

## SEMESTER I

### ORGANOMETALLICS AND NUCLEAR CHEMISTRY

1. To understand about various organometallic compounds, their structure, synthesis, bonding and reactions.
2. To learn about the catalysis by organometallic compounds.
3. To study about bioinorganic compounds and their roles in biological systems.
4. To provide an insight on nuclear chemistry and their applications.

### STRUCTURAL AND MOLECULAR ORGANIC CHEMISTRY

1. To understand about the basic concept in organic chemistry.
2. To learn about various photochemical reactions and physical aspect of organic chemistry.
3. Students are enabled to understand about the stereochemistry of organic compounds and its various conformers.

### QUANTUM CHEMISTRY AND GROUP THEORY

1. To study about the various postulates of quantum mechanics and its applications.
2. To understand about the quantum mechanics of hydrogen like atoms.
3. To provide a basic understanding on group theory, symmetry of molecules and its applications.

### CLASSICAL AND STATISTICAL THERMODYNAMICS

1. To understand about the basic concepts of classical thermodynamics.
2. To introduce statistical thermodynamics.

## Semester II

### COORDINATION CHEMISTRY

1. To learn about the structural aspects, bonding in coordination complexes.
2. To give an insight on kinetics, spectral and magnetic properties of metal complexes.
3. To learn about the stereochemistry of coordination compounds.
4. To study about the coordination chemistry of lanthanides and actinides.
5. To qualitatively analyze various rare cations.

### ORGANIC REACTION MECHANISM

1. To learn about the various organic reaction mechanism.
2. To understand about the chemistry of carbanions, carbonations, carbenes, arynes, nitrenes and carbonyl compounds.
3. To study about the radical reactions and concerted reactions.
4. To quantitatively analyze various organic compounds.

### CHEMICAL BONDING AND COMPUTATIONAL CHEMISTRY

1. To expose the students to the field of computational chemistry, this is emerged as a powerful tool in chemistry.
2. To calculate certain quantities which are difficult to, by other experimental method.
3. To familiarize with programs like games.

### MOLECULAR SPECTROSCOPY

1. To lay a foundation on spectroscopic techniques and resonance spectroscopy.
2. To determine the quantity of ions using colorimetric methods.

## Semester III

### STRUCTURAL INORGANIC CHEMISTRY

1. To understand about the various solid state properties, electrical, magnetic and optical properties.
2. To study about the inorganic chains, rings, cages and metal clusters.
3. To learn about the chemistry of materials.

### ORGANIC SYNTHESIS

1. To understand the various organic reactions.
2. To learn about the modern synthetic method and reagent.
3. To introduce the basic concept to retrosynthetic analysis, protecting group chemistry, biosynthesis and biomimetic synthesis.
4. To learn about the construction of carbocyclic and heterocyclic ring system.

### CHEMICAL KINETICS, SURFACE CHEMISTRY AND PHOTOCHEMISTRY

1. To develop a deeper knowledge in chemical kinetics, mechanism of heterogeneous catalysis, enzyme catalysis and its mechanisms.
2. To provide an insight into the topics surface chemistry, photochemistry.

### SPECTROSCOPIC METHODS IN CHEMISTRY

1. A better understanding on various spectroscopic techniques like ultraviolet-visible and chiroptical spectroscopy, infrared spectroscopy, NMR spectroscopy, Mass spectroscopy.
2. To learn about the structural elucidation using spectroscopic techniques.

## SEMESTER IV

### ELECTIVE COURSES

#### ADVANCED INORGANIC CHEMISTRY

1. With perception of providing better knowledge on inorganic spectroscopic methods, inorganic photochemistry and application of group theory.
2. A general introduction to nanomaterials.
3. To understand in depth about various analytical methods.
4. To gravimetrically analyze concentration of various ions.

#### ADVANCED ORGANIC CHEMISTRY

1. To apprehend more about supramolecular chemistry.
2. To grasp a better knowledge on green alternatives to organic chemistry.
3. To learn more about principles of Nano chemistry.
4. To understand more about the stereoselective transformations.
5. With an insight to introduce about the chemistry of natural products, biomolecules, medicinal chemistry and drug designing.
6. To introduce a basic concept on research methodology.
7. To prepare various organic compounds.

#### ADVANCED PHYSICAL CHEMISTRY

1. To lay a foundation on fluorescence spectroscopy.

2. To understand in depth about crystallography, gaseous state, electrochemistry and electromotive force.
3. To provide a better understanding on diffraction methods, atomic spectroscopic techniques and electroanalytical techniques.
4. To gain hands-on experience on various analytical techniques.