

Course Title: Chemistry Core-1: General Inorganic Chemistry and Related Techniques of Analysis w.e.f. the session 2022-23 and onwards	
Class: M.Sc. Pt.-I / Semester-II	Course code: MCH-C201
Lectures: 60	Credits : 04
MM: 70	Exam Hours: 03

NOTE: The question paper shall consist of Two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer (about 150 words) type questions of SIX marks each and student shall be required to attempt any five questions. Sec.-B shall contain 08 descriptive type questions of TEN marks each and student shall be required to attempt any four questions. Both sections shall have questions from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

COURSE CONTENTS:

Unit - I

Interaction of radiation with matter:

Units of Radioactivity(Ci, Ru, Bq, Specific activity), units of radiation energy(rad, Gray,Röntgen, RDE, REM, Sievert),Measurements of activity, Geiger Muller counter, Proportional and scintillation counters, Application of Radioactive tracers, Isotopic dilution (IDA)and activation analysis(NAA).

Unit – II

Raman Spectroscopy :

Base Concepts of Raman Spectroscopy, Principle, instrumentation and applications. Fundamentals of ESR spectrum, E.S.R. spectra of transition metal complexes, spin Hamiltonian, Instrumentation and application of E.S.R. spectroscopy.

Unit - III

Principle, instrumentation and applications of Atomic absorption spectroscopy and atomic emission spectroscopy, flame photometric methods of estimation of alkali and alkaline metals, Nephelometry and Turbidimetry.

Unit - IV

Thermal Analytical methods :

Scope, classification, Principles, instrumentation and applications of Thermo gravimetric analysis, Differential thermal analysis and differential scanning calorimetry. Thermometric titrations.

Unit - V

Inductively Coupled Plasma:

Principle, Technique, Instrumentation and Applications. Analysis of mineralogical samples, Analysis of water, Applications in biological systems.

Suggested Readings:

1. Instrumental Methods of Chemical Analysis by: G.W.Ewing, Mc Graw Hill Book Company
2. A Text book of Quantitative Inorganic Analysis by: A.I.Vogel
3. Inorganic Thermogravimetric Analysis by: Duval
4. Modern Methods of Chemical Analysis by: R.L.Pecsok and L.D.Shields
5. Thermal Analysis by: Antonin Blazek

COURSE OBJECTIVES:

1. Interaction of radiation with matter
2. Raman Spectroscopy

3. Atomic absorption spectroscopy, Atomic emission spectroscopy, Nephelometry and Turbidimetry
4. Thermal Analytical methods
5. Inductively Coupled Plasma technique

COURSE OUTCOMES:

On completion of this course, student shall be able to:

CO 1: Categorize units of radioactivity on the basis of their practical utility. At the same time acquaintance to different techniques and apparatus for detection and measurement of radioactivity enhancing the knowledge in the field of nuclear chemistry.

CO 2: Understand the principle Recognize all components of the following instruments: Raman spectrophotometer, ESR spectrophotometer, Atomic Absorption spectrophotometer, Nephelo-turbidimeter and Inductively coupled plasma and interpret data from them.

CO 3: Know the capability and disadvantages of above mentioned techniques so as to be able to choose the most suitable technique, and optimize the conditions for sample. The analytical thinking ability gets feed by studying various spectroscopic techniques.

CO 4: Have in-depth understanding the principles and practical utility of thermogravimetry, differential thermal analysis and Differential scanning calorimetry.

Mapping of Course outcomes (COs) with Programme outcomes (POs)

Course outcomes/ Programme outcomes	1	2	3	4	5	6	7	8
CO 1	X		X		X	X		X
CO 2	X		X		X		X	X
CO 3			X		X		X	X
CO 4	X		X		X		X	X