

Subject Code: 1SC2030412	Subject Title: ANALYTICAL CHEMISTRY -VI
COURSE TYPE: CORE COURSE	

Course Objective: Separation techniques are the basis of instrumental analysis widely applied in industry, chemistry, biochemistry, environment science. These techniques are based on principles of chemistry. Therefore in this module we shall study the principles on which these techniques are based and acquire the basic skills necessary to use the techniques. Studying this depends the understanding of the underlying chemistry principles making the learner better able to teach them.

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	UHPLC Principle, theory, instrumentation and applications of ultrahigh performance liquid chromatography (UHPLC) and its comparison with HPLC.	25%
II	LC-MS Principle, theory, instrumentation and applications of liquid chromatography-mass spectrometry (LC-MS) and its comparison with Mass Spectroscopy.	25%
III	LC-NMR Principle, theory, instrumentation and applications of liquid Chromatography –nuclear magnetic resonance (LC-NMR) and its comparison with NMR	25%
IV	SFC Principle, theory, instrumentation and applications of supercritical fluid chromatography (SFC) and its comparison with HPLC.	25%

LEARNING OUTCOMES

- Understanding the principles of chromatographic techniques, with the emphasis on the application in chemistry, biochemistry.
- Updating the recent developments in the field of Chromatography& Spectroscopy.
- Students can able to design, perform, and interpret chromatographic experiments for biochemical applications.
- Separation techniques are the basis of instrumental analysis widely applied in industry, chemistry, biochemistry, environment science. These techniques are based

on principles of chemistry. Therefore in this module we shall study the principles on which these techniques are based and acquire the basic skills necessary to use the techniques.

REFERENCE BOOKS:

1. "Analytical Chemistry" by Gary D. Christian, 6th Edition, John Wiley and Sons Inc. New Jersey.
2. Beginners Guides to UPLC: Ultra-Performance Liquid Chromatography
By Douglas R. McCabe, Eric S. Grumbach & Joseph C. Arsenault.
3. LC/MS: A practical Users' Guide by Marvin C. McMaster.
4. LC-MS in Drug Bioanalysis by Springer Q. Alan Xu-Timothy L. Madden
5. LC-MS/MS In Proteomics Methods and Applications by Pedro R. Cutillas & John F. Timms
6. On line LC-NMR and Related Technique by Klaus Albert
7. Practical Aspects of Gas Chromatography/Mass Spectroscopy by Gordon M. Message, John Wiley & Sons, 1984.
8. LC-NMR and other Hyphenated NMR Technique overview and application
9. Principles of Instrumental Analysis D. A. Skoog and J. L. Loary, W. B. Saunders.
10. Modern Practice of Gas Chromatography by Robert L. Grob and Eugene F. Barry, 3rd edition, Wiley-Interscience, 1995.
11. Basic Gas Chromatography by Harold M. McNair, James M. Miller, John Wiley and Sons, 2008.
12. Analytical gas Chromatography by Walter Jennings, Eric Mittlefehldt and Philip Strempel, second edition, Elsevier Science, 1997.
13. Supercritical Fluid Chromatography by Colin F. Poole,