

## MSc. Chemistry Course Outcome

### **Inorganic Spectroscopy and Bioinorganic (Theory)**

Upon successful completion of this course, students should be able to-

1. Basic principle of Infrared, Raman, NMR, ESR, Mossbauer spectroscopy and mass spectrometry and their application in inorganic compound structure study.
2. Role of metal ions in the biological system, and diseases related to metal deficiency.
3. Application of thermodynamics in a biological system.

### **Organic Spectroscopy, pericyclic, and photochemistry (Theory)**

Upon successful completion of this course, students should be able to:

1. Familiarization with UV-visible, NMR, IR spectroscopy, and mass spectrometry and their application for the structural elucidation of organic compounds.
2. Comprehensive study of pericyclic reactions.
3. Study of the photochemistry of alkenes, carbonyls, aromatic compounds, and rearrangements.

### **Organic Synthesis (Theory)**

Upon successful completion of this course, students should be able to-

1. Describe methods for synthesis and transformation of functional groups, rearrangement reactions, and named reactions.
2. Describe stereochemical concepts and stereoselectivity in relation to chemical transformations. Identify, analyze, and evaluate synthetic routes to target molecules using retrosynthesis.

### **Environmental and Analytical Chemistry (Theory)**

Upon successful completion of this course, students should be able to-

1. Discussion of the basic concepts of environmental chemistry.
2. Understanding causes and solutions of the greenhouse effect and global warming phenomenon.
3. Study the causes and remediation of air pollution.
4. Study of chemical and environmental toxicology of chemicals.

### **Medicinal Chemistry (Theory)**

Upon successful completion of this course, students should be able to-

1. Describe the drug design, action of drug, and their structure-based classification.
2. Describe the concept of receptors, thermokinetics and thermodynamics.
3. Describe the antineoplastic agents, cardiovascular agents and psychoactive agents and antibiotics.
4. Understanding the chemical aspect of Vitamins and Hormones.
5. Describe the various stages involved in the development of a drug.

## **Chemistry of Materials (Theory)**

Upon successful completion of this course, students should be able to-

1. Describing the multiphase materials, glass, ceramics and composites.
2. Introduction of nanomaterials and their application.
3. Study of thin film techniques and their advantages.
4. Study of solid state devices, and molecular devices.

Describing the polymeric materials, liquid crystals and ionic conductors.

## **Polymers (Theory)**

Upon successful completion of this course, students should be able to-

1. Define related concepts of polymers and summarize the historical evolution of the polymers.
2. Evaluate the structure of polymers and recognize bonds between polymer chains.
3. Debate thermal character and affecting factors of thermal behaviours
4. categorize polymers and explain polymers' production and processing.

## **Research Aptitude in Chemistry (Theory)**

Upon successful completion of this course, students should be able to-

1. Understanding of the foundation of the research, research methodology, and formulation.
2. Learning method designing, literature survey, and error analysis.
3. Acquainting with the fundamental laboratory techniques and report writing.
4. Understanding research ethics and paper communication.

## **Inorganic Practical**

Upon successful completion of this course, students should be able to-

1. Inorganic preparation of double salts and coordination complexes.
2. Performing acid-base, redox, and precipitation titration.
3. Estimation of metal ions by colorimetry and spectrophotometry.
4. EDTA titration, and separation of ions by chromatography.

## **Organic Practical**

Upon successful completion of this course, students should be able to-

1. Separation, purification, and identification of a ternary mixture of organic compounds.
2. Learning multistep organic synthesis
3. Separation and identification of organic mixtures by chromatography
4. Structural elucidation by spectroscopic analysis.

## **Physical Practical**

Upon successful completion of this course, students should be able to-

1. Conductometric and potentiometric titration of acid and bases.
2. pH- metry titration of acid and bases.
3. Demonstration of colorimetry and polarimetry.
4. Learning computer applications in chemistry.

