

Course Title: DSC-Chemistry and Related Techniques of Analysis <i>w.e.f. the session 2025-26 and onwards</i>	
Class: PT.IV / SEM VIII	Course code: BCH-C801
Lectures: 60	Credits: 04
MM: 70	Exam Hrs: 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.

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). (10 Lectures)

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. (10 Lectures)

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. (10 Lectures)

Thermal Analytical methods :

Scope, classification, Principles, instrumentation and applications of Thermo gravimetric analysis, Differential thermal analysis and differential scanning calorimetry. Thermometric titrations. (10 Lectures)

Inductively Coupled Plasma:

Principle, Technique, Instrumentation and Applications. Analysis of mineralogical samples, Analysis of water, Applications in biological systems. (10 Lectures)

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 (COs)

CO:1 To understand the concept of Interaction of radiation with matter

CO:2 Theories of Raman & ESR Spectroscopy

CO: 3 Various concept and difference between Atomic absorption spectroscopy, Atomic emission spectroscopy

CO:4 Role of Nephelometry and Turbidimetry

CO:5 Studies various application of thermal analytical methods

CO:6 Principle, theories and application of Inductively Coupled Plasma

Mapping of course Outcomes (COs) with program outcomes (POs)

Course Outcomes/Program outcomes	1	2	3	4	5	6	7	8
CO:1	X	X			X		X	X
CO:2			X	X				X
CO:3		X	X				X	X
CO:4		X	X				X	
CO:5			X				X	X
CO:6		X	X				X	X

Note: put 'X' in relevant column of mapping