

20MSC509T					Analytical Chemistry II					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	0	0	0	2	25	50	25	--	--	100

COURSE OBJECTIVES

- 1 Acquisition the fundamental knowledge of advance analytical methods
- 2 Learning the basic principles of spectroscopic techniques.
- 3 Understanding and acquiring the necessary basic knowledge of chromatographic separation working of various chromatographic techniques
- 4 Attaining necessary basic knowledge of extraction procedures for practical application in various fields
- 5 Learning the basic electrochemical techniques and attaining the fundamental knowledge of potentiometry.

UNIT 1 Separation Techniques**8 Hrs.**

Types of separation techniques, solid (SLE), liquid liquid extraction (LLE), Technique for solvent extraction: batch extraction and continuous extraction, Extraction of lighter type or heavier type liquid, Working Methodology and Applications of extraction LLE, SPE, SPME, solid- liquid extraction factors influencing.

UNIT 2 Chromatography**10 Hrs.**

Fundamentals of chromatography, Definition of resolution, capacity factor, selectivity factor, dead time and dead volume. Types of chromatography depending upon mobile phase, instrumentation and separation TLC, HPTLC, Ion exchange, types of resin, working methodology and application of TLC, HPTLC and Ion exchange, instrumentation and working methodology and applications of HPLC & GC (Gas Chromatography), types of columns, packed columns, capillary columns, bonded phase columns.

UNIT 3 Introduction to Spectroscopy**12 Hrs.**

Interaction between Electromagnetic Radiation and Matter: Introduction to Electromagnetic Radiation, Interaction of Electromagnetic Radiation with Matter

Introduction to Atoms and Atomic Spectroscopy, Molecules and Molecular Spectroscopy: Rotational Transitions in Molecules, Vibrational Transitions in Molecules, Electronic Transitions in Molecules.

Absorption Laws: Beer Law

Methods of Calibration: Calibration with Standards, Method of Standard Additions, Internal Standard Calibration

Optical Systems Used in Spectroscopy: Radiation Sources, Wavelength Selection Devices, Filters, Monochromator

Resolution Required to Separate Two Lines of Different Wavelengths, Detectors, Single-Beam and Double-Beam Optics

UNIT 4 Electrochemical techniques**8 Hrs.**

Potentiometry - electrode systems, potentiometric titrations and applications

Max. 36 Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

CO1 - understand the basic principal of various separation techniques and will be able to distinguish and propose the appropriate technique for different types of analysis.

CO2 - Student will acquire the fundamental knowledge of spectroscopy and will be able to understand the principle behind spectroscopic instruments.

CO3 - Learn various type of chromatographic techniques and will acquire the basic knowledge of the instrumentation involved in these techniques.

CO4 – Students will learn methods of calibration of instruments involved in analytical chemistry and will be able to understand the basic optical systems of instruments.

CO5 - Students will be able to explain the working principal of potentiometric analysis and will be able to describe the working principle of electrodes in potentiometric techniques.

TEXT/REFERENCE BOOKS

1. Introduction to Spectroscopy by D.L. Pavia, G. M. Lampman, G. S. Kriz, Harcourt College Publisher, NY, 2001
2. Organic Spectroscopy by William Kemp, ELBS 3rd Ed. 1994.
3. Modern Analytical Chemistry, David Harvey, McGraw Hill, 2000.
4. Organic Spectroscopy, Kemp W. 5. Treatise on Analytical Chemistry: Vol I to VII – I. M. Kolthoff
5. Spectroscopic identification of organic compounds- R.M. Silverstein and G. C. Bassler
6. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming 8. Absorption spectroscopy of organic molecules- V.M. Parikh
7. Applications of spectroscopic techniques in Organic chemistry- P. S. Kalsi

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

- Part A/Question: 10 multiple choice questions 1 mark each
Part B/Question: 10 Questions of 2 marks each with internal choice
Part C/Question: 4 Questions of 15 marks each with internal choice
Part D/Question: 1 Questions of 10 marks with internal choice

Exam Duration: 3 Hrs

- 10 Marks
20 Marks
60 Marks
10 Marks