

M. Sc. Chemistry

Programme Specific outcomes

At the time of post graduation, the students will be able to-

PO1: Develop critical thinking ability to solve problems in chemistry

PO2: Demonstrate and understand major concepts in all disciplines of chemistry

PO3: Perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on the obtained results and draw reasonable accurate conclusion

PO4: Present Scientific and technical information resulting from laboratory experimentation

PO5: Use technologies/instrumentation to gather and analyze data

PO6: Acquire knowledge about physical aspects of atomic structure, dual behaviour reaction pathways with respect to time, various energy transformations, molecular assembly at nanoscale level, aspects of electrochemistry, molecular segregation using their symmetry

PO7: Learns about the potential uses of analytical, industrial, medicinal and green chemistry

Course Outcomes

F.Y M.Sc.

Semester I

CHE-101 Analytical Chemistry

Upon completion of the course, the students will be able to-

CO1: Explain different chromatographic techniques

CO2: Discuss basic separation techniques

CO3: Discuss role of analytical chemistry in various fields

CO4: Discuss the effect of pH and reagent concentration on the solvent extraction of metal chelates

CHE-102 Inorganic Chemistry

Upon completion of the course, the students will be able to-

CO1: Discuss the function of essential and trace element in biological system

CO2: Describe classification of point groups

CO3: Discuss in detail the mechanism involved in electron transfer reaction

CO4: Explain factors affecting stability constant

CO5: Describe in details synthesis of anticancer agents

CHE-103 Organic Chemistry

Upon completion of the course, the students will be able to-

CO1: .Explain the effect of conformation on reactivity

CO2: .Discuss various types of substitution reaction

CO3: Explain ambident nucleophile

CO4: Explain elements of symmetry

CHE-104 Physical Chemistry

Upon completion of the course, the students will be able to-

CO1: Describe thermodynamics of biological reaction

CO2: Explain theory of absolute reaction rates

CO3: Calculate ionic strength of solutions

CO4: Calculate solubility and solubility product of silver chloride in water

CO5: Calculate pH values of solutions of various concentration

Semester II

CHE-205 Spectroscopic method of analysis

CO1: Discuss different spectroscopic methods and their applications in the analysis of compound

CO2: Describe electromagnetic radiation

CO3: Explain in details photoelectron spectroscopy

CO4: Discuss the nuclear magnetic resonance spectroscopy

CHE-206 Inorganic Chemistry

- CO1: Discuss electronic spectra and magnetic properties of metal complex
- CO2: Describe methods of preparation, properties and structure of various compounds
- CO3: Explain the construction of tanabe- sugano diagram with suitable example
- CO4: Discuss the 18 electron rule
- CO5: Describe role of Orgel diagram

CHE-207 Organic Chemistry

- CO1: Explain general mechanistic consideration of rearrangement reactions
- CO2: Discuss mechanism of elimination reactions
- CO3: Explain mechanism of metal hydride reduction of saturated and unsaturated carbonyl compound in ester and nitrile
- CO4: Discuss ortho and para ratio

CHE-208 Physical Chemistry

- CO1: Discuss the properties of quantum mechanical operators
- CO2: Describe classification of solids on the basis of shapes and bonding
- CO3: Explain the effect of increase of voids on the crystals
- CO4: Explain the selection rule and spin orbital coupling

Laboratory course CHE-209 General and Analytical

- CO1: Analyze different components such as oil, coco-cola, bleaching powder
- CO2: Analyze COD in water

CHE-210 Inorganic Chemistry

- CO1: Separate metal ions from binary mixture
- CO2: Identify basic radicals

CHE-211 Organic Chemistry

- CO1: Describe single stage preparations of compounds

CO2: Analyze binary mixtures

CO3: Describe method of preparation of P-nitrobromobenzene from bromobenzene

CHE-212 Physical Chemistry

CO1: Explain instrumental techniques such as potentiometer, conductometer, colorimeter

CO2: Discuss Non- instrumental methods

CO3: Determine radius of molecule by viscosity measurement

CO4: Determine velocity constant of hydrolysis of ester

S.Y M.Sc.

Semester III

CHE-313 Structural elucidation by spectral methods

Upon completion of the course, the students will be able to-

CO1: Explain principles of H1 NMR, C13 NMR and Mass Spectroscopy

CO2: Solve Problems on UV, IR spectroscopy

CO3: Explain Principle of Massbauer spectroscopy, Quadrupole splitting

CO4: Explain Principle of ESR Spectroscopy, Hyperfine splitting, Kramer's degeneracy

CO5: Discuss elucidation of structure by spectral methods

CHEO-314 Organic Synthesis

Upon completion of the course, the students will be able to-

CO1: Explain reaction intermediates and preparation and uses of organometallic reagents

CO2: Explain mechanism of different reactions

CO3: Explain concept of oxidation and various oxidative reagents

CO4: Discuss uses organic reagents

CHEO-315 Asymmetric synthesis and Bio-organic chemistry

Upon completion of the course, the students will be able to-

CO1: Explain asymmetric hydroxylation and asymmetric reactions

CO2: Describe aspects of Bio-organic chemistry and enzyme chemistry

CO3: Discuss co-enzyme chemistry

CO4: Describe enzyme models, chiral recognition, cyclodextrins

CO5: Explain chiral pool, chiral auxiliary, asymmetric hydrogenation

CHEO-316 Photochemistry, Free radicals And Pericyclic reactions

Upon completion of the course, the students will be able to-

CO1: Explain concept of Free radical reactions

CO2: Discuss Pericyclic and Electrocyclic reactions

CO3: Describe Cyclo-addition reactions

CO4: Describe electro-cyclisation, sigmatropic rearrangements, photofries rearrangement

Semester IV

CHEO-417 Organic Synthesis: Retro-synthetic Approach

Upon completion of the course, the students will be able to-

CO1: Discuss Retro-synthetic analysis of different molecules

CO2: Describe disconnection approach, protecting group, C-C disconnections

CO3: Discuss ring synthesis, rearrangements, photochemistry in synthesis

CO4: Describe synthesis of 3,4,5,6 membered ring

CHEO-418 Advanced Organic and Heterocyclic Chemistry

Upon completion of the course, the students will be able to-

CO1: Discuss five member hetero-cycles and fused hetero-cycles

CO2: Describe mechanism of rearrangements and name reactions

CO3: Explain nomenclature of hetero-cycles

CO4: Describe fused heterocycles

CHEO-419 Chemistry of Natural Products

Upon completion of the course, the students will be able to-

CO1: Describe plant pigments and Biogenesis

CO2: Describe Terpenoids and carotenoids, coniine, nicotine, atropine, quinine and morpholine

CO3: Explain Diel's hydrocarbon, Bile acids, hormones

CO4: Explain Synthesis of Anthocyanins with mechanism

CHEO-420 Medicinal Chemistry

Upon completion of the course, the students will be able to-

CO1: Discuss Synthesis and utilities of different drug molecules

CO2: Describe types of drug, drug activity, drug absorption, distribution and deposition

CO3: Explain mechanism of drug action, classification of drugs

CO4: Discuss antibiotic, antidiabetic, antineoplastic drugs

CHEO-421 Laboratory Course- Qualitative analysis of ternary mixtures

Upon completion of the course, the students will be able to-

CO1: Explain ternary mixtures

CO2: Identify each component in ternary mixtures

CHE-422 Organic multistep preparations

Upon completion of the course, the students will be able to-

CO1: Describe thin layer chromatography

CO2: Explain multistep preparation with mechanism

CO3: Describe single stage preparation with mechanism

CO4: Describe re-crystallization of prepared compounds

CHE-423 Structure elucidation and green protocol

Upon completion of the course, the students will be able to-

CO1: Describe spectral analysis of organic compounds

CO2: Explain Concept of green synthesis and its importance

CO3: Describe principles of spectroscopy

CO4: Describe synthesis of compound by green method with mechanism

CHE-424 Project work

Upon completion of the course, the students will be able to-

CO1: Describe concept of synthesis, knowledge of project writing

CO2: Perform literature survey with experimental details

CO3: Describe step wise mechanism of synthesis of assigned compound