, L. & Feist, J. (2010). Health Psychology: An Introduction to Behaviour and Health. Belmont, CA: Thomson/Wadsworth.
4. Carson, C. R., Butcher J. N. (1992). Abnormal Psychology and Modern Life (9th ed) Harper Collins Publisher.
5. Davison, G. C. & Neal, J. N. (2000). Abnormal Psychology – 8th Ed. Wiley Publishers.
6. Deb, S. (2009). Reproductive Health Management, New Delhi, Akansha Publications.
7. Dimmates, M. R. & Martin, L. R. (2007). Health Psychology. Pearson.
8. Friedman, H. S. (1998). Encyclopaedia of Mental Health. Academic Press.
9. Kleinman, A. (1988). Rethinking Psychiatry from Cultural Category to Personal Experience. Free Press. New York.
10. Marks, D. F. (2002). The Health Psychology Reader. Sage.
11. Ogden, J. (1996). Health Psychology. A Textbook. Open University Press.
12. Page, J. D. (1975). Psychopathology: The Science of Understanding Deviance.
13. Prokop, C. K. & Bradly, L. A. (1981). Medical Psychology: Contribution to Behavioural Medicine. Academic Press.
14. Rice, P. L. (1998). Health Psychology. Pacific Grove Books. Cole Pub.
15. Taylor, S. E. (1999). Health Psychology. McGraw Hill.



PAPER – X
PRACTICUM

M. M. 100

This paper consists of the laboratory (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 reports are found satisfactory.

List of Practicum: (Any Five Tests and One Field Study)

- | | |
|--------------------------------------|-----------------------------|
| 1. Aggression | 7. Personality |
| 2. Aptitude | 8. Mental Health |
| 3. Emotional Intelligence | 9. Projective Test |
| 4. Digit Memory Scope/Span | 10. Problem Solving Ability |
| 5. Intelligence (Individual / Group) | 11. Stress / Depression |
| 6. Locus of Control | 12. Motivation |

Field Work

- | | | |
|------------------------------|-----------------|-------------------|
| 1. Achievement Motivation | 2. Adjustment | 3. Anxiety |
| 4. Happiness | 5. Intelligence | 6. Leadership |
| 7. Parent Child Relationship | 8. Personality | 9. Social Support |

Note: Field Studies topics would be allotted by the Departmental Committee.

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M. A. – III SEMESTER (PSYCHOLOGY)

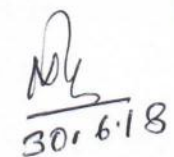
The curriculum frame – work is as under.

COMPULSORY PAPERS (Two)

S.No.	Paper No	Title of Paper	Marks	
			Theory	Internal Assessment
1.	XI	Personality and Indigenous Psychology	80	20
2.	XII	Psychological Assessment - I	80	20
Optional Papers: Two Papers from any One of the Three Groups				
Group A: Psychology of Management				
3.	XIII	Organizational Behaviour – I	80	20
4.	XIV	Human Resource Development and Management – I	80	20
Group B: Psychology of Education				
3.	XIII	Educational and Instructional Psychology – I	80	20
4.	XIV	Basics of Psychological Guidance and Counselling – I	80	20
Group C: Clinical Psychology				
3.	XIII	Clinical Diagnosis – I	80	20
4.	XIV	Psychotherapeutic Counselling - I	80	20
5.	XV	Practicum	100	

NOTE: Internal Assessment will be done on the basis of Class Tests / Seminar / Tutorials




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M. A. – III SEMESTER (PSYCHOLOGY)
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 Introduction

Personality Meaning, Perspectives and Measurement of Personality.
Concept of Mature Personality, Personality Theory- Problems and Procedures.

UNIT – II Approaches to Personality- I

Psychodynamic Perspectives of Personality: Theories of Personality: Freud, Erikson, Adler. Structure, Dynamics and Development of Personality.
Methods to study Personality.

UNIT – III Approaches to Personality –II

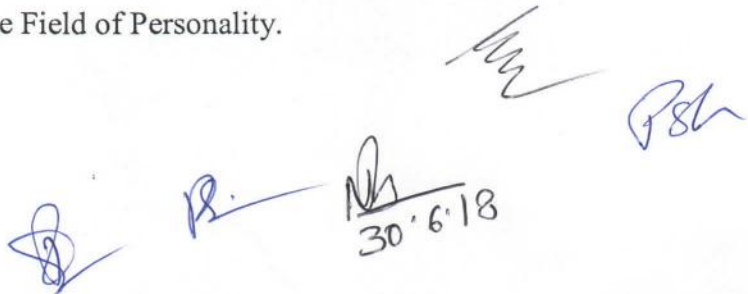
Theories of Personality: Cattell and Eysenck- Structure, Dynamics and Development of Personality. Research Methods.

UNIT – IV Approaches to Personality-III

Cognitive, Behavioural and Humanistic. Kelly, Bandura and Roger's.
Structure, Dynamics and Development of Personality. Research Methods.

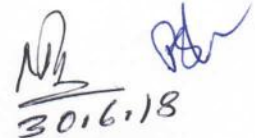

UNIT – V Approaches to Personality-IV

Indigenous Concept and Models of Personality – Yogic, Samkhya.
Current Researches in the Field of Personality.


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BOOKS RECOMMENDED


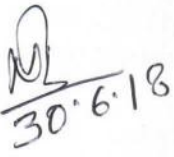

1. Barbara, E. (2008). *Personality Theories* (8th Edition). California. Wadsworth Publishing Company.
2. Bischof, L. J. (1970). *Interpreting Personality Theories*. Harper & Row, New York.
3. Feldman, S.R. (2009). *Essentials of Understanding Psychology*, 7th Edition. Tata McGraw-Hill Education, Pvt. Ltd.
4. Friedman, H. S. & Schustack, M. W. (2016). *Personality: Classic Theories and Modern Research*. (6th Edition), Pearson.
5. Hasurkar, S. S. (1958). *Vācaspati Miśra on Advaita Vedanta*. Darbhanga: Mithila Institute of Post-Graduate Studies.
6. Hall, C. S., Lindzey, G. & Campbell, J. B. (2007). *Theories of Personality* (4th Ed.). John Wiley, New York.
7. Hjelle, L. A. & Ziegler, D. J. (1992). *Personality Theories: Basic Assumptions, Research and Applications* (2nd Ed.). International Student Edition. McGraw Hill, International Book Co.
8. John, O. P., Robins, R. W. & Pervin, L. A. (2010). *Handbook of Personality: Theory and Research*. Guilford Press.
9. Loehlin, J. C., Willerman, L., & Horn, J. M. (1988). Human Behaviour Genetics. *Annual Review of Psychology*, 39(1), 101-133.
10. Magnusson, D., & Endler, N. S. (1977). *Personality at Crossroads*. New Jersey, Hillsdale: Lawrence Erlbaum Associates.
11. Misra, G., & Mohanty, A. K. (2002). *Perspectives on Indigenous Psychology*. New Delhi: Concept Company.
12. Mohanty, J. N. (2000). *Classical Indian Philosophy*. Oxford: Rowman & Littlefield.
13. Mukhopadhaya, K. L. & Swami Niranjana Saraswati. *Yoga Darshan Munger*: Bihar School of Yoga.
14. Murphy, G., & Murphy, L. B. (1968). *Asian Psychology*. New York: Basic Books.
15. Naidu, R. K. & Pandey, N. (1999). *Anāsakti: The Indian vision of Potential Human Transcendence beyond Mechanistic Motivations*. In G. Misra (Ed.), *Psychological Perspectives on Stress and Health* (pp. 85–99). New Delhi: Concept Publishing Company.



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16. Paranjpe, A. C. (2011). Indian Psychology and the International Context, *Psychology and Developing Societies*, 23 (1), 1-26.
17. Paranjpe, A. C. (1988). A Personality Theory according to Vedanta. In A.C. Paranjpe, D.Y.F. Ho, & R. W. Rieber (Eds), *Asian contributions to Psychology*. New York: Praeger.
18. Paranjpe, A. C., Ho, D. Y. F., & Rieber, R. W. (Eds.). (1988). *Asian Contributions to Psychology*. New York, NY, England: Praeger Publishers.
19. Patanjali Yog Sutra.
20. Pervin, L. A. (1975). *Personality: Theory, Assessment and Research*. 2nd Ed. Wiley International ed. New York.
21. Pervin, L. A. (1993). *Personality: Theory and Research*. John Wiley & Sons.
22. Rao, Sheshagiri, V. N. (1984). *Vācaspati's Contribution to Advaita*. Mysore: Samvit Publishers.
23. Sahakian, W. S. (1975). *Psychology of Personality: Readings in Theory*. Rand McNally, Chicago, Illinois, United States.
24. Sinha, J. (1958). *Indian Psychology* (2nd ed., 2 vol). Calcutta: Sinha Publishing House.

उच्चतर सामान्य मनोविज्ञान (2004): अरुण कुमार सिंह, मोतीलाल बनारसी दास ।
 व्यक्तित्व मनोविज्ञान (2004): अरुण कुमार सिंह, मोतीलाल बनारसी दास ।
 व्यक्तित्व मनोविज्ञान (2002): मधु अस्थाना, किरण बाला, मोतीलाल बनारसी दास ।
 व्यक्तित्व मनोविज्ञान (2004): डी. एन. श्रीवास्तव, भार्गव पब्लिकेशन हाउस, आगरा ।



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M. A. – III SEMESTER
(COMPULSORY)
PAPER – XI
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 Nature of Psychological Assessment

Nature of Psychological Assessment, Difference between Physical and Psychological Assessment. Problems in Psychological Assessment. Levels of Assessment.

UNIT – II Scaling

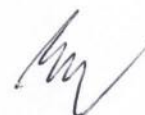
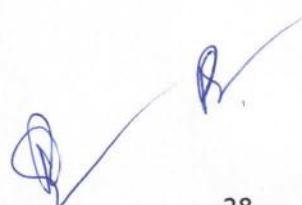
Scaling: Unidimensional and Multidimensional. Scale Construction Techniques. Difference among Tests, Scales, Questionnaire and Schedule. Characteristics of a good Psychometric Test. Difference between Psychometric and Projective Tests.

UNIT – III Construction of Psychometric Tools

Construction of Psychometric Tools: Steps in Test Construction, Item-writing, Pre-try out, Item difficulty, Discrimination Power. Types of Psychological test.

UNIT – IV Standardization Process of Psychometric Test

Standardization Process of Psychometric Test. Reliability: Concept and Type. Methods of determining Reliability. Validity: Concept and Type. Methods of determining Validity. Factors affecting Reliability and Validity. Norms: Types, Uses and Method.



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UNIT – V **Adaptation of Tests**

Adaptation of Tests. Test taking Response Styles: Social Desirability, Acquiescence and Faking. Use of Psychological Tests in applied field of Life: Diagnosis, Psychotherapy, Education, Occupations and Organizations.

BOOKS RECOMMENDED

1. Anastasi, A. (1988). Psychological Testing. Macmillan.
2. Cronbach, L. (1951). Essentials of Psychological Testing New York: Harper & Brothers.
3. Freeman, F. S. (2008). Theory and Practice of Psychological Testing. Publisher: Oxford and IBH Publishing.
4. Friedenberg, L. (1995). Psychological Testing: Design, Analysis, and Use. Allyn & Bacon.
5. Ghiselli, E. E. (1964). Theory of Psychological Measurement. New Delhi, Tata McGraw- Hill.
6. Gregory, R. J. (2004). Psychological Testing: History, Principles, and Applications. Needham Heights, M A, US: Allyn & Bacon.
7. Guilford, J. P. (1954). Psychometric Methods. New Delhi Tata Mc Graw Hill
8. Nunnally, J. C. (1970). Introduction to Psychological Measurement. New York: McGraw-Hill.
9. Price, L. R. (2016). Psychometric Methods: Theory into Practice. Guilford Press, Routledge.


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M. A. – III SEMESTER (PSYCHOLOGY)

GROUP - A

PAPER – XIII (OPTIONAL)

ORGANIZATIONAL BEHAVIOUR – 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 Introduction

Emergence of OB as a Discipline and Contributing Disciplines to OB. Contributions of Hawthorne Studies to OB; OB trends – Globalization; Outsourcing; Call Centres; Knowledge Process Outsourcing. The FIVE Anchors of OB and Knowledge Management.

UNIT – II Motivational Process

Motivational Process: Meaning of Motivation; Primary Motives; General Motives, Secondary Motives and Motivational Process. Content Theories of Work Motivation – Maslow's Hierarchy of Needs; Herzberg's Factor Theory; ERG Theory. Theory X and Theory Y.

UNIT – III Leadership

Leadership: Difference between Leader and Manager. Important studies on Leadership. Factors influencing Leadership Role. Essentials of Leadership, Leadership Styles. Supervision and Patterns of Supervision. Modern Theoretical Process of Leadership: Charismatic Leadership Theories; Transformational Leadership Theory; A Socio-Cognitive Approach; Leadership across Cultures; Corporate Leaders.

UNIT – IV Conflict and Power ^{at} in Work Place

Conflict: The Conflict Process; Sources of Conflict in Organizations. Organizational Conflict, Conflict Management. Interpersonal Conflict Management Styles; Resolving Conflicts.

Power: Meaning of Power; Sources of Power; Contingencies of Power; Influencing Others; Influencing Tactics and Organizational Politics.

Organizational Power and Politics. Union Management Interface.



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UNIT – V **Decision Making**

Nature and Concepts. Decision Making Process, Types of Decisions.
Factors influencing Decision Making. Management Decision Techniques.

BOOKS RECOMMENDED

1. Bristal, V. (1997). Rethinking the Future: Rethinking Business, Principles, Competition, Control & Complexity, Leadership, Markets and the World. *The Journal of Business Strategy*, 18(4), 62.
2. Gibson, R., & Handy, C. (1998). Rethinking the Future: Rethinking Business Principles, Competition, Control and Complexity, Leadership, Markets and the World.
3. Greenberg, J. & Baron, R. A. (2003). Behaviour in Organizations: Understanding and Managing the Human Side of Work. Upper Saddle River, N J: Prentice Hall.
4. Griffin, W. H. & Pareek, U. (2005). Management of Change in Education.
5. Luthans, F. (1995). Organizational Behaviour. Mc Graw Hill, International Student Edition.
6. Lynton, R. P. & Pareek, U. (1978). Training for Development.
7. Pareek, U. (1996). Organizational Behaviour Processes.
8. Pareek, U. (2007). Understanding Organizational Behaviour.
9. Pareek, U. (2011). Udai Pareek's Understanding Organizational Behaviour.
10. Pareek, U. (2016). Understanding Organizational Behaviour 4E.
11. Pareek, U. (2017). Designing and Managing Human Resource Systems.
12. Pareek, U. & Rao, V. (2005). First Handbook of Psychological and Social Instruments.
13. Pareek, U. & Khanna, S. (2007). Understanding Organizational Behaviour. Oxford University Press.
14. Rao, T. V. (2015). Performance Management: Toward Organizational Excellence.
15. Robbins, S. P. (2000). Organizational Behaviour. (9th edition). Prentice Hall India, New Delhi.

16. Schein, E. M. (1990). Organizational Psychology 3rd edition. Prentice Hall of India Pvt. Ltd. New Delhi.
17. Toffler, A., Toffler, H., & Gibson, R. (2011). Rethinking the Future: Rethinking Business Principles, Competition, Control and Complexity, Leadership, Markets and the World. Hachette UK.
18. Ulrich, D., Allen, J., Brockbank, W., Younger, J., & Nyman, M. (2009). HR Transformation: Building Human Resources from the Outside In. New York: McGraw-Hill.
19. Wolfe, B. (2015). The Little Black Book of Human Resources Management. The Expressive Press.

M. A. – III SEMESTER (PSYCHOLOGY)

GROUP - A

PAPER – XIV (OPTIONAL)

HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT – 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 Human Resource Management

Nature, Function, Personnel Management vs. HRM, HRD vs. HRM. Assumptions about HRM, Structure and Role of HRM. The Indian context of HRM. Models of HRM. Current and Future Challenges to HRM. Strategic Role, International Human Resource Management.

UNIT – II Human Resource Planning

Human Resource Planning: Importance, process, Forecasting Demand, Estimating Supply, Effective HRP, Human Resource Accounting. Steps, Stages and Structure in Manpower Planning. HRD in India.

UNIT – III Job Analysis and Job Design

Job Analysis: Uses, Process, Methods, Job Description and Job Specifications. Job Analysis and Job Design. Recruitment and Selection.

UNIT – IV Training and Development

Training: Nature and Importance. How to make Training Effective. Importance of Training in Organizational Set Up-Training as a Profession-Training Needs Analysis- Types of Training-Training Design-Steps Involved. Organizational Development: Nature and Objectives of OD. Phases of an OD Programme; OD Interventions; OD in Indian Industry; Criticism of OD.

UNIT – V Performance Appraisal

Performance Appraisal, Factors Distorting Appraisal and how to improve Appraisals. Types of Appraisal. Comparing with Performance Management, Methods, Challenges, Legal Implications.

BOOKS RECOMMENDED

1. Aswathappa, K. (1999). Human Resource and Personnel Management-Text and Cases, New Delhi: Tata McGraw Hill, pp.208.
2. Beardwell, I. & Holden, L. (1997). Human Resource Management. A Contemporary Perspective.
3. DeCenzo, D. A., Robbins, S. P. & Verhulst, S. L. (2012). Fundamentals of Human Resource Management, Wiley.
4. Fisher, C. D., Shaw, J. B. & Schoenfeldt, L. F. (1993). Human Resource Management. Houghton Mifflin Company.
5. Pareek, U. (2017). Designing and Managing Human Resource Systems. Oxford and IBH Publishing.
6. Pareek, U. & Rao, T. V. (1981). Designing and Managing Human Resource Systems. New Delhi: Oxford and IBH.
7. Robbins, S. P. & Judge, T. A, (2013). Essentials of Organizational Behaviour. Pearson.
8. Sinha, J. B. (2009). Culture and Organizational Behaviour. SAGE Publications India.

M. A. – III SEMESTER (PSYCHOLOGY)
GROUP - B
PAPER – XIII (OPTIONAL)
EDUCATIONAL AND INSTRUCTIONAL 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 Conceptual and Theoretical Perspectives

Conceptual and Theoretical Perspectives in Educational Psychology.

Theories: Behaviouristic, Social Learning and Cognitive Applications in Teaching.

UNIT – II Information Processing Models

Instructional Models, Programmed Learning, Concept, Characteristics and Models.

UNIT – III Human Diversity and Education

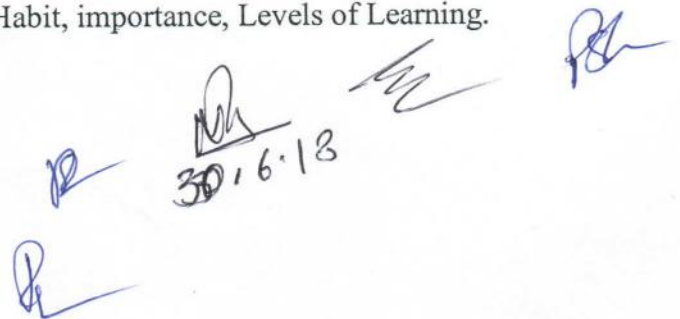
Learning Styles: Nature, Approaches to Learning Style, Measurement of Learning Styles. Attempt to Modify Learning Styles.

UNIT – IV Individual and Group Differences

Individual and Group Differences in Intelligence. Theories of Intelligence, Gender Differences issues in the Classroom.

UNIT – V Learning and Motivation

Learning and Motivation, Study Habit, importance, Levels of Learning.


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BOOKS RECOMMENDED

1. Bruce, R. J., Weil, M., & Calhoun, E. (2014). Models of Teaching (9th Edition) Pearson.
2. De Secco, J. P. & Crawford, W. R. (1974). The Psychology of Learning and Instruction. Englewood Cliffs, NJ: Prentice Hall.
3. Ellis, R. S. (1965). Educational Psychology, A Problem Approaches Affiliated. New Delhi, East West Press.
4. Gage, N. L., & Berliner, D. C. (1998). Educational Psychology (6th ed.). Boston, MA: Houghton Mifflin.
5. Ghaoui, C. (2004). Human Factors and Innovative Approaches. Idea Group Inc (IGI).
6. Santrock, J. W. (2011). Educational Psychology. Tata McGraw Hill.
7. Schunk, D. H. (2012). Learning Theories an Educational Perspective, Sixth Edition. Pearson.
8. Travers, J. F. (1979). Educational Psychology (2nd Ed.). New York & Row.
9. Woolfolk, A. E. (1995). Educational Psychology (6th Ed.) Allyn & Bacon, London/ Boston.
10. Woolfolk, A. (2005). Educational Psychology, 9/E, Active Learning Edition. Allyn & Bacon, Boston.
11. Woolfolk, A. (2006). Educational Psychology. International Edition with Pearson Education.
12. Woolfolk, A., Misra, G. & Jha, A. (2012). Fundamentals of Educational Psychology. Pearson.
13. Woolfolk, A. & Perry, N. E. (2014). Child and Adolescent Development. Pearson.
14. Woolfolk, A., & Vij Shivani (2017). Educational Psychology. Pearson.

M. A. – III SEMESTER (PSYCHOLOGY)
GROUP - B
PAPER – XIV (OPTIONAL)
BASICS OF PSYCHOLOGICAL GUIDANCE AND COUNSELLING – 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 Introduction

Nature, Need and Functions of Guidance. Principles of Guidance.
Individual and Group Approaches.

UNIT – II Techniques of Appraising the Client – I

Non-Standardized Methods: Anecdotal Record, Auto Biography, Case Study,
Sociometric, Observation, Rating Scale, Questionnaire.

UNIT – III Techniques of Appraising the Client -II

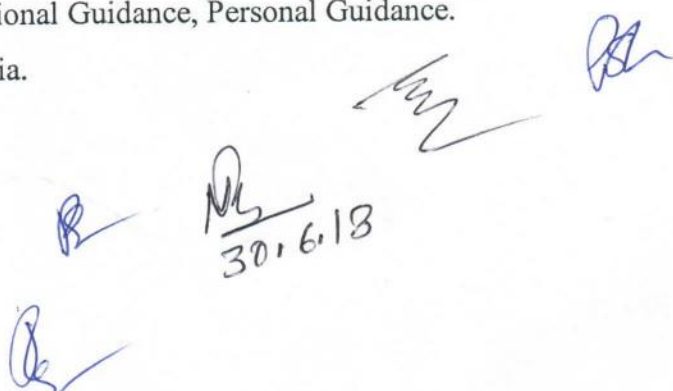
Standardized Methods: Intelligence, Personality Aptitude, Interest,
Achievement.

UNIT – IV Organization of a Guidance Programme

Duties and Responsibilities of the Guidance Personnel, School,
Duties and Responsibilities of Family and Community. Individual and Group
Guidance


UNIT – V Special Areas of Guidance

Vocational Guidance, Educational Guidance, Personal Guidance.
Problems of Guidance in India.


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BOOKS RECOMMENDED

1. Anastasi, Z. (1992). Psychological Testing (Seventh Ed.). New York, McMillan.
2. Anastasi, Z., & Lewis, E.C. (1970). Counselling Psychology. New York, Holt Rinehart and Winster, Inc.
3. Gibson, R. L. & Mitchell, M. (2008). Introduction to Counselling and Guidance. New Delhi: Prentice Hall of India.
4. Harson, J. C. (1978). Counselling Processes and Procedures. New York, McMillan Publishing Co. Inc.
5. Kemp. C. G. (1970). Foundations of Group Counselling. New York, McGraw Hill.
6. Nystul, M. S. (2006). Introduction to Counselling: As an Art and Science Perspective. Allyn & Bacon.
7. Rappaport, D., Gill, M. M. & Schafer, R. (1968). Diagnostic Psychological Testing. (Revised edition, edited by Holt, R. R.) New York, International Universities Press.
8. Rao. S. N. (1981). Counselling Psychology. New Delhi, Tata McGraw Hill.
9. Siddiqui, M. H. (2008). Guidance and Counselling. APH Publishing.
10. Shrivastava, K. K. (2003). Principles of Guidance and Counselling. Kanishka Publishers, Distributors, New Delhi.
11. Steffler, B. (Ed.) (1965). Theories of Counselling. New York, McGraw Hill Book Co.
12. Warters, J. (1964). Techniques of Counselling. New York, McGraw Hill Book Co.


30.6.18

M. A. – III SEMESTER (PSYCHOLOGY)
GROUP - C
PAPER – XIII (OPTIONAL)
CLINICAL DIAGNOSIS – 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 Introduction

History and Current trends. Nature, Problems and Methods of Clinical Psychology. Professionals. Growth of the Branch. Growth in India.

UNIT – II Approaches

Psychodynamic, Behaviouristic, Humanistic, Cognitive and Socio-Cultural.

UNIT – III Diagnosis -I

Meaning of Psycho-Diagnosis. Types and Importance. Concept of Prognosis. Symptomatic vs. Dynamic. Symptomatic Diagnosis: ICD-10, DSM-IV (R).

UNIT – IV Diagnosis -II

Dynamic Diagnosis: Observation, Case History, and Interview.

UNIT – V Impressionistic Approach

Impressionistic Approach of Diagnosis: Informal Assessment, Sources of Errors in Impression Formation. Importance of Psychometric Approach.

BOOKS RECOMMENDED

1. Bholra, P. & Raghuram, A. (2016). Ethical Issues in Counselling and Psychotherapy Practice. Springer.
2. Carr, A. (2012). Clinical Psychology: An Introduction. Routledge.
3. Dalton, J. H., Elias, M. J., Wandersman, A. & Dalton, J. H. (2007). Community Psychology: Linking Individuals and Communities. Wadsworth, Thomson Learning US.
4. Davey, G. (2008). Clinical Psychology. Taylor & Francis, India Pvt Ltd, New Delhi.

5. DeRubeis R. J., Donald, K. and Routh, D. K. (1998). The Science of Clinical Psychology: Accomplishments and Future Directions. Google Books.
6. Gladding, S. T. (2017). Counselling: A Comprehensive Profession. Seventh Edition. Pearson.
7. Hecker, J. E. & Thorpe, G. L. (2007). Introduction to Clinical Psychology. Pearson Education.
8. Heiden, L. A. & Hersen, M. (1995). Introduction to Clinical Psychology 1st Edition. Springer.
9. Iscope, I., Block, B. L. & Spielberger, C. D. (1977). Community Psychology: Perspectives in Training and Research. NY: Appleton.
10. Kellerman, H. & Burry, A. (2009). Handbook of Psycho-Diagnostic Testing: Analysis of Personality in the Psychological Report. Springer.
11. Korchin, S. J. (1978). Modern Clinical Psychology: Principles of Intervention in the Clinic and Community. International Edition.
12. Korchin, S. J. (2004). Modern Clinical Psychology: Principles of Intervention in the Clinical and Community. 1st Edition. CBS Publisher.
13. Kumar, V. (2011). Clinical Psychology. Aadi Publications.
14. Mann, P.A. (1978). Community Psychology: Concepts and Applications. The Free Press.
15. Perkins, D. (2011). An Introduction to Community Psychology. Vanderbilt University.
16. Plante, T. G. (2010). Contemporary Clinical Psychology. John Wiley & Sons.
17. Pomerantz, A. M. (2017). Clinical Psychology: Science, Practice, and Culture 4th Edition. Sage Publications.
18. Rapaport, J. (1977). Community Psychology: Values, Research and Action. NY: Holt Rinehart.
19. Rappaport, J. & Seidman, E. (2000). Handbook of Community Psychology. Springer Science + Business Media, LLC.
20. Reich, S. M., Riemer, M, Prilleltensky, I. & Montero, M. (2007). International Community Psychology: History and Theories. Springer.
21. Walker, E. C. (1991). Clinical Psychology: Historical and Research Foundations. Springer Science + Business Media, LLC.
22. Wolman, B. B. (ed). (1965). Handbook of Clinical Psychology. Mc Graw Hills.

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M. A. – III SEMESTER (PSYCHOLOGY)
GROUP - C
PAPER – XIV (OPTIONAL)
PSYCHOTHERAPEUTIC COUNSELLING – 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 Psychotherapeutic Counselling Techniques

Techniques of Psychotherapeutic Counselling: Psychoanalytic, Behavioural.
Client Centred. 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

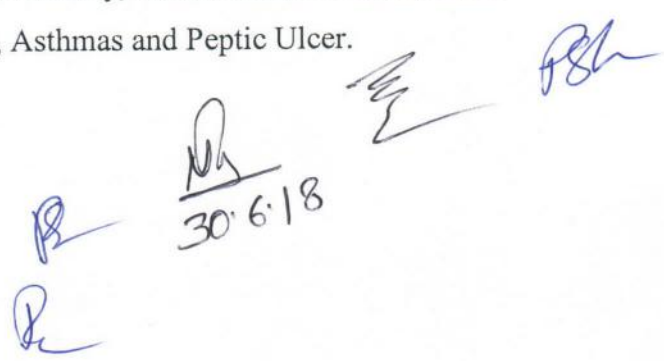
Excessive Smoking, Alcoholism, Drug Addiction and Temper-Outburst,
Physical Aggression.

UNIT – IV Methods of Altering Inappropriate Behaviour

Marital Maladjustment, Child Misbehaviour, Homosexuality, Exhibitionism.
Stress and Coping.


UNIT – V Methods for Altering Fears and Anxiety

Methods for altering Fears and Anxiety. Treating Psychophysiological
Disorders: Test-Anxiety, Generalized Anxiety, Stress, School Phobia, Snake
Phobia, Combination of Fears, CHD, Asthmas and Peptic Ulcer.


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BOOKS RECOMMENDED

1. Abate, L. & Milan, M. A. (ed.) (1985). Handbook of Social Skill Training and Research. New York: John Wiley & Sons.
2. Adelson, D. & Kalis, B. L. (1970). Community Psychology and Mental Health Perspectives. Seaton.
3. Carson, R. C., Butcher, J. N. & Mineka, S. M. (1999). Abnormal Psychology and Modern Life. Pearson.
4. Corey, G. (1986). Theory and Practice of Counselling and Psychotherapy. Monterey, C A.
5. Gelso, C J. Williams, E. N. & Fretz, B. R. (1995). Counselling Psychology. APA Books.
6. Ghosh, M. (2015). Health Psychology: Concepts in Health and Well-being. Pearson.
7. Iscoe, I., & Spielberger, C. D. (Eds.). (1970). Community Psychology: Perspectives in Training and Research. New York, Appleton-Century-Crofts.
8. Iscoe, I. Bloom, B. L. & Spielberger, C. D. (1977). Community Psychology in Transition. USA: Hemisphere Publishing Corporation.
9. Levine, M., Perkins, D. D. & Perkins, D. V. (2005). Principles of Community Psychology: Perspectives and Applications. Third Edition, New York, Oxford University Press.
10. Mann. A. P. (1978). Community Psychology: Concepts and Applications. Free Press.
11. Rennie, D. L. (1998). Person-Centred Counselling: An Experiential Approach. London, UK: Sage.
12. Tayler S. E. (2006). Health Psychology. Tata McGraw Hill, New Delhi
13. Toukmanian, S. G. & Rennie, D. L. (1992). Psychotherapy Process Research: Paradigmatic and Narrative Approaches. Thousand Oaks, CA: Sage.
14. Wolberg, L. R. (2013). The Technique of Psychotherapy. Fourth Edition, International Psychotherapy Institute E-Books.
15. Woolfe, R. & Dryden, W. (eds) (1996). Handbook of Counselling Psychology. Sage, London.

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M. A. – III SEMESTER (PSYCHOLOGY)
PAPER – XV (OPTIONAL)
PRACTICUM


M. M. – 100

NOTE: 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 (STM)
8. Effect of Group on Individual Judgement.
9. Mental Health

One Field Study

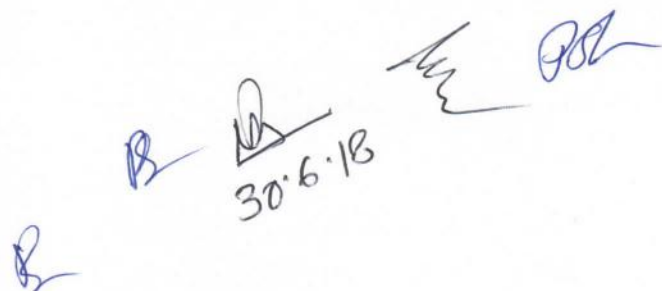



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M. A. – IV SEMESTER (PSYCHOLOGY)

S. No.	Paper No	Title of Paper	Marks		Time
			Theory	Internal Assessment	
16.	XVI	Life Span Development	80	20	Three Hours
17.	XVII	Psychological Assessment – II	80	20	Three Hours
Optional Papers: Two Papers from any One of the Three Groups					
Group A: Psychology of Management					
18.	XVIII	Organizational Behaviour - II	80	20	Three Hours
19.	IX	Human Resource Development and Management – II	80	20	Three Hours
Group B: Psychology of Education					
18.	XVIII	Educational and Instructional Psychology – II	80	20	Three Hours
19.	IX	Basics of Psychological Guidance and Counselling – II	80	20	Three Hours
Group C: Clinical Psychology					
18.	XVIII	Clinical Diagnosis and Community Mental Health – II	80	20	Three Hours
19.	IX	Psychotherapeutic Counselling – II	80	20	Three Hours
20.	XX	Practicum (Field Work)	100		Four Hours



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M. A. – IV SEMESTER (PSYCHOLOGY)

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 Introduction to Development

Introduction: Nature, Stages and Principles of Developmental Psychology, Maturation vs Experience; Nature- Nurture debate

Unit – II Theories of Development

Theories of Human Development: Psychodynamic, Psychosocial, Behaviourism, Social Learning, Cognitive, Socio-Cultural Theory of Development.

Unit–III Research Methods and Ethical Issues

Research Methodology in Development Psychology and Measurement Techniques, Research Design, Ethical Issues in Research on Child Development.

Unit – IV Foundations of Development

Biological foundation of Development, Development of Language and Communication. Emotional, Social, Personality and Moral Development.




Unit – V Development in Later Age

Adulthood, Middle and Old Age: Characteristics, Psychological Changes and Adjustment.

Books Recommended

1. Baltes, P. B. & Brim O. G. Jr. (1978). Life Span Development and Behaviour. New York Academic Press.
2. Baltes, P.B. & Brim O.G. Jr. (1979). Life Span Development and Behaviour (Vol. 2). New York Academic Press.
3. Baltes, P. B. & Brim O. G. Jr. (1980). Life Span Development and Behaviour (Vol. 3). New York Academic Press.
4. Baltes, P. B., Reese, H. W., & Lipsitt, L. P. (1980). Life-Span Developmental Psychology. *Annual Review of Psychology*, 31(1), 65-110.

5. Baltes, P. B. & Brim O. G. Jr. (1981). Life Span Development and Behaviour (Vol. 4). New York Academic Press.
6. Baltes, P. B. & Brim O. G. Jr. (1983). Life Span Development and Behaviour (Vol. 5). New York Academic Press.
7. Baltes, P. B. & Brim O. G. Jr. (1984). Life Span Development and Behaviour (Vol. 6). New York Academic Press.
8. Baltes, P. B. (1987). Theoretical propositions of Life-Span Developmental Psychology: On the Dynamics between Growth and Decline. *Developmental Psychology*, 23(5), 611.
9. Brophy, J. E., & Willis, S.L. (1981). Human Development and Behaviour. New York: St. Martin's Press.
10. Hurlock, E. (2017). Developmental Psychology: A Life-Span Approach. Tata McGraw Hill Education (5th Ed.).
11. Keenan, T. & Evans, S. (2009). An Introduction to Child Development. London: Sage Publications.
12. Papalia, D., Olds, S. & Feldman, R. (2017). Human Development. McGraw Hill Education, (9 Edition).
13. Thomas, M. R. (2000). Recent Theories of Human Development. Thousand Oaks: Sage Publication Hill.

 
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PAPER – XVII (COMPULSORY)
PSYCHOLOGICAL ASSESSMENT - 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 be answer one question from each unit.

UNIT – 1 Measurement of Intelligence

Concept and Measurement of Intelligence, Major Tests of Intelligence developed under Western and Indian Cultural set up.

UNIT – II Measurement of Aptitude Test

Concept and Measurement of Aptitude Test. Major Test of Aptitude Developed under Western and Indian Cultural set up. Achievement Test: Concept and Measurement.

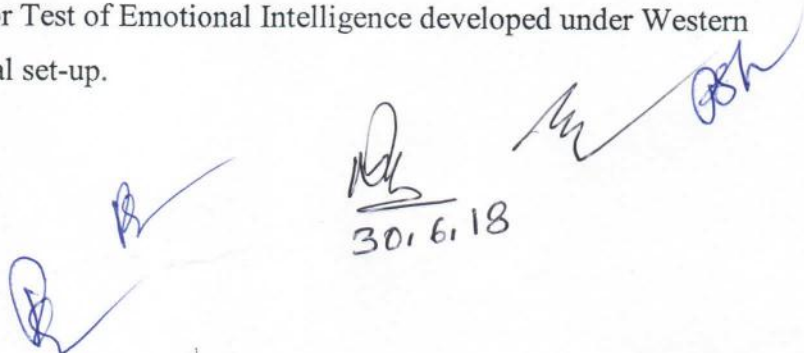
UNIT – III Test of Personality

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 development under Indian condition.

UNIT – V Psychological Testing in Applied Field

Psychological Testing in Applied Field: Neuro-Psychological Testing: Objectives and Major Neuropsychological Test. Emotional Intelligence Test: Concept and Major Test of Emotional Intelligence developed under Western and Indian Cultural set-up.


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BOOKS RECOMMENDED

1. Anastasi, A. (1988). Psychological Testing. London: Mc Millan Publishing Company.
2. Cronbach, L. J. (1997). Essentials of Psychological Testing. Pearson.
3. Freeman, S. (2018). Theory and Practice of Psychological Testing, 3/E. Oxford & IBH-Pubs Company-New Delhi.
4. Ghiselli, E. E. (1964). Theory of Psychological Measurement. Tata McGraw-Hill.
5. Goleman, D. (1996). Emotional Intelligence. Bantam Doubleday Dell Publishing Group.
6. Guilford, J. P. (1954). Psychometric Methods. New Delhi, Tata Mc Graw Hill.
7. Guilford, J. P. (1982). Psychometric Methods. New Delhi, Tata McGraw Hill.
8. Nunnally, J. C. (1970). Introduction to Psychological Measurement. Mc Graw Hill.
9. Nunnally, J. C. (1997). Psychometric Theory. Pearson, 5 Edition.
10. Nunnally, J. & Bernstein, I. (2017). Psychometric Theory. McGraw Hill Education.
11. Psychological Studies – 2004, Vol.-49.
12. Urbina, S. (2014). Essentials of Psychological Testing. John Wiley & Sons Inc.

GROUP - A

PAPER – XVIII (OPTIONAL)

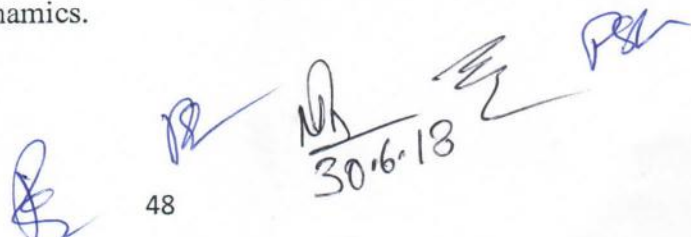
ORGANIZATIONAL BEHAVIOUR – II

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 Groups

Types of Groups, Processes, Group Culture and Social Influence, Team Building. Techniques of Building Group Consensus. Understanding and Managing Team Dynamics.

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UNIT – II Communication

Nature, Types, Application of different types of Communication, Role of T A in Communication.

UNIT – III Organizational Change

Types of Change, Sources of Change Process, Human Element in Change.

UNIT – IV Organizational Development

Concepts, objectives and Goals, Process Behavioural Science approach to Organizational Development.

UNIT – V Marketing

Marketing Research, Nature and Functions, Consumer Behaviour. Sales Promotion Strategies.

BOOKS RECOMMENDED

Drummond, H. (2000). Introduction to Organizational Behaviour. OUP Catalogue.

Greenberg, J. & Baron, R. A. (2008). Behaviour in Organizations. Upper Saddle River, N.J.: Prentice Hall.

Johns, G., & Saks, A. M. (2001). Organizational Behaviour: Understanding and Managing Life at Work.

Luthans, F. (1995). Organizational Behaviour. Mc Graw Hill International Edition.

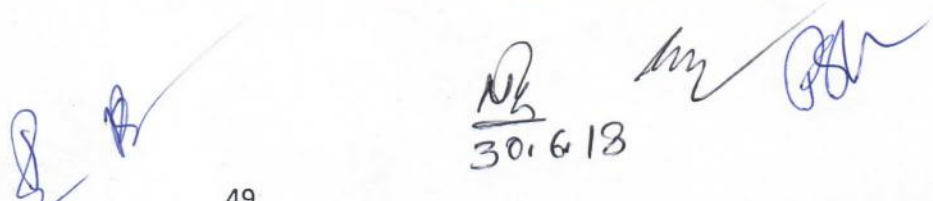
Luthans, F. (2011). Organizational Behaviour. The McGraw-Hill Companies, Inc.

Robbins, S. P. (2000). Organizational Behaviour (9th edition). Prentice Hall India, New Delhi.

Robbins, S.P. Organizational Behaviour: Concepts and Self-Assessment. Pearson College Division.

Robbins, S. P., Judge, T., & Breward, K. (2003). Essentials of Organizational Behaviour (Vol. 7). Upper Saddle River, NJ: Prentice Hall.

Wilson, F. M. (2018). Organizational Behaviour and Work: A Critical Introduction. Oxford University Press.

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GROUP - A
PAPER – XIX (OPTIONAL)
HUMAN RESOURCE DEVELOPMENT AND MANAGEMENT – 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 Job Evaluation

Job Evaluation, Wage and Salary Administration. Employment Incentives.

UNIT – II Human Resource Policies and Practices





Human Resource Policies and Practices, changing trends in Work Environment, Developing the Human Resource.

UNIT – III Maintaining Human Resource

Maintaining Human Resource Safety and Health Stress Management, Labour Relations.

UNIT – IV Collective Bargaining, Employee Involvement, Employee Communication.

UNIT – V Employee Counselling. Challenges of Human Resource Management.


  
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BOOKS RECOMMENDED

Aswathappo. (2002). Human Research and Personnel Management. Tata McGraw Hill.

Bhattacharyya, D. K. (2011). Performance Management Systems and Strategies. Pearson Education India.

Cascio, W. F. (1998). Managing Human Resource. Delhi: Tata McGraw Hill.

Cascio, W. F. & Aguinis, H. (2010). Applied Psychology in Human Resource Management. Prentice Hall India Learning Private Limited; 6 Edition.

Cascio, W. & Nambudiri, R. (2010). Managing Human Resources: Productivity, Quality of Work Life, Profits. McGraw Hill Education; 8 Edition.

John O. Okpara, J. O. & Wynn, P. (2007). Human Resource Management Practices in a Transition Economy: Challenges and Prospects. Emerald Group Publishing Limited.

Johnson, G. & Scholes, K. (1996). Exploring Corporate Strategy. Prentice- Hall, New Delhi.

Miner, J. B. (1992). Industrial / Organizational Psychology. New York, McGraw Hill.

Pareek, U. & Rao, T. V. (2015). Designing and Managing Human Resources Systems. Oxford & IBH.

Pareek, U. (2017). Designing and Managing Human Resource Systems. Oxford & IBH Publishing Co Pvt. Ltd; 3rd edition.

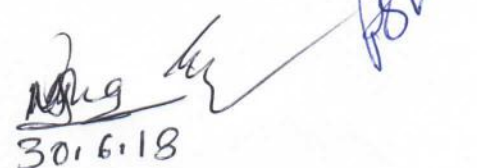
Pareek, U. & Rao, T. V. (2005). First Handbook of Psychological and Social Instruments. Concept Publishing Company.

Rao, T. V. (2015). Performance Management: Toward Organizational Excellence. SAGE Response; Second edition.

Pareek, U. & Khanna, S. (2016). Understanding Organizational Behaviour. Oxford University Press.

Robbins, S. P., Judge, T. & Vohra, N. (2016). Organizational Behaviour. Pearson.

Snell, S. & Bohlander, G. (2012). Human Resource and Management. Cengage Learning.



GROUP - B
PAPER – XVIII (OPTIONAL)
EDUCATIONAL INSTRUCTIONAL PSYCHOLOGY – 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 Teaching and Classroom Management

Effective Teaching and Classroom Management. Planning and Setting Objectives for Teaching. Characteristics of Effective Teachers.

UNIT – II Teaching Methods and Instruction

Teaching Methods, Instruction Lecturing and Explaining, Questioning, Student Centred Teaching Class Room Management and Teaching in Small Groups. Discussion Method and Cooperative Learning, Computer-Assisted Instruction.

UNIT – III Exceptionality and Social Education

Exceptionality and Social Education: Categories of Exceptionality, Labelling and Educational Relevance. Physically Disabled Students. Students with Cognitive Disabilities. Brain Dysfunction and Communication Disorders.

UNIT – IV Emotional and Behaviour Disorder

Students with Emotional and Behaviour 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 Measurement and Evaluation

Measurement and Evaluation: Educational Assessment, Measurement and Evaluation (Norm Referenced and Criterion Referenced Tests). Test Scores- Meaning and Types, Standardized Test: Meaning Types and Interpretation. Classroom Assessment and Grading. Techniques of Class Room Evaluation. Observation, Questionnaire.

BOOKS RECOMMENDED

1. Aruna, M. G. (2003). Educational Psychology. New Delhi: Neel Kamal Publications.
2. Best, J. W. (1992). Research in Education. New Delhi: Prentice Hall of India, Private Limited.
3. Borg, W. R., Gall, M. D. & Gall, M.D. (1997) Educational Research and Introduction. New York: Longman Inc.
4. Cecco, John P.De (1968). The Psychology of Learning and Instruction: Educational Psychology. Englewood Cliffs, N. J.: Prentice-Hall.
5. Cohen, L & Manion, L. (1989) Research Methods in Education. London: Routledge.
6. Crow, L. & Crow A (1991.) Educational Psychology. New Delhi: Eurasia Publishing Home.
7. Ellis, R. S. (1965). Educational Psychology: A Problem Approach Affiliated, New Delhi, East West Press.
8. Gage, N. L., & Berliner, D. C. (1998) Educational Psychology (6th ed.). Boston, MA: Houghton Mifflin.
9. Goswami, M. (2015). Essentials of Educational Psychology. Mahaveer Publications.
10. Meece, J. L., Anderman, E. M. & Anderman, L. H. (2006). Classroom Goal Structure, Student Motivation and Academic Achievement. Annual Review of Psychology, Vol. 57 (1), 487-503.
11. Sharma, R. A. (2010). Essentials of Educational Technology and Management. International Publishing House – Meerut.
12. Travers, J. F. (1979). Educational Psychology (2nd Ed.). Harper & Row, New York.
13. Travers, R. M. W. (1986). An Introduction to Educational Research. New York: The McMillan Publishing Company.
14. Woolfolk, A. H. (1993). Educational Psychology (6th Ed.) Allyn & Bacon, London/Boston.
15. Woolfolk, A. H. (2018). Educational Psychology. Pearson.

GROUP - B
PAPER – XIX (OPTIONAL)
BASICS OF PSYCHOLOGICAL GUIDANCE AND COUNSELLING – 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 Introduction

Nature, Need and Functions of Counselling. Counselling and Psychotherapy. Intervention, Goal and Objectives of Counselling. Characteristics of a Good Counsellor. Counsellor's Training.

UNIT – II Counselling Process and Counselling Skills

Stages in Counselling. Critical Issues in Counselling Process. Basic and Advanced Counselling Skills: Active Listening, Empathy, Probing, Working through thought Cognition, Affect and Emotion.

UNIT – III Approaches

Approaches of Counselling: Directive, Non-Directive, Eclectic. Individual and Group Counselling. Group Counselling Skills. Evaluation of Counselling. Follow-Up and Placement.

UNIT – IV Counselling in Special Settings -I

Educational Settings: Elementary, School, Secondary School, Institutions of Higher Education. Vocational Schools, Career Counselling, Employment Counselling

UNIT – V Counselling in Special Settings -II

Community and Mental Health. Pre-Marital and Marital Counselling. Family Counselling. Gerontology Counselling. Special Populations: Suicide, HIV-AIDS, Sexual Abuse.

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BOOKS RECOMMENDED

1. American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental Disorders (DSM-5 (R)). American Psychiatric Association Publishing; 5th Revised edition.
2. Anastasi, Z., & Lewis, E. C. (1970). Counselling Psychology. New York, Holt Rinehart and Winster, Inc.
3. Berms, C. (1999). Dealing with Challenges in Psychotherapy and Counselling (Skills, Techniques, & Process). Brooks Cole.
4. Bhatnagar, A. & Gupta, N. (1199). Guidance and Counselling, Vol. 1: A Theoretical Perspective. Vikas Publishing House Pvt. Ltd., New Delhi.
5. Bhatnagar, A. & Gupta, N. (1999). Guidance and Counselling, Vol. II: A Practical Approach. Vikas Publishing House Pvt. Ltd., New Delhi.
6. Corey, G. (2013). Theory and Practice of Counselling and Psychotherapy Perfect. Wadsworth; 9 Edition.
7. Corey, G., Haynes, R. H., Moulton, P. & Muratori, M. (2014). Clinical Supervision in the Helping Professions: A Practical Guide. American Counselling Association; 2 Edition.
8. Feltham, C., Feltham, C. & Hortan, I. (2006). The SAGE Handbook of Counselling and Psychotherapy. Sage Publications Ltd; Second Edition.
9. Gibson, R. L. & Mitchell, M. H. (2009). Introduction to Counselling & Guidance Learning: New Delhi: PHI, Pvt. Ltd.
10. Harson, J. C. (1978). Counselling Processes and Procedures. New York, McMillan Publishing Co. Inc.
11. Jones, R. N. (2012). Basic Counselling Skills: A Helper's Manual. Sage South Asia; Third Edition.
12. Jones R. N. (2012). Theory and Practice of Counselling and Therapy. SAGE South Asia; Fifth edition.
13. Jones R. N. (2012). Introduction to Counselling Skills: Text and Activities. SAGE Publications Ltd; Fourth edition.
14. Jones, R. N. (2014). Nelson-Jones' Theory and Practice of Counselling and Psychotherapy. SAGE Publications Ltd; Sixth edition.
15. Kapur, M. (1995). Mental Health of Indian Children. New Delhi: Sage Publications.
16. Kapur, M. (1997). Mental Health in Indian Schools. New Delhi. Sage Publications.

17. Kapur, M. (2011). Counselling Children with Psychological Problems. Pearson Education India.
18. Kemp. C.G. (1970). Foundations of Group Counselling. New York, McGraw Hill.
19. Lewis, E. C. (1970). The Psychology of Counselling. New York: Holt, Rinehart and Winston, Inc.

GROUP - C
PAPER – XVIII (OPTIONAL)
CLINICAL DIAGNOSIS AND COMMUNITY MENTAL HEALTH

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 Clinical Assessment

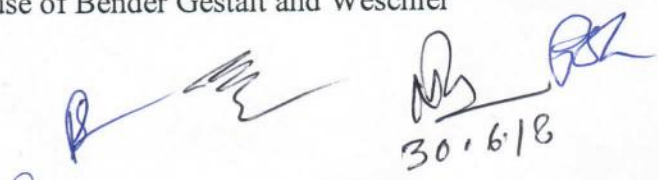
Clinical assessment: Basic principles, Psychometric Tests: MMPI, WAIS and WISC.

UNIT – II Projective Tests

Projective Tests: Characteristics and Clinical Use, Rorschach and TAT.

UNIT – III Neuro Psychological Examination

Neuro Psychological Examination: Approaches: Halstead Neuropsychological Test Battery, Luria Nebraska Battery, use of Bender Gestalt and Weschler Scale in Neuro Psychological Testing.


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UNIT – IV Community Psychology

Community Psychology: History and Perspectives of Community Psychology. Theoretical concepts of Community Psychology: Definition and Perspectives with Reference to Mental Health, Organizational Health and Social Action. Individual Wellness, Sense of Community, Psychological Sense of Community, Social Justice, Participatory Approach, Empowerment Citizen Participation, Collaborative Community Strength, Human Diversity and Empirical Grounding.

UNIT – V Community Psychology and Social Intervention

Community Psychology: Social Interventions: Methods and Strategies.

BOOKS RECOMMENDED

1. Carter, J. W. (1986). Research Contributions from Community Psychology in Community Health Behaviour Pub. NY.
2. Iscope, I., Block, B. L. & Spielberger, C. D. (eds) (1977). Community Psychology: Perspectives in Training and Research. NY: Appleton.
3. Korchin, S. (1978). Modern Clinical Psychology. Harper and Row.
4. Mann. A. P. (1978). Community Psychology: Concepts and Applications. Free Press.
5. Nelson, G., Kloos, B. & Ornelas, J. (2014). Community Psychology and Community Mental Health: Toward Transformative Change. Prints Publication.
6. Park, K. (2013). Park's Textbook of Preventive and Social Medicine. Banarsidas Bhanot-Jabalpur.
7. Rapaport, J. (1977). Community Psychology: Values, Research and Action. NY: Holt Rinehart.
8. Wolman, B. B. (ed). (1972). Handbook of Clinical Psychology. Mc Graw Hills.

GROUP - C
PAPER – XIX (OPTIONAL)
PSYCHOTHERAPEUTIC COUNSELLING – 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 Cognitive and Behaviour Therapies

Nature, Concept and Modes of Therapies: Individual and Group, Couple and Family. Behaviour Modification. Behavioural Therapy, Cognitive Behaviour Therapy, Rational Emotive Therapy. Integrative and Multi-Model Therapies.

UNIT II Assertiveness Training

Nature and Concept. Assertiveness Training. Developing Assertive Behaviour. Assertiveness through Personal Appearance, Improving Client's Grooming Modelling.

UNIT III Career Planning and Decision Making

Counselling for Career Planning and Decision Making. Theories of Career Development and Decision Making. Career Planning and Decision Making in Schools.

UNIT IV Psychological Interventions

Psychological Interventions Techniques. Rogers Client Centred Therapy. Family and Group Interventions and Wellness.

UNIT V Ethical Issues and Legal Concerns

Counsellors Accountability System. Ethical Issues, Legal Concerns of the Counsellors. Special Counselling Population: HIV- AIDS, Substance Abuse.

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BOOKS RECOMMENDED

1. Abate, L. & Milan, M. A. (ed.) (1985). Handbook of Social Skill Training and Research. New York: John Wiley & Sons.
2. Busch, F. N. (2018). Psychodynamic Approaches to Behavioural Change. American Psychiatric Association, Publishing.
3. Caligor, E., Kernberg, O. F., Clarkin, J. F. & Yeomans, F. E. (2018). Psychodynamic Therapy for Personality Pathology: Treating Self and Interpersonal Functioning. American Psychiatric Association, Publishing.
4. Carson, R. C., Butcher, J. N. & Mineka, S. (2000). Abnormal Psychology and Modern Life. Allyn & Bacon.
5. Corey, G. (2017). Theory and Practice of Counselling and Psychotherapy. Cengage Learning.
6. Corbett, F. C. (1977). The Community Involvement Program: Social Service as a Factor in Adolescent Moral and Psychological Development. Dissertation and Thesis. <https://digitalcommons.unomaha.edu/slcedt/5>, University of Nebraska at Omaha.
7. Dewan, M.J., Steenbarger, B. N. & Greenberg, R. P. (2018). The Art and Science of Brief Psychotherapies: A Practitioner's Guide, Third Edition. American Psychiatric Association Publication.
8. Gelso, C. J. & Fretz, B. R. (1995). Counselling Psychology, Bangaluru. Prism Book Ltd.
9. Iscoe, I. Block, B.L. & Spielberger, C.D. (eds.) (1977): Community Psychology: Perspectives in Training and Research. N.Y: Appleton.
10. Levine, M., Perkins, D. D. & Perkins, D. V. (2005). Principles of Community Psychology: Perspectives and Applications.
11. Mann, A. P. (1978): Community Psychology: Concepts and Applications. Free Press.
12. McBride, D. M. & Cutting, J. C. (2015). Lab Manual for Psychological Research. Revised Third Edition. SAGE Publications, Inc.
13. Simel, D. L. & Rennie, D. (2009). The Rational Clinical Examination: Evidence-Based Clinical Diagnosis. McGraw-Hill Education / Medical; 1 edition.
14. Toukmanian, S. G. & Rennie, D. L. (1992): Psychotherapy Process and Research. Sage. Psychology. (Editor) SAGE Publications.

15. Wolberg, L. R. (1995). The Technique of Psychotherapy. Jason Aronson, Inc.; Fourth edition.
16. Wolberg, L. R. (1977). The Technique of Psychotherapy, 3rd edition, Parts 1 and 2, Grune & Stratton, New York City.
17. Wolberg, L. R. (2013). The Technique of Psychotherapy. Fourth Edition. International Psychotherapy Institute E-Books.
18. Woolfe, R. & Dryden, W. (eds) (1996). Handbook of Counselling Psychology. Sage Publications.
19. Woolfe, R., Strawbridge, S., Douglas, B. & Dryden, W. (2009). Handbook of Counselling Psychology, Third Edition, Sage Publications.

PAPER – XX (OPTIONAL)
PRACTICALS (COMPULSORY)

M. M. - 100

FIELD STUDY

This part of the practical paper comprises of completion of two Field Studies, and two tests, one from the area of compulsory papers and another from the area of optional papers of the special groups. Administration, Scoring and Interpretation of various test results should be done. The optional group prescribed along with the areas of specialization given below:

Group ‘A’ Psychology of Management

- Communication Network
- Emotional Intelligence
- Job Satisfaction / Job Analysis
- Management Style
- Occupational Stress
- Organizational Structures
- Role Conflict / Role Stress

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Group 'B' Psychology of Education

- Academic Stress
- Exceptional Children
- Learning Style /Thinking Style
- Need of Guidance: Educational/ Vocational
- Test Anxiety
- Youth Problem

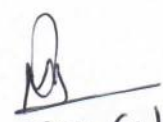
Group 'C' Clinical Psychology

- Adjustment
- Intelligence (Verbal / Non- Verbal)
- Mental Health
- Depression
- Personality
- Rorschach Ink Block Test
- Well-Being

Note: Besides the above, the candidate has to complete any two of the following in detail.

- Case Study
- Construction of a tool on a theme
- Construction of Questionnaire
- Steps of Clinical Interview
- Designing any OD intervention




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Suggested Readings

List of Books in English and Hindi

Semester I & II

Cognitive and General Psychology

- Best, J. B. (1992). Cognitive Psychology .3rd Edition. West Publishing Company.
- Feldman, R. S. (2008). Essentials of Understanding Psychology. Pearson Education; Eighth edition.
- Feldman, R. S. (2008). Understanding Psychology. McGraw-Hill, Higher Education; 9th edition.
- Feldman, R. (2010). Development across the Lifespan. Pearson Education: Delhi.
- Feldman, R. S. (2013). Understanding Psychology. McGraw-Hill, Higher Education; eleventh edition.
- Galotti, K. M. (2001). Cognitive Psychology in and outside of the Laboratory. 2nd Edition, Wadsworth.
- Goldstein, B. E. (2007). Sensation and Perception (7th Edition). Wadsworth.
- Harley, T. A. (2002). The Psychology of Language: From Data to Theory. Taylor Francis
- Hoeksema, S. N., Fredrickson, B. L. Loftus, G. R. & Lutz, C. (2015). Atkinson & Hilgard's Introduction to Psychology. Cengage India.
- Kellog, R. T. (2012). Fundamentals of Cognitive Psychology. SAGE South Asia; Second edition.
- Kosslyn, S. M. & Smith, E. E. (2015). Cognitive Psychology: Mind and Brain. Pearson Education India; 1 edition.
- Mangal, S. K. (2009). General Psychology. Sterling Publishers, Pvt. Ltd.
- Mangal, S. K. (2009). An Introduction to Psychology. Sterling Publishers.
- Matlin, M. W. (2008). Cognition (7th Ed.). CA: John Wiley & Sons.
- Naranjo, C. (2000). Gestalt Therapy: The Attitude and Practice of an Atheoretical Experientialism. Wales: Crown House Publishing Limited.
- Passer, M. W. & Smith, R. E. (2010). Psychology: The Science of Mind and Behaviour. New Delhi: Tata McGraw-Hill.

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Solso, R. L., MacLin, O. H. & MacLin, M. K. (2008). *Cognitive Psychology*. Pearson, Allyn and Bacon.

Social Psychology

Aronson, E., Wilson, T. D., & Akert, R. M. (2010). *Social Psychology* (7th ed.). Upper Saddle River, NJ: Prentice Hall.

Baron, R. A., Branscomb, N. R. & Byrne, D. (2009). *Social Psychology* (12th ed.). New York: Pearson Education.

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Baumeister, R. F. & Bushman, B. J. (2013). *Social Psychology and Human Nature*. Wadsworth.

Bhardwaj, G. (2011). *Fundamentals of Social Psychology*. Pearson Education India.

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Chiu, C., & Hong, Y. (2006). *Social Psychology of Culture*. New York: Psychology Press.

Cornelissen, R. M., Verma, S. & Misra, G. (2010). *Foundations of Indian Psychology, Volume one: Concepts and Theories*. Pearson, New Delhi.

Dalal, A. K. (2016). *Cultural Psychology of Health in India: Well-Being, Medicine and Traditional Health Care*. Sage Publications India Private Limited.

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Worcel, S., Cooper, J., Goethals, G. R. & Olson, J. M. (2000). *Social Psychology*. CA Wadsworth.

Research Methods and Statistics

Aron, A., Coups, E. J. & Aron, E. N. (2012). *Statistics for Psychology*. Pearson Education, Prentice Hall.

Chadha, N. K. (1991). *Statistics for Behavioural and Social Sciences*. Reliance Pub. House: New Delhi.

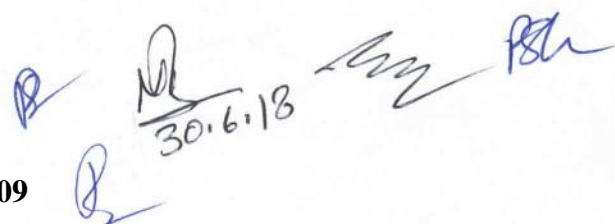
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Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics*. Sage Publications.

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Gravetter, F. J. & Forzana, L. A. B. (2009). *Research Methods for Behavioural Sciences*. United States: Wordsworth Cengage Learning.

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Kumar, R. (2014). *Research Methodology*. Sage Publishing; 4th Edition.

McCormick, K., Abbott, D., Brown, M. S., Khabaza, T., & Mutchler, S. R. (2013). *IBM SPSS Modeler Cookbook*. Packt Publishing.

Neuman, W. L. (2006). *Social Research Methods: Qualitative and Quantitative Approaches* (6th Ed.) Boston: Pearson Education.

Tripathi, L. B. (1985). *Psychological Research Methods*, Har Prasad Bhargav, Agra.

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Paneerselvam, R. (2013). *Research Methodology*. Prentice Hall India Learning Private Limited; Second edition.

Psychopathology and Health Behaviour

Ahuja, N. (2011). *A Short Textbook of Psychiatry*. JPB; seventh edition.

Allen, F. (2011). *Health Psychology and Behaviour*. Tata McGraw Hill Edition.

American Psychological Association (2009). *Publication Manual of the American Psychological Association*, 6th Edition.

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Bennett, P. (2006). *Abnormal and Clinical Psychology: An Introductory Textbook*. New York: Open University Press.

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David, B. H. & Durand, V. M. 7th Edition, e-book (2013). Abnormal Psychology. Cengage Learning India Edition.

Gabbarel, G. O., Beck, J. S., & Holmes, J. (2007). Oxford Text Book of Psychotherapy. New York: Oxford University Press.

Kearney, C. A. & Trull, T. J. (2012). Abnormal Psychology and Life: A Dimensional Approach. Cengage Learning.

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Snyder, C. R. & Lopez, S. J. (2007). Positive Psychology: The scientific and practical explorations of human strengths. Thousand Oaks, CA: Sage.

Taylor, S. E. (2014). Health Psychology. 9th Edition. New Delhi: Tata McGraw Hill.

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W H O (2004). The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines. AITBS Publishers and Distributors.

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Semester III & IV

Developmental Psychology

Feldman. R. S. & Babu, N. (2018). Development Across the Life Span. Pearson Education.

Hurlock, E. (1993). Developmental Psychology. Tata McGraw Hill.

Feldman, R. (2010). Development Across the Lifespan. Pearson Education: Delhi

Hurlock, E. (1993). Developmental Psychology. Tata McGraw Hill


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Personality Psychology

Adair, J. G. (2002). How International is International Psychology? *International Journal of Psychology*, 37, 160-170.

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Cornelissen, R. M. M. & Misra, G. & Varma, S. (2013). *Foundations and Applications of Indian Psychology*. Pearson Education.

Dalal, A. K. & Misra, G. (2010). *The Core and Context of Indian Psychology*. SAGE.

Fadiman, J. & Frager, R. (2005). *Personality and Personal Growth*. 6th Edition New York: Prentice Hall.

Misra, G. (2002). *Perspectives on Indigenous Psychology*. Concept Publishing Company.

Misra, G., Cornelissen, R. M. M. & Verma, S. (2010). *Foundations of Indian Psychology Volume 1: Concepts and Theories*. Pearson Education India.

Pandey, A. (2010). *Psychotherapy and Indian Thought. Science and Spirituality, Next Future*.

Rao, K. R. (2011). *Indian Psychology: Implications and Applications*. In Cornelissen, R. M. M., Misra, G., Varma, S. (Eds.), *Foundations of Indian Psychology: Theories and Concepts*, Vol. 1. New Delhi: Pearson.

Assessment

Anastasi, A. & Urbina, S. (2016). *Psychological Testing 7/e (Adaptation)*. Pearson Education India; Seventh edition.

Cohen, R. J. & Swerdlik, M. E. (2009). *Psychological Testing and Assessment*. McGraw-Hill Higher Education.

Gregory, R. J. (2014). *Psychological Testing: History, Principles, and Applications*. Pearson Education Limited.

Hussain, A. (2012). *Psychological Testing*. New Delhi Pearson Education.

Murphy, K. R. & Davidshofer, C. O. (2004). *Psychological Testing: Principles and Applications (6th Ed.)* New Jersey: Prentice Hall.

Palmer, J. O. (1983). *The Psychological Assessment of Children* New York: John Wiley and Sons.

Sattler, J. H. (1986). Assessment of Children. 3rd Ed. San Diego, Jerome, M. Sattler Publisher.

Singh, A. K. (2017). Tests, Measurements and Research Methods in Behavioural Sciences. Bharati Bhawan Publishers & Distributors; Fifth edition.

Educational Psychology

Aggarwal, J. C. (2014). Essentials of Educational Psychology. Pearson Education India.

Lahey, R. B. & Graham, J. E. (2000). An Introduction to Educational Psychology. 6th Ed., Tata McGraw Hill Publishers, New Delhi.

Mathur, S. S. (2016). Fundamentals of Guidance and Counselling. Vinod Pustak Mandir, Agra.

Misra, G., Jha, A. & Woolfolk, A. (2012). Fundamentals of Educational Psychology. Pearson Education India.

Rao, S. N. (2002). Educational Psychology. New Age International Pub; First edition.

Santrock, J. W. (2010). Educational Psychology. McGraw-Hill Education; 5edition.

Sharma, R. N. & Sharma, R. K. (2006). Advanced Educational Psychology. Atlantic Publishers.

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Woolfolk, A. & Woolfolk, H. A. (2008). Educational Psychology. Pearson, New Delhi.

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Guidance and Counselling

Gladding, S. T. (2017). *Counselling*. Pearson.

Gladding, S. T. & Batra, P. (2017). *Counselling: A Comprehensive Profession*. Pearson Education; Seventh edition.

Jones, R. N. (2012). *Theory and Practice of Counselling and Therapy*. SAGE South Asia.

Nayak, A. K. (1997). *Guidance and Counselling*. New Delhi: APH Publishing Corporation, New Delhi.

Peterson, J. V. & Nisenholz, B. (1995). *Orientation to Counselling*. Allyn and Bacon, Boston.

Rao, S. N. (2002). *Counselling and Guidance*. Tata McGraw - Hill Education.

Ranganathan, N. & Wadhwa, T. (2017). *Guidance and Counselling for Children and Adolescents in Schools (India)*. SAGE Publications, India, Pvt Ltd.

Sharma, R. A. (2001). *Fundamentals of Guidance and Counselling*. Meerut: R. Lall Book Depot.

Sharma, S. R. (2016). *Guidance and Counselling: An Introduction*. Vinod Pustak Mandir, Agra.

Taneja, V. B. (1972). *First Course in Guidance and Counselling*. Chandigarh: Mohindra Capital Publishers.

Clinical Diagnosis / Psychotherapeutic Counselling

Brewer, K. (2001). *Clinical Psychology*. Oxford: Heinemann Educational Publishers.

Corey, G. (2009). *Theory and Practice of Counselling and Psychotherapy*. (8th ed). Belmont, C. A: Brooks/Cole.

Culari, S. (1998). (Ed.) *Foundations of Clinical Psychology*. New York: Allyn & Bacon.

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Nystul, M. S. (2015). Introduction to Counselling: An art and science perspective. SAGE Publications

Page, A. C. & Stritzke, W. G. K. (2006). Clinical Psychology for Trainees: Foundations of Science informed Practice. New York: Cambridge University Press.

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Waters, J. (1964). Techniques of Counselling. McGraw Hill Book Co., Inc., New York.

Organizational Behaviour / Human Resource Management

Aamodt, M. G. (2001). Industrial / Organizational Psychology. New Delhi: Cengage.

Bhatnagar, J. & Budhwar, J. (2009). The Changing Face of People Management in India. London: Routledge.

Briscoe, D. R., Schuler, R. S. & Claus, L. (2009). International Human Resource Management: Policies and Practices for Multinational Enterprises (3rd Ed). New York: Routledge.

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Pareek, U. (2017). Designing and Managing Human Resource Systems. Oxford & IBH Publishing Co Pvt. Ltd; 3rd edition.

Prakash, A. (2011). Organizational Behaviour in India: An Indigenous Perspective. in G. Misra (Ed.), Handbook of Psychology. New Delhi: Oxford University Press.


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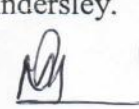
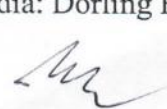
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Hindi

1. Singh, A. K. (2012). Uchchar Samanya Manovigyan: Advanced General Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
2. Singh, A. K. & Singh, A. K. (2013). Vyaktitva Ka Manovigyan: The Psychology of Personality. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India
3. Singh, A. K. (2015). The Comprehensive History of Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
4. Singh, A. K. (2015). Uchchar Samanya Manovigyan: Advanced General Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
5. Singh, A. K. (2016). Uchchar Naidanik Manovigyan: Advanced Clinical Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
6. Singh, A. K. (2016). Adhunik Asamanaya Manovigyan: Modern Abnormal Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
7. Singh A. K. (2017). Tests, Measurements and Research Methods in Behavioural Sciences. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
8. Singh A. K. (2017). Shiksha Manovigyan. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
9. Singh A. K. (2017). Manovigyan, Samajshastra tatha Shiksha mein Shodh Vidhiyan: Research Methods in Psychology, Sociology and Education. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
10. Singh, A. K. (2017). Sangyanatamak Manovigyan: Cognitive Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
11. Singh, A. K. (2017). Samaj Manovigyan Ki Rooprekha: An Outline of Social Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
12. Singh, A. K. (2017). Neuromanovigyan ke Mooltattva: Fundamentals of Neuropsychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
13. Suleman, M. (2014). Uchchar Samaj Manovigyan: Advanced Social Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
14. Suleman, M. (2014). Uchchar Shiksha Manovigyan: Advance Educational Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
15. Suleman, M. (2015). Samanya Manovigyan: Mool Prakriyain evam Sangyanatamak Prakriyain: General Psychology: Fundamental Processes and Cognitive Processes. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
16. Suleman, M. & Choudhary, V. K. (2014). Adhunik Audhyogik Evam Sangathanatamak Manovigyan: Modern Industrial and Organizational Psychology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.

17. Suleman, M. & Kumar, D. (2016). Sangathanatmak Vyavahar: Organizational Behaviour. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
18. Suleman, M. & Kumar, D. (2017). Manorog Vigyan: Psychopathology. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
19. Suleman, M. & Touwab, M. (2017). Asamanya Manovigyan: Vishay aur Vyakhya. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.
20. Suleman, M. (2018). Manovigyan, Shiksha evam anya Samaajik Vigyanon mein Samkhyikee: Statistics in Psychology, Education and other Social Sciences. Motilal Banarsidass Publishers Pvt. Ltd., New Delhi, India.

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M.A. PSYCHOLOGY

[ANNUAL EXAM]

SYLLABUS

2018-19

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 & Distraction 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, Gender 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, Randomized block, 2X2 factorial design, Repeated measures (on one factor) Design : Graeco 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 (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 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 disease (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. (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 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 learning.

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: Approach Freud, Erikson, Adler. Trait: Approach Allpert, Cattell and Eysenck, Cognitive: Approach Kelly, Behavioural Approach 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 (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.
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 (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 - 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 Context 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 Models, 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, asthma 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, Monterey California, books colely 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)
PRACTICALS (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	40	100
	PAPER II – Counselling Theories and Techniques	40	100
B.	PAPER III – Field Exploration		
	1. Field Internship – 30	40	100
	2. Case Study Report – 70		
C.	PAPER IV – Laboratory Practical		
	1. Construction of Guidance tool – 30	40	100
	2. Psychological testing – 70		
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.

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. Alcohhal 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. Euresis
 - 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. Renhart 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.

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 ELIGIBLE 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	<hr/> 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	
<u>Group – A</u>					
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
<u>Group – B</u>					
	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 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 design.

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 writing with the help of Microsoft word,
Presentation preparation with the help of Microsoft Power Point,
Research paper search method
Database viz. Psycinfo, Medline, UGCinfo,
Plagiarism checker online software viz. duplichekar,
Statistical analysis software viz. SPSS, MS Excel, Strata.
UGC research related websites viz, UGC infolibnet, 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, Alcohol 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 (2nd Ed.) 1980.
4. Travers, J.F. : Educational Psychology (2nd Ed.) 1979.
5. Woolbtk, A.E. (1995), Educational Psychology (6th Ed.) Allya & Bacon, London/ Bostan.
6. Gage, N.L. & Berliner (1998). Education of Psychology (6th 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, Dysfunctional 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 Standard 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 WORK Syllabus

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 test.

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, PP 316-334
2. Psychometric Theory. Nunally, PP 151-188.
3. Psychometric Methods. Guilford, 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 Design in Behavioural Research. Milar Fastern. N. Delhi (1989)

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.

School of Regional Studies and Research

Syllabus

M.A. in Rural Development
Session: 2018-2020



Pt. Ravishankar Shukla University, Raipur -492010
Chhattisgarh, India

School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)
M.A. in Rural Development
Syllabus
2018-2020
Scheme of Examination

Session- 2018-2019

Sem.	Course Code	Name of the Paper	Teaching Learning Methodology	External Marks		Internal Marks		Credit
				Maxi.	Min.	Maxi.	Min.	
I	RD 101	Rural Development: Indian Context	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 102	Rural Development: Planning and Management	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 103	Rural Development Programmes and Evaluation	Lecture, ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 104	Rural Social Problem	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 105	Panchayati Raj and Rural Administration	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
Total (Sem.-I)				400		100		20
II	RD 201	Urban Planning	Lecture through ICT, Case Study, Group Discussion	80	16	20	4	4
	RD 202	Rural Economy & Industrialization	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 203	Rural Health Care	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 204	Scientific Research Methodology in Rural Development	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 205	Tribal Development	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
Total (Sem.-II)				400		100		20
Sub Total (Sem.-I + Sem.-II)				800		200		40

(Signature)
12/7/2018

(Signature)
12/7/18

(Signature)

Session- 2019-2020

Sem.	Course Code	Name of the Paper	Teaching Learning Methodology	External Marks		Internal Marks		Credit
				Maxi.	Min.	Maxi.	Min.	
III	RD 301	Communication and Extension in Rural Development	Lecture through ICT, Case Study, Group Discussion(Student Centric Approach)	80	16	20	4	4
	RD 302	Rural Social Development	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 303	Voluntary Action in Rural Development	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 304	Land Reforms and Rural Development	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 305	Dissertation: Project Report based on Field Work	Field Work, PLA, Collection of data, Analysis of data, Report writing	80	16	20	4	4
Total (Sem.-III)				400		100		20
IV	RD 401	Entrepreneurship and Rural Development	Lecture through ICT, Case Study, Workshop, Training, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 402	Natural Resources and Sustainable Development	Lecture through ICT, ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 403	Resources and Livelihood Management	Lecture through ICT, Case Study, Group Discussion (Student Centric Approach)	80	16	20	4	4
	RD 404	Internship	-	80	16	20	4	4
	RD 405	Presentation	-	80	16	20	4	4
Total (Sem.-IV)				400		100		20
Sub Total (Sem.-III + Sem.-IV)				800		200		40
Grand Total (Sem.-I + Sem.-II + Sem.-III + Sem.-IV)				1600		400		80

Choice Based Credit System (CBCS) 2018-20

Sem.	Course Code	Title of the Paper	Teaching Learning Methodology	External Marks		Internal Marks		Credit
				Maxi.	Min.	Maxi.	Min.	
II	CBCS 101	Applied Research Methodology Semester-II	Lecture, Case Study, Group Discussion	80	16	20	4	3
III	CBCS 102	Corporate Social Responsibility Semester-III	Lecture, Case Study, Workshop, Training, Group Discussion	80	16	20	4	3

Note:

1. In M.A., 80% marks in each theory paper will have questions in four parts as follows:
Part- A - MCQ-20 questions of 1 mark each.
Part- B - Very short answer in 2-3 sentences -8 questions of 2 marks each.
Part- C - Short answer within ≤ 75 words-8 questions of 3 marks each.
Part- D - Long answer using 150 words-4 questions of 5 marks each.
2. 20% marks in each subject, internal marks awarded to a student in any particular paper shall be based on his/her performance in all the tests, assignments and seminars conducted during a semester and shall be awarded (average of marks best two test in each paper) at the end of the semester.
3. The percentage of marks secured by a student in a particular paper shall be converted to a grade and grade point for that course by the university.
4. The Credit of the Core Subject is mandatory based on the Course selected.
5. Papers proposed under Choice Based Credit System (CBCS) may be obtained by the students of other departments and internal students in Semester – II & III as per the scheme.
6. CBCS will be run only when minimum ten students will opt. it.

ah *ash* *Amr*

M.A. in Rural Development

Session: 2018-19

Semester- I

Paper-I

Course Code: RD 101

Title: Rural Development: Indian Context

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the meaning, scope and historical background of rural development.
2. know the various programmes of rural development.
3. gain knowledge of rural development in Indian context and Asian countries.

Unit- I

Rural Development – An overview, Importance, Scope & Objectives, Traditional and Modern Concept of Development: Indicators of development; Theoretical approach to development (Marx, Rostov, Myrdal, International Dependence Theory).

Unit- II

Rural Demography, Rural Social Structure, Rural Economy Structure, Rural Poverty, Strategy of Rural Development.

Unit- III

Agrarian Movement, Land Reforms, Green Revolution, White Revolution, Agricultural Extension Services.

Unit- IV

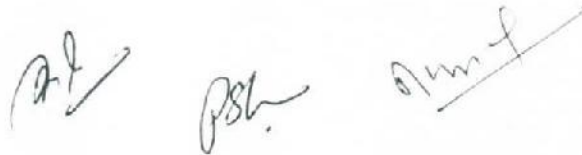
Various approaches to Rural Development – Gandhian approach for Community development, I.A.D.P., I.R.D.P., N.R.E.G.A., Neo Gandhian, (PURA), Need Based and Demand based centers. Rural Development experiences of some Asian Countries – China, Malaysia, Sri Lanka and Bangladesh.

Unit -V

Social Change: Mobility & Mobilization, Empowerment, Education and Communication, Information Technology and Rural Development.

Recommended Readings:

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 Statistics: 2007-08**. National Institute of Rural Development, Ministry of R. D., Govt. of India, Rajendra Nagar, Hyderabad – 30 July, 2008.
5. Prasad, B.K. **Rural Development: Concept, Approach and Strategy**. New Delhi: Sarup & Sons, 2003.
7. Rau, S.K. **Global Search for Rural Development**. Hyderabad: NIRD, 2001.
8. Satya Sundaram, I. **Rural Development**. Mumbai: Himalaya, 2002.



Paper - II
Course Code: RD 102
Title: Rural Development Planning and Management

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the concept and scope of rural development management.
2. identify the role of planning in rural development.
3. meaning of projects and project evaluation and development of planning in India.
4. identify the barriers of implementation of projects.

Unit- I

Planning for Rural Development: Definition, Planning Process, Stages 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, Role of Panchayati Raj, Gram Sabha.

Unit- III

Issues in Management of Rural Development Projects, Project Dimension, Identification and Formulation of Projects.

Unit- IV

Project Appraisal-I (Technical Feasibility), Project Appraisal-II (Economic Feasibility), Project Appraisal-III (Financial Feasibility)

Programme Implementation (Activity Planning and Network Analysis), Monitoring Development Projects, Project Evaluation.

Unit- V

Voluntary Effort in Rural Development, Voluntary Administration, Developing Community Based Programmes and Projects, Social Action, Formation and Strengthening of Voluntary Organisations, Role of Voluntary Organizations in Rural Development.

Recommended Readings:

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**. Hawaii: Ralph Ngalala Love East West Centre, 2000.
4. Sanyal, B.M. **India: decentralised planning, themes and issues**-New Delhi: Concept, 2001.
5. Sisodia, Yatindra. **Functioning of Panchayat Raj System**-New Delhi: Rawat Publications, 2005.
6. Sudhakar , V. **New Panchayati Raj System: Local Self-Government Community Development**. Jaipur: Mangal Deep Publications, 2002.
7. Mohanty , Bijoyini. **Financing The Grassroots Government**, New Delhi: A.P.H. Publishing, 2001.



Paper – III
Course Code: RD 103
Title: Rural Development Programme & Evaluation

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. know what impact various programmes have had on the poor and the rural areas.
2. understand the landmarks in educational development in rural areas.
3. understand the main objectives of the Drought Prone Areas Programme (DPAP) and the Desert Development Programme (DDP).

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

Deen Dayal Upadhyay – Gramin Kaushal Vikas Yojna, Pradhan Mantari Kaushal Vikas Yojna, Mukhiya, Mantari Kaushal Vikas Yojna Swarnajayanti Gram Swarozgar Yojana (SGSY)-1, Swarnajayanti Gram Swarozgar 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,. Integrated Wasteland Development Programme, Science and Technology for Rural Development, Evaluation of Rural Development Programmes through different community, Suggestion & Recommendation of Desert Development Programme.

Recommended Readings:

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 अँड कं. पब्लिशर्स, नागपूर 2005.
3. डॉ. झामरे जी. एन. **भारतीय अर्थव्यवस्था , विकास व पर्यावरणात्मक अर्थशास्त्र** पिंपळापुरे अँड कं. पब्लिशर्स, नागपूर 2006.
4. प्रा. निंबाळकर, संजिव के. **समाजकल्याण** केशव-कृष्णा प्रकाशन, 14 विद्यानगर, चंद्रपूर 2005.
5. यादव, रामजी **भारत में ग्रामीण विकास** अर्जुन पब्लिशिंग 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.

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Paper - IV
Course Code: RD 104
Title: Rural Social Problem

Maxi. Marks: 80
Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the problems of inequality and tribal issues.
2. know the role and status of women and violence against women.
3. identify the problems of land and displacement.

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, Constitutional provisions to solve the problems, government measures for development. Problems and Remedies of the backward classes, Disabilities problems.

Unit - III

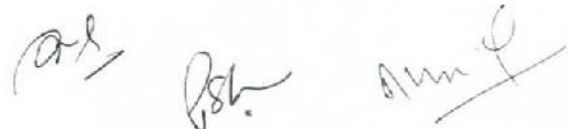
Role and Status of Women: Role of gender inequality, Status of women in different ages, nature of women disabilities in Indian society, Causes of women decline, Women's problem in present age.
Dowry: Meaning, Causes, Prohibition Act, Measures to eradicate dowry.
Domestic Violence: Meaning of violence against women, Nature of violence, Major causes of harassment.

Unit - IV

Problems related to Land: Types and techniques of farm production, Problems of land owners, Landless labours and artisans, Measures to reduce rural land issues, 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 to control migration.



Recommended Readings:

1. डॉ. कन्हाडे बी. एम. समाजशास्त्र : प्रश्न व समस्या पिंपळापुरे अॅण्ड कं. पब्लिशर्स, नागपूर 2009.
2. डॉ. महाजन, संजिव आधुनिक भारतमें समाजिक परिवर्तन अर्जुन पब्लिशिंग हाउस, अंसारी 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.

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BSB.

Paper - V
Course Code: RD 105
Title: Panchayati Raj and Rural Administration

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. know the rural development programmes, policies and acts.
2. know the thrust areas of Rural Development and Agricultural Extension Services.
3. understand the functions of Panchayat Raj System.

Unit - I

Programmes for Rural Development in India since Independence. Rural Development Policies during Planning period; Administrative structure. The Chhattisgarh Panchayat Raj Adhiniyam, 1993, PESA Act 1996. Five Year Plan. NITI Aayog.

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/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, Small holdings, Infrastructure, Role of Women in Rural Development, Marginalization of Women in Land Reform Agenda.



Recommended Readings:

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.

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Session: 2018-19
Semester-II
Paper - I
Course Code: RD 201
Title: Urban Planning

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the meaning, goals and objectives of urban planning.
2. know the theories of urbanization and concepts of compact city approach.
3. identify methods of urban and regional problems.

Unit – I

Urban Planning: Meaning and 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

Urbanization: Theories of Urbanization and Theories of City Development, Theories of urbanization including Concentric Zone Theory, Sector Theory, and 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.

Recommended Readings:

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.

PSB

PSB - Anand

Paper - II
Course Code: RD 202
Title: Rural Economy & Industrialization

Maxi. Marks: 80
Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are able to:

1. understand the concept and basic needs of rural economy and rural industrialization.
2. know the policies & programmes for rural industrial development during planning era.
3. measure the rural poverty and rural employment.

Unit - I

Rural Economy: 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

Policies & Programmes for rural industrial development during planning era.
Important programmes 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, Type of Unemployment in rural area. Rural employment programmes and its impacts & evaluation.

Unit - V

Rural poverty: Nature of Rural poverty causes, Measurement of poverty. Poverty eradication programmes and its outcomes, Need based education and training for rural youth, Development of Entrepreneurship abilities among rural students, Poverty eradication programmes and its impacts.

AN *Bsh.* *Amif*

Recommended Readings:

1. Satya. Sundaram. **Rural Development**. Mumbai: Himalaya, 2002.
2. Datt. Rudra & Sundharam **Indian Economy**. New Delhi: S. Chand, 2008.
3. Book by Gyanindra Dash and Rajan Kumar Sahoo, **Agriculture and Rural Economy**. 2009.
4. Barun Kumar Sahu, **Rural Development in India**. 2003.

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Paper - III
Course Code: RD 203
Title: Rural Health Care

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the concepts and components of health and health care services in rural India.
2. learn about various diseases and its prevention and controls.
3. get information about planning and management of rural health care services.

Unit- I

Health: Concepts and Components, Health and Development, Types of Health Care Services, 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) and Maternal and Child Health (MCH), Impact and Evaluation of RCH and MCH

Unit- V

Planning Rural Health Care Services, Management of Rural Health Care Services, Communication and Health Education: An Outline, NGO Experience in Health Care.



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Recommended Readings:

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.
3. Jacob C. Warren. **Rural Public Health: Best Practices and Preventive Models**. 2014
4. Charlene A. Winters, Helen Lee -**Rural Nursing: Concepts, Theory and Practice, Third Edition**. 2005.

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Paper - IV
Course Code: RD 204
Title: Scientific Research Methodology in Rural Development

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. explain the meaning, importance and purpose of research.
2. describe the nature of research and identify the areas of rural development in which research is being increasingly undertaken.
3. describe the steps in the sampling process and the various methods of sampling
4. write a research report.

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 Problem, Research Process II: Preparing a Research Proposal

Unit - III

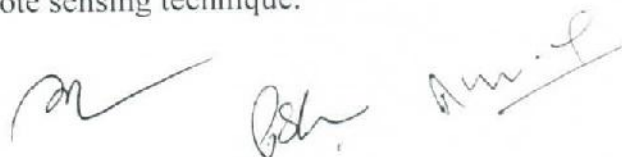
Scientific Methods of Social Research, Descriptive and Experimental Research Evaluation and Action Research, Naturalistic Inquiry and Case Study.

Unit - IV

Sampling: 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.



Recommended Readings:

1. Crabtree & 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.

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Paper – V
Course Code: RD 205

Title: Tribal Development (With special reference to Chhattisgarh)

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are able to:

1. know the geographical distribution of tribal population.
2. understand the concept and objectives, plans, programmes of tribal development.
3. critically review the forest policies of tribal and identify the problems of tribes.

Unit - I

Definition of Tribe, Characteristics, Classification – Geographical, Linguistics, Economic and Racial, Difference between Schedule Caste and Schedule 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, Kavar, Halba, Binjhar. Primitive Tribes of Chhattisgarh: Abujhmaria, Pahari Korwa, Kamar, Baiga, Birhor and Their Social Organization: Family, Marriage, Economic, Religious, Political, Youth Dormitories etc.

Unit – IV

Forest and Tribal's, Critical review of Forest policies, Deforestation and Tribal, 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.



Recommended Readings:

1. Elwin, V. **Muria and Their Ghotul: Kingdom of the Young** (abridged edition). New Delhi: Vanya Prakashan, 1991.
2. Elwin, V. **The Baiga**. New Delhi: Gyan Publishing House, 2002.
3. Elwin, V. **Maria, Murder and Suicide**. New Delhi: Vanya Prakashan, 1991
4. Vidhyarthi, L.P. & Rai, **The Tribal Culture of India**. New Delhi: Concept Publishing Company, 1985.
5. Husnain, N. **Tribal India**. Delhi: Palka Prakashan, 2006,
6. Grigson, Sir Wilfrid. **The Maria Gonds of Bastar**. New Delhi: Vanya Prakashan, 1991.
7. Verma, R.C. **Indian Tribes Through the Ages**. New Delhi: Publication, Division, Govt, of India, 1995.
8. Majumdar, D.N. **Races 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. नायडू. **भारत के आदिवासी विकास की समस्याएँ** नई दिल्ली: राधा पब्लिकेशन, 2002.

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Semester – III
Session: 2019-20
Course Code: RD 301

Title: Communication and Extension in Rural Development

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are able to:

1. understand the meaning, concept and communication process.
2. describe the principles of extension for effective execution of extension programme and list out the general and specific objectives of extension.
3. describe communication support in the context of rural development.

Unit – I

Meaning, Concept and Communication Process, 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 Extension, 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, Organizational Communication, Communication Strategies for Rural Development – Media Mix

A handwritten signature in black ink, appearing to read 'R. Anand' followed by a flourish and the initials 'B.S.'. The signature is written in a cursive style.

Recommended Readings:

1. Gamble, T.K. & Gamble, M , **Communication Works**, McGraw Hill. 2002.
2. Knapp, M.L. & Miller, G.R. **Handbook of Interpersonal Communication**, Sage Publications. 1985.
3. Melkote, Srinivas, **Communication for Development in the Third World**, Theory and Practice , Sage Publications. 1991.
4. Owen, Hargie, **The Handbook of Communication Skills**, Routledge, 2006.
5. Treholm, Sarah, **Thinking through Communication: AN Introduction to the Study of Human Communication**. Allyn & Bacon.1993.
6. Thompson, Neil, **Communication and Language: A Handbook of Theory and Practice'** Palgrave. Macmillan, 2003.
7. Morreale, Spitzberg & Barge, **Human Communication: Motivation, Knowledge and Skills**, Wadsworth: Thomson Learning, 2001.

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Paper – II
Course Code: RD 302
Title: Rural Social Development

Maxi. Marks: 80
Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are going to:

1. understand the overall status of rural women in India.
2. identify indicators that are commonly used to describe the health, nutrition and educational status of women & children.
3. describe the constitutional status of Scheduled Tribe & Scheduled Caste and assess their social and economic status in society.
4. describe the main aspects related to the development of scheduled castes and indicate their representation in services.

Unit - I

Rural Women: Status and Development Strategies, Education and Training for 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 Tribes, Bonded Labour, Development of Artisans and Landless Labourer.

Unit - V

Social Legislations on Children, Social Legislations on Women, Social Legislations on Scheduled Castes and Schedule Tribes, Other Social Legislations.

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Recommended Readings:

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.

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Paper – III
Course Code: RD 303
Title: Voluntary Action in Rural Development
(With special reference to Chhattisgarh)

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the essence and meaning of voluntarism and identify the theoretical assumptions of voluntarism.
2. make a critical assessment of the interrelations between market economy, voluntary effort and rural development.
3. identify the global voluntary effort in rural development and case studies of voluntary organizations in India.

Unit – I

Voluntarism – Theoretical Issues, Voluntary Associations in a Democratic Society, VOS, The State and Development – Delicate Relationship, Philosophy and Nature of Non-Profit Organizations.

Unit – II

Organization and Structure of VOs, Voluntary Agency, Administration and Management of Voluntary Organizations, Voluntary Organizations: Issues and Agenda for Social Transformation, Voluntary Organizations: Finance and Resource Mobilization.

Unit – III

Voluntary Effort in Rural Development – A Critical Appraisal, Nature and Types of Voluntary Organizations in Rural India, Problems faced by Voluntary Organizations in Rural Areas, Voluntary Organizations and Rural Development at Cross- Roads.

Unit - IV



State Sponsored Voluntary Organizations and Rural Development; Community Based Voluntary Organizations and Rural Development.

Unit - V

Global Voluntary Effort in Rural Development, Some Successful Case Studies of Voluntary Organizations in India (with reference to Chhattisgarh). Case studies on Phulbbai Devi Voluntary Organization, Grihini Voluntary Organization etc.

commended Readings:

1. G. Satyanarayana -**Voluntary Effort and Rural Development 1st Edition -2007**
2. Vinoda Parthasarathy - **The Voluntary Sector in Rural Development: Lessons from Social Marketing Based on Study of Ngos in South India ,2014.**
3. **The Hindu survey of Environment** 1993, 1994,1995,1996,1997,1998.
4. **The Hindu survey of Agriculture** 1993, 1994,1995,1996,1997,1998.
5. Mark A Robinson, **Evaluating the impact of NGOs in Rural Poverty Alleviation : Indian country study**, London: Development Institute, 2002.

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Paper – IV
Course Code: RD 304
Title: Land Reforms and Rural Development

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are will learn to:

1. understanding the meaning of land reform, its scope and importance and understand the need of land reform in rural development.
2. know the contributions of land reform in rural development and identify various issues concerning land reform.
3. understand the administration of land revenue, Panchayati Raj and land reforms.

Unit – I

Significance of Land Reforms in Rural Development, Origin and Development of Land Tenure Systems in India, Land Tenure Systems and Agrarian Structure – I

Land Tenure Systems and Agrarian Structure – II, Agrarian Structure and Agrarian Movements

Unit - II

Freedom Movement 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.



Recommended Readings:

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. Haphal (ed.). **Challenges of Liberalisation to Indian Agriculture**. Hyderabad: NIRD, 2002.
4. H.R. Yadav- **Village Development Planning**, 2009.
5. K. Venkata Reddy-**Agriculture And Rural Development Paperback**, 2012.

M. Anand Babu

Paper – V
Course Code: RD 305
Title: Dissertation: Project Report based on Field Work

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

The field based learning and writing dissertation should will proof of students' understanding of:

1. research design as applicable to a specific topic.
2. issues concerning sampling, quantitative and qualitative analysis of data.
3. compile the analyzed data and present in the form of a report.
4. get Hands-on-Field experience

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



10.4.2018

Session: 2019-20
Semester – IV
Paper – I
Course Code: RD 401

Title: Entrepreneurship and Rural Development

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. identify and respond to rural entrepreneurship needs.
2. learn about broader rural socio-economic issues and its impact on rural communities.
3. understand strategies incorporated in various plans to promote entrepreneurship in rural areas.
4. analyze the outcomes of the policies and strategies for promoting entrepreneurship in rural areas.

Unit- I

Rural Entrepreneur and Rural Entrepreneurship: Characteristics of an Entrepreneur, Distinction between an Entrepreneur and a Manager, Functions of an Entrepreneur, Theories of Entrepreneurship, Concept of Entrepreneurship, Growth of Entrepreneurship in India, Role of Entrepreneurship in Economic Development.

Unit- II

Women Entrepreneurship - Problems and Prospects Rural Entrepreneurship., Development and Entrepreneurship, Market-Economy and Entrepreneurship, Unleashing Rural Entrepreneurship, Problems faced by Rural Entrepreneur.

Unit- III

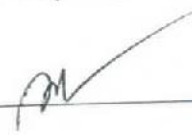

Entrepreneurship – Policies and Strategies, Types of Rural Entrepreneurship, Financial organizations for Rural Entrepreneur. Introduction to Micro & Small Enterprises, Role of Small Enterprises in Rural Development.

Unit- IV

Rural Entrepreneurship – Successful Experiences, Rural Entrepreneurship–International Experiences, Domains of Rural Entrepreneurship, Environmental scanning - Political , Economical, Sociological, Technological and analogical environment (PESTE) – MSME Act

Unit- V

Planning a Rural Enterprise, Human Resources and Infrastructure, Arrangement of Fund and Financial Management. Commercial Banks – Financial Institutions: IDBI, IFCL, IIBI, UTI, LIC, NABARD , SFCs, SIDCs, SIDBI, AND EXIM Bank, - Role of NSIC, SSIB SSICs, MSMEDI, DICs. Industrial Estates, Specialized Institutions, and TCO, Microfinance institutions – Venture Capital – Private equity – crowd funding. Managing a Rural Enterprise, Marketing Rural Products and Services



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Recommended Readings:

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.
5. Vijay Sathé, "**Corporate Entrepreneurship**" 1st edition, 2006, Cambridge.
6. S.s. Khanka, "**Entrepreneurial Development**", 2007, S. Chand & Co. Ltd.
7. Vasanth Desai, "**dynamics of Entrepreneurial Development and Management**", 2007, HPH.
8. Dr. Vasant Desai, "**Small Scale Industries and Entrepreneurship**" 2006, HPH.
9. P. Narayana Reddy, "**Entrepreneurship – Test and Cases**", 2010, 1st Ed. Cengage Learning.
10. S.R. Bhowmik and M.Bhowmik, "**Entrepreneurship 2007**" New Age International.



Paper – II
Course Code: RD 402

Title: Natural Resources and Sustainable Development.

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students will be able to:

1. identify the meaning ,types & importance of natural resources of natural resources.
2. understand the meaning and concept sustainable development.
3. know the forest resources and distribution, major forest types and water resources and its traditional management.

Unit-I

Natural Resources: Meaning and Types, Importance of Natural Resources, 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 traditional knowledge for sustainable development.

Unit-III

Energy and Sustainability. Non-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, Soil Pollution.

Recommended Readings:

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.
3. Marothia, D.K. and Nandi, D. 1994. **Degraded lands, Agroforestry and Energy Needs: Issues and Development Strategies**. In Punjab Singh, P.S. Pathak and M.M. Roy (Editors) (1994) **Agro forestry Systems for Sustainable Land Use**, New Delhi, Oxford & IBH. pp. 250-262
4. Marothia, D.K. 1993. Property Regimes and Institutional Arrangements: Concepts and their Relevance in Managing the Village Commons, *Indian Journal of Agricultural Economics*, 48(3) 557-565.
5. Marothia, D.K. 1993. **Rapporteur's Report on Tribal and Hill Economy**. *Indian Journal of Agricultural Economics*, 47(3) 567-578.
6. Marothia, D.K. 1992. **Village Irrigation Tanks: Institutional Design for Sustainable Resource Use**. *Agricultural Situation in India*, 47 (6) 479-487.

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Paper – III
Course Code: RD 403
Title: Resources and Livelihood Management

Maxi. Marks: 80

Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. understand the resources and rural livelihood management.
2. know the various government scheme for rural livelihood.
3. identify the resources and utilize it for sustainable livelihood.

UNIT – I

Livelihood: Meaning and Definition, Rural Livelihood: Nature and Scope, Indian Farmer and Role of Rural Economics for Indian Farmer, Green Revolution, White Revolution, Agricultural Mechanization, Animal Husbandry and effect on Rural Livelihood.

UNIT – II

Various Government Scheme -National Rural Livelihood Mission. Introduction, Objectives, Benefits and Role of Entrepreneurship in Livelihood.

UNIT – III

Organizational Development- SHGs, Types of SHGs, Procedure of Formation, Project Management for Livelihood-Cooperation and Meeting Arrangements

UNIT – IV

Rural Livelihood Management, Market- Definition, Types, Structure of Local Market, Types of Rural Livelihood, Interference and Methods, Value-addition and Marketing.

UNIT- V

Livestock Resources and Livelihood Management, Forest Resources, Farm based Livelihood and Non-Farm based Livelihood and Sustainable Livelihood.

Recommended Readings:

1. Bhattacharjee M.- **Sustainable Livelihood**. 2015.
2. Akango Raphael A. **Local Livelihoods and Rural Poverty Reduction: A Study of the Bolgatanga Handicraft Industry in the Upper East Region of Ghana**. 2010.
3. **Narasimhan Srinivasan G. State of India's Livelihood Report**. 2016.
- ✓ 4. Aradom Gebbrekidan A. **Emerging Towns and Rural Livelihoods**. 2010.
5. Ian Scoones Sustainable. **Livelihoods and Rural Development**. 2015.
6. Nora McNamara and Stephen Mors Sustainable- **Livelihood Approach: A Critique of Theory and Practice**. 2013.
7. Marothia, D.K., Pandey S., and V.K. Choudhry. **Irrigation Tanks in Chhattisgarh: Traditional Technology for Sustaining Rainfed Agriculture**. In S Singh and M.S.Rathore (Eds).**Rainfed Agriculture in India :Perspective and Challenges**, Rawat Pub. Jaipur, India. 2009.



Paper – IV
Course Code: RD 404
Title: Internship

Maxi. Marks: 80
Min. Marks: 16

Credit: 4

Learning Objectives:

Through the experience of 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 working place.
4. Develop the ability to work in group & co-ordinate at work place.

Duration of Internship will be 1.5-2 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 405: Presentation

Maxi. Marks: 80
Min. Marks: 16

Credit: 4

Learning Objectives:

At the end of the course the students are expected to:

1. learn public speaking and good presentation skills
2. learn how to face reply the public in their understandable manner on the work they did.



**School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)**

Choice Based Credit System for students of other department

Session: 2018-19

Course Code: CBCS 101

Title: Applied Research Methodology

Credit: 03

Learning Objectives:

At the end of the course the students are expected to:

1. explain the meaning, importance and purpose of research.
2. describe the nature of research and identify the areas of rural development in which research is being increasingly undertaken.
3. describe the steps in the sampling process and the various methods of sampling and define a probability sample and describe the various types of probability sample.
4. The course will be helpful in field training & writing a research report based on scientific method.

Unit-I

Social Research: Concept, Objectives, Types, Importance, Scope, Selection of Research problem, Hypothesis. Social Survey Method, Role of Social Scientist in Rural development, (participant observation, field work, cultural relativism) and holistic study.

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

Qualitative and Quantitative research, Research Design and its Types, Preparation of a research design. Sampling method and its types, 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.



Recommended Readings:

1. Crabtree & 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.

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**School of Regional Studies and Research
Pt. Ravishankar Shukla University, Raipur (C.G.)**

Choice Based Credit System for students of other department

Course Code: CBCS 102

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.

Learning Objectives:

At the end of the course the students are going to:

1. understand the meaning and definition of Corporate Social Responsibility (CSR).
2. know the implementation and impact of CSR practices on development.
3. understand the act, policies and laws of corporate social responsibility.

Unit-I

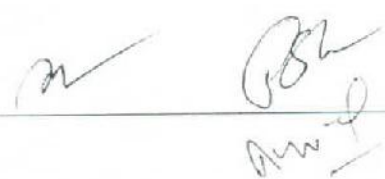
Corporate Social Responsibility: Meaning and Definition, Concept, Historical Evolution of CSR, Developmental Phases of CSR, Benefits and Criticisms, CSR and Strategic Branding in Rural India, CSR Practices in India, Impact of CSR Practices on Sustainable development, Generation of Employment,

Unit-II

Corporate and Rural Development, Public Private Partnerships, Stakeholder Engagement, Social Marketing, Environmental responsibility, National voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business, Impact of CSR Practices on Promotion of Education, Gender Equality and women empowerment, Improvement of Health services.

Unit-III

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,



Recommended Readings:

1. Jeremy M. **Corporate Social Responsibility: A Very Short Introduction**, 2014
2. Waddock, S. **Making a difference. Corporate responsibility as a social movement.**
Journal of Corporate Citizenship. 33, 35-46, 2009.
7. Sanjay K Agarwal **Corporate Social Responsibility in India**, 2008
8. Mishra and Puri, **Growth and Development**, Himalaya publishing house. 2004.
9. Nancy Lee and Philip Kotler -**Corporate Social Responsibility: Doing the Most Good for Your Company and Your Cause.** 2004

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1. Jeremy M. **Corporate Social Responsibility: A Very Short Introduction**, 2014
2. Waddock, S. **Making a difference. Corporate responsibility as a social movement.** **Journal of Corporate Citizenship.** 33, 35-46, 2009.
7. Sanjay K Agarwal **Corporate Social Responsibility in India**, 2008
8. Mishra and Puri, **Growth and Development**, Himalaya publishing house. 2004.
9. Nancy Lee and Philip Kotler -**Corporate Social Responsibility: Doing the Most Good for Your Company and Your Cause.** 2004

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