**MASTER OF SCIENCE (CHEMISTRY)**

**SEMESTER – I**

**CORE COURSE – I ORGANIC CHEMISTRY - I (21PCH01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Distinguish between different types of isomers, including enantiomers and diastereomers.

**CO2**: Learn the involvement of reactive intermediates and understand their structure and reactivity through various organic reactions.

**CO3**: Explore the knowledge of aromatic electrophilic substitution reactions

**CO4**: Gain knowledge of nucleophilic substitution in aliphatic and aromatic systems.

**CO5**: Learn the different types of alkaloids, glycosides, terpenes, etc.

**CORE COURSE – II: INORGANIC CHEMISTRY – I (21PCH02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Express the electron and bonding structures of captions, anions, and ionic compounds.

**CO2**:  Able to describe the stability of metal complexes.

**CO3**: Discussion on electronic spectra and magnetic properties of transition metal complexes

**CO4**: Recognise the correct methods for the assumption of inorganic reaction mechanisms.

**CO5**: Learn about the large family of clusters that contain boron.

**CORE COURSE – III: PHYSICAL CHEMISTRY-I (21PCH03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Understand the role of thermodynamic cycles.

**CO2**: Understand the role of internal energy, enthalpy, entropy, temperature, pressure, and specific volume thermodynamic properties.

**CO3**: Understand the rate of change associated with chemical change.

**CO4**: Quantum chemistry uses high-level mathematics as a tool to understand atomic and molecular structure and properties.

**CO5**: Generate groups given specific conditions.

**ELECTIVE-I: POLYMER CHEMISTRY (21PCHE01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Students will be able to understand the relationships between polymer molecular weight, molecular weight distribution, and the properties of polymeric materials.

**CO2**: Students will demonstrate an ability to distinguish different polymerization reactions and their mechanisms and kinetics.

**CO3**: Learn how actual polymerization is performed in the laboratory.

**CO4**: Students will also be able to analyse polymerization data and predict the conversion and molecular weight.

**CO5**: Students will improve and expand their skills in performing and analysing the thermal and mechanical properties of polymers.

**SEMESTER-II**

**CORE COURSE – V: ORGANIC CHEMISTRY - II(21PCH04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Learn the fundamentals of symmetry, the nature of bonding, and the structure of molecules.

**CO2**: Interpret the concept of aromaticity and the main properties of aromatic compounds.

**CO3**: Gain an understanding of photochemical processes in organic synthesis.

**CO4**: Conservation of orbital symmetry and what conrotatory and disrotatory mean

**CO5**: Describe and apply stereochemical concepts such as hilarity, stereoisomerism, and stereoselectivity in relation to chemical transformations.

**CORE COURSE – V: PHYSICAL CHEMISTRY-II (21PCH05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Explain the fundamental differences between classical and quantum statistics and learn about quantum statistical distribution laws.

**CO2**: recognising the rate of change and how it can be measured

**CO3**: Explain the adsorption process and its mechanisms on the surfaces.

**CO4**: Applying quantitative reasoning and problem-solving skills with quantum chemistry

**CO5**: Recognise the mathematical objects called groups.

**ELECTIVE – II: SPECTROSCOPY I (21PCHE03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Able to interpret atomic absorption spectroscopy

**CO2**: Important terms and theory of nuclear magnetic resonance spectroscopy and its applications to structural problems

**CO3**: Problems solved based on NMR to interpret structure

**CO4**: Problems solved based on MS spectroscopy to interpret structure

**CO5**: Learn photoacoustic spectroscopy based on the absorption of electromagnetic radiation by analysing molecules.

**CORE PRACTICAL L: ORGANIC CHEMISTRY PRACTICAL - I**

**(21PCHP01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Separate and purify products in organic reactions.

**CO2**: Create knowledge in the synthesis of organic compounds.

**CORE PRACTICAL-II: INORGANIC CHEMISTRY PRACTICAL-I**

**(21PCHP02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Analyse the rare earth elements qualitatively.

**CO2**: Combine procedures for the synthesis of inorganic complexes

**CO3**: Estimate the amount of metals by the colorimetric method.

**CORE PRACTICAL-III: PHYSICAL CHEMISTRY PRACTICAL-I**

**(21PCHP03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Carry out scientific experiments.

**CO2**: Use modern instrumentation and classical techniques to properly record the results of their experiment.

**CO3**: Analyse and apply the results of their experiments as analytical tools.

**SEMESTER-III**

**CORE COURSE-VI: ORGANIC CHEMISTRY - III (21PCH06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To learn addition to carbon-carbon multiple bonds, addition to carbon-hetero atom multiple bonds

**CO2**: Students can make use of different reagents in the organic synthesis of molecular rearrangements.

**CO3**: Identify an oxidation-reduction reaction based on changes in oxidation numbers across the chemical change.

**CO4**: Students should understand what a steroid is.

**CO5**: Get awareness of the principles and applications of ORD, CD, and mass spectrometry.

**CORE COURSE - VI: INORGANIC CHEMISTRY-II (21PCH07)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Understand the crystal structure, Miller indices, x-ray diffraction, and crystal defects.

**CO2**: Learn the crystal systems of diffraction and reciprocal space.

**CO3**: Known to the bonding types in crystals.

**CO4**: Identify and define various types of nuclear changes or processes, including fission and decay reactions.

**CO5**: Use proper isotopic notation to down-balance a nuclear reaction.

**CORE COURSE-VIII: PHYSICAL CHEMISTRY - III (21PCH08)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Evaluate the fundamentals of electrochemistry.

**CO2**: Recognise the electrochemical processes.

**CO3**: gives the basis for photochemistry as well as different types of spectroscopy.

**CO4**: Identify and explain the main similarities and differences between computational approaches.

**CO5**: The student will acquire basic knowledge of the interaction of radiation with matter.

**ELECTIVE –III: EXPERIMENTAL METHODS IN CHEMISTRY (21PCHE04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Get knowledge and information about the most general EM techniques and the relevant areas.

**CO2**: Able to interpret atomic absorption spectroscopy

**CO3**: Rigorous examination of the theory and practice of electroanalytical chemistry

**CO4**: Calculate the number of stages required for multiple-stage separation operations.

**CO5**: Understand advanced chromatographic and electroplate methods.

**SEMESTER-IV**

**CORE COURSE IX: INORGANIC CHEMISTRY –III (21PCH09)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Organometallic compound synthesis, structure, bonding, properties in the P block main group, transition metal

**CO2**: Have a good overview of the fundamental principles of organ transition-metal chemistry and know how chemical properties are affected by metals and ligands.

**CO3**: Able to use knowledge about structure and bonding issues to understand the stability and reactivity of simple organometallic complexes

**CO4**: Have insight into the use of modern methods to characterise organometallic compounds.

**CO5**: Know important applications of organometallic homogeneous catalysis in the production of large-scale and smaller-scale production

**ELECTIVE - IV: MEDICINAL CHEMISTRY (21PCHE06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Predict a drug's properties based on its structure.

**CO2**: Describe the factors that affect its absorption, distribution, metabolism, and excretion, and hence the considerations to be made in drug design.

**CORE PRACTICAL-IV: ORGANIC CHEMISTRY PRACTICAL- II (21PCHP04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Plan and conduct experiments for quantitative identification of organic compounds.

**CO2**: Identify the techniques involving drying and recrystallization by various methods.

**CO3**: Demonstrate the various techniques of preparation in two stages.

**CORE PRACTICAL-V: INORGANIC CHEMISTRY PRACTICAL-II (21PCHP05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Analyse the concept of analytical chemistry.

**CO2**: Estimate metal ions by the complexometric method.

**CO3**: Perform quantitative estimation of metals by the gravimetric method.

**CORE PRACTICAL-VI: PHYSICAL CHEMISTRY PRACTICAL-II (21PCHP06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Validate the theory of electrochemistry and the measurement of electrical conductance through the practical seasons.

**CO2**: Demonstrate the conduct of metric experiments.

**CO3**: Evaluate the results of physical chemistry experiments.

**CO4**: Apply the results of the experiments to the environment and other issues.