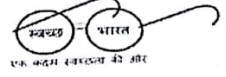


SCHOOL OF STUDIES IN CHEMISTRY



रसायन अध्ययन शाला
(DST FIST SPONSORED & UGC-SAP (DRS-II) ASSISTED
DEPARTMENT)
PT. RAVISHANKAR SHUKLA UNIVERSITY,
पं.रविशंकर शुक्ल विश्वविद्यालय रायपुर (छ.ग.)
RAIPUR-492010 (CHHATTISGARH)



क्रमांक / 12/रसायन अ.शा./2019

रायपुर, दिनांक 19.09.2019

सूचना

पंडित रविशंकर शुक्ल विश्वविद्यालय में संचालित समस्त अध्ययनशालाओं को सूचित किया जाता है कि च्वाईस बेस्ड पाठ्यक्रम के अंतर्गत रसायन अध्ययनशाला में संचालित Resonance Spectroscopy and Photochemistry and Nanochemistry and Its Applications विषय की कक्षाएं दिनांक 25.09.2019 से आरंभ होगी। च्वाईस बेस्ड पाठ्यक्रम तृतीय सेमेस्टर 2019 का सिलेबस विभागीय वेबसाइट में उपलब्ध हैं।

अतः उक्त च्वाईस बेस्ड पाठ्यक्रम के विषयों का चयन कर, आपके अध्ययनशाला में तृतीय सेमेस्टर में अध्ययनरत विद्यार्थियों के आवेदन दिनांक 20.09.2019 तक विभाग को अग्रेषित करने का कष्ट करें।

विभागाध्यक्ष
Head
School of Studies in Chemistry
Pt. Ravishankar Shukla University
RAIPUR (C.G.)

Name of SoS – School of Studies in Chemistry

Syllabus- Choice Based Syllabus(Third Semester)

Name of paper- RESONANCE SPECTROSCOPY AND PHOTOCHEMISTRY

Total Credit-03

Total Marks -80+20

RESONANCE SPECTROSCOPY,PHOTOCHEMISTRY AND ORGANOCATALYSIS

Elective Course

Choice Based Credit System in Master Course in Chemistry

- A. **ELECTRON SPIN RESONANCE SPECTROSCOPY** : Hyperfine coupling, spin polarization for atoms and transition metal ions, spin-orbit coupling and significance of g-tensors, application to transition metal complexes (having one unpaired electron).
- B. **NUCLEAR QUADRUPOLE RESONANCE SPECTROSCOPY**: Quadrupole nuclei, quadrupole moments, electric field gradient, coupling constant, splittings, applications.
- A. **PHOTOELECTRON SPECTROSCOPY** : Basic principle both for atoms and molecules; Photo-electric effect, ionization process, extraKoopman'sofsimplemolecules,theorem,Auger p electron spectroscopy, Determination of Dipole moment.
- B. **PHOTOACOUSTIC SPECTROSCOPY**: Basic principle of Photo acoustic Spectroscopy (PAS), PAS –gases and condensed system Chemical and Surface application.
- A. **PHOTOCHEMICAL REACTIONS** : Interaction of electromagnetic radiation with matter, Stern Volmer equation, types of excitations, fate of excited molecule, quantum yield, transfer of excitation energy, Actinometry.
- B. **DETERMINATION OF REACTION MECHANISM**: Classification, rate constatnts and life times of reactive energy states –determination of rate constants of reactions. Effect of light intensity on the rate of photochemical reactions.
- C. **MISCELLANEOUS PHOTOCHEMICAL REACTIONS** : Photo-Fries reactions of anilides, Photo-Fries rearrangement. Barton reaction. Singlet molecular oxygen reactions. Photochemical formation of smog. Photodegradation of polymers, Photochemistry of vision.
- A. **ORGANOCATALYSIS**
General Principles: Energetic, Catalytic cycles, catalytic efficiency and life time, selectivity. Type of organometallic reaction: Ligand substitution, Oxidative addition, reductive elimination and insertion and deinsertion. Homogeneous catalysis: Hydrogenation of alkenes, Hydroformylation, Monsanto acetic acid synthesis, Wacker oxidation of alkenes, Alkenes metathesis, Palladium-Catalysed C-C bond forming reactions, asymmetric oxidation. Heterogenous catalysis: The nature of heterogenous catalysts, Fischer-Tropsch synthesis, alkene polymerization.

BOOK SUGGESTED:

1. Infrared and Raman Spectra: Inorganic and Coordination Compounds, K. Nakamoto, Wiley.
2. Fundamentals of Photochemsitry, K.K. Rohtagi-Mukherji, Wiley-Eastern.
3. Essentials of Molecular Photochemistry, A. Gilbert and J. Baggott, Blackwell Scientific Publications.
4. Molecular Photochemsitry, N.J. Turro, W.A. Benjamin.
5. Introductory Phtochemistry, A. Cox and T. Camp, McGraw-Hill.
6. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson.
7. Application of Spectroscopy of Organic Compounds, J.R. Dyer, Prentice Hall.
8. Photochemistry , R.P. Kundall and A. Gilbert, Thomson Nelson.
9. Organic Photochemistry, J. coxon and B. Halton, Cambridge University Press.
10. Shriver& Atkins Inorganic Chemistry: P.Atkins, T.Overtone, J. Rourke, M. Weller, F. Armstrong, Oxford University Press
11. Inorganic Chemistry: C.E. Housecraft, A.G. Sharpe, Pearson Education Limited.
12. Inorganic Chemistry: Principles of Structure and Reactivity: J.E. Huheey, E.A. Keiter, R.L.Keiter, O.K. Medhi, Pearson Education

Name of SoS – School of Studies in Chemistry

Syllabus- Choice Based Syllabus (Third Semester)

Name of paper- CHEMISTRY OF BIOMOLECULES

Total Credit-03

Total Marks -80+20

CHEMISTRY OF BIOMOLECULES

Elective Course

Choice Based Credit System in Master Course in Chemistry

- A. **BIOENERGETICS:** Standard free energy change in biochemical reactions, exergonic, endergonic. Hydrolysis of ATP, synthesis of ATP from ADP.
 - B. **ELECTRON TRANSFER IN BIOLOGY:** Structure and function of metalloproteins in electron transport processes –cytochromes and iron-sulphur proteins, synthetic models.
 - C. **TRANSPORT AND STORAGE OF DIOXYGEN:** Heme proteins and oxygen uptake, structure and function of haemoglobin, myoglobin, haemocyanins and haemerythrin, model synthetic complexes of iron, cobalt and copper.
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- A. **METALLOENZYMES:** Zinc enzymes –carboxypeptidase and carbonic anhydrase. Iron enzymes – catalase, peroxidase and cytochrome P-450. copper enzymes- superoxide dismutase. Molybdenum oxotransferase enzymes –xanthine oxidase.
 - B. **ENZYME MODELS:** Host-guest chemistry, chiral recognition and catalysis, molecular recognition, molecular asymmetry and prochirality. Biomimetic chemistry, Cyclodextrin-based enzyme models, calixarenes, ionophores, synthetic enzymes or synzymes.
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- A. **ENZYMES:** Nomenclature and classification of induced enzyme. Fit hypothesis, concept and identification of active site by the use of inhibitors.
 - B. **CO-ENZYME CHEMISTRY:** Structure and biological functions of coenzyme A, thiamine pyrophosphate, pyridoxal phosphate, NAD⁺, NADP⁺, FMN, FAD, lipoic acid, vitamin B₁₂.
 - C. **BIOTECHNOLOGICAL APPLICATIONS OF ENZYMES:** Techniques and methods of immobilization of enzymes, effect of immobilization on enzyme activity, application of immobilization enzymes in medicine and industry. Enzymes and Recombinant DNA Technology.
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- A. **BIOPOLYMER INTERACTIONS:** forces involved in biopolymer interaction. Electrostatic charges and molecular expansion, hydrophobic forces, dispersion force interactions. Multiple equilibria and various types of binding processes in biological systems. Hydrogen ion titration curves.
 - B. **THERMODYNAMICS OF BIOPOLYMER SOLUTIONS:** Thermodynamics of biopolymer solution, osmotic pressure, membrane equilibrium, muscular contraction and energy generation in mechanochemical system.
 - C. **CELL MEMBRANE AND TRANSPORT OF IONS:** Structure and functions of cell membrane, ion transport through cell membrane, irreversible thermodynamic treatment of membrane transport and Nerve conduction.

BOOK SUGGESTED:

1. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.
2. Bioinorganic Chemistry, I. Bertini, H.B. Gray, S.L. Lippard and J.S. Valentine, University Science Books.
3. Inorganic Biochemistry vols II and I. Ed G.L. Eichhorn, Elsevier.
4. Principles of Bioinorganic Chemistry, S.J. Lippard and J.M. Berg, University Science Books.

5. Bioinorganic Chemistry, I. Bertini, H.B. Gary, S.J. Lippard and J.S. Valentine, University Science.
6. Inorganic Biochemistry vols I and II ed. G.L. Eichhorn, Elsevier.
7. Bioorganic Chemistry: A Chemical Approach to Enzyme Action, Hermann Dugas and C. Penny, Springer-verlag.
8. Understanding Enzymes, Trevor Palmer, Prentice Hall.
9. Enzyme Chemistry : Impact and Applications, Ed. Collin J Suckling, Chapman and Hall.
10. Enzyme Mechanisms Ed, M.I. Page and A. Williams, Royal Society of Chemistry.
11. Fundamentals of Enzymology, N.C. Price and L. Stevens, Oxford University Press.
12. Immobilized Enzymes: An Introduction and Applications in Biotechnology, Michael D. Trevan, and John Wiley.

13. Enzymatic Reaction Mechanisms, C. Walsh, W.H. Freeman.
14. Biochemistry: The Chemical Reactions of Living Cells, D.E. Metzler, Academic Press.
15. Principles of Biochemistry, A.L. Lehninger, Wroth Publishers.
16. Biochemistry, L. Stryer, W.H. Freeman.
17. Biochemistry, J. David Rawn, Neil Patterson.
18. Biochemistry, Voet and Voet, John Wiley.
19. Outlines of Biochemistry, E.E. Conn and P.K. Stumpf, John Wiley.
20. Bioorganic Chemistry : A Chemistry Approach to Enzyme Action, H. Dugas and C. Penny, Springer-Verlag.
21. Biochemistry and Molecular Biology of Plants, Buchanan, Grissem and Jones, I.K. International Pvt. Ltd.