

PAPER CODE:1SC2030314	TITLE OF PAPER: ANALYTICAL CHEMISTRY -IV
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Course Objective: The purpose of this lesson is for students to investigate the characteristics of matter. The students will investigate mixtures and spectroscopic methods. Students will understand the concepts of solute, solvent, compound, element, and mixture based on their chemical and physical properties.

Teaching scheme (hours) per week		Credit		Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	-	4	-	60	40	-	-	100

UNIT	DISCRIPTION IN DETAIL	WEIGHTAGE
I	Atomic Absorption Spectrometry Introduction, Basic Principles, Instrumentation, interferences. Techniques for Quantification of Elements, Recent Developments and applications.	25%
II	Lasers Principle of laser operation, Stimulated emission population inversion, Single level and multi level laser systems, Properties of laser light and its general and analytical applications; ruby laser, He-Ne laser, CO ₂ laser, Use of laser radiation in absorption and fluorescence spectroscopic methods	25%
III	ICP AES (Inductive coupled Plasma Atomic Emission Spectrometry) ICP-AES, Introduction, Basic Principles, Instrumentation, interferences. Operation, Comparison with other technique and Applications.	25%
IV	(ICP MS), (Inductive coupled Plasma Mass Spectrometry) ICP MS Introduction, Basic Principles, Instrumentation, interferences. Operation, Comparison with other technique and Applications.	25%

LEARNING OUTCOMES

- Students can explain the principle and applications of atomic & emission spectroscopy.

- Students will investigate the characteristics of matter.
- Students can describe the principles of lasers
- The students will investigate mixture of components by using spectroscopic methods.
- Students will understand the concepts of solute, solvent, compound, element, and mixture based on their chemical and physical properties.
- Describe and explain the principle of operation of modern spectroscopic instrumentation.

REFERENCE BOOKS:

1. “Analytical Chemistry” by Gary D. Christian, 6th Edition, John Wiley and Sons Inc. New Jersey.
2. Lasers by A. E. Siegman
3. Principles of Lasers by Orazio Svelto
4. Lasers: Fundamentals and Applications by K. Thyagarajan, Ajoy Ghatak
5. Atomic Absorption Spectrometry: Theory, Design, and Applications by Stephen John Haswell
6. Atomic Absorption Spectrometry by Bernhard Welz
7. Inductively Coupled Plasma-mass Spectrometry: Practices and Techniques by Howard Edward Taylor
8. Inductively Coupled Plasma Spectrometry and its Applications by Steve J. Hill
9. Practical Guide to ICP-MS by Robert Thomas, Marcel Dekker Inc., 2004.
10. Packed columns SFC by T.A. Berger, RSC Chromatography Monographs, RSC, 1995.
11. Introduction to Mass Spectrometry: Instrumentation, Applications, and Strategies for Data Interpretation by J. Throck Watson, O. David Sparkman, Wiley, 2007.
12. Interpretation of Mass Spectra by Fred W. McLafferty, Turecek University Science Books, 1993.
13. Mass spectrometry-Principles and Applications by Edmond de Hoffmann and Vincent Stroobant, John Wiley and Sons, 2007.