

Branch Name:	B.Sc. chemistry
Program Code:	SC103
Course Name:	ANALYTICAL CHEMISTRY-1
Course Code:	2SC1030504
Pre-requisite Course:	Basic fundamental chemistry

Course Objectives:

1. To impart knowledge and training in chemistry at advanced level, make aware with recent analytical technique, use of reagents and reactions in laboratory, synthesis and study of materials, the exploration of their properties and development of ways to use the mineral life.
2. To redesign the courses the special emphasis on local requirements, environment, to link the courses with requirements of the industries and research.
3. The primary goal of this course is to make students aware of how chemical processes can be designed, developed and run in a sustainable way.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture(L)	Tutorial(T)	Practical(P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
3	--	-	3	70	30	-	-	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	The Nature of Analytical Chemistry Role of analytical chemistry in sciences. Chemical analysis: Qualitative analysis, Quantitative analysis, Primary and secondary standards, Concentration Units, Mole Concept, molecular weight, formula weight, and equivalent weight. Concentration units: Molarity, Formality, Normality, Molality, Mole fraction, Percent by weight, Percent by volume, Parts per thousand, Parts per million, Types of errors Accuracy and Precision	15	33
2	Chromatography. Fundamentals of chromatography, principle of separation, classification Theoretical Plates, HETP, Resolution, Capacity Factor, Selectivity Factor, Dead .Paper, TLC, Column & HPTLC, Principles, theory, preparation, purification and identification). Application of Paper, TLC, HPTLC, Column chromatography & Comparison.	15	34
3	Atomic Spectroscopy (Flame Photometry & Atomic Absorption spectroscopy) Introduction, Principle, Flame Emission Spectroscopy (FES) and Atomic adsorption Spectroscopy (AAS), Principal, comparison and applications, Burners (Total consumption burner and Premix burners), Inductively coupled plasma Emission Spectroscopy	15	33

	(ICPAES).Application of FP & AAS.		
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Reference Books:

- 1) Introduction to Spectroscopy: Donald L. Pavia, Gary M. Lampman, George S. Kriz Cengage Learning; 4th Edition.
- 2) Spectrometric Identification of Organic Compounds: Robert M. Silverstein, Francis X. Webster, David Kiemle Wiley; 7th Edition.
- 3) Infrared spectra of Complex molecules: J. Bellamy, John Wiley & Sons, Inc., 3rd Edition.
- 4) Pharmaceutical Analysis by DrS. RaviSankar.
- 5) Instrumental method for Analysis by G. Vidyasagar.
- 6) Spectroscopic Method in Organic Chemistry: Dudley Williams, Ian Fleming McGraw-Hill Education; 6th Edition.
- 7) Applications of spectroscopic techniques in Organic Chemistry: P.S. Kalsi, New Age International; 6th Edition.
- 8) Elementary Organic Spectroscopy; Principles And Chemical Applications: Y. R. Sharma, S. Chand & Co Pvt Ltd.
- 9) Fundamentals of Molecular Spectroscopy: C. M. Banwell and E. McCash, Tata McGraw Hill, 4th Edition.
- 10) Modern Raman Spectroscopy: A Practical Approach; Ewen Smith, Geoffrey Dent., Wiley; 1st Edition.
- 11) Analytical Chemistry: Gary D. Christian, 6th Edition; Wiley & Sons
- 12) Fundamentals of Analytical Chemistry: D. A. Skoog, D. M. West and F. J. Holler, 9th Edition, Cengage Learning.
- 13) Instrumental Methods of analysis: (CBS) H.H. Willard, L.L. Mirrit, J.A. Dean
- 14) Solvent extraction in Analytical Chemistry: G.H. Morrison, F. Frieiser, John Wiley & Sons, NY.
- 15) Instrumental Methods of Inorganic Analysis: A.I. Vogel, ELBS
- 16) Chemical Instrumentation: A Systematic approach- H.A. Strobel
- 17) The principals of ion-selective electrodes and membrane transport: W.E.Morf
- 18) Principles of Instrumental Analysis: Douglas A. Skoog., F. James Holler, Stanley R. Crouch, Cengage Learning; 6th Edition.
- 19) Quantitative Chemical Analysis: Daniel C. Harris, W H Freeman, New York.
- 20) Ion exchange and solvent extraction of metal compounds: Y. Macros, A.S.Kertes, Wiley, Interscience

List of Open Source Software/learning website:

- 1 <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=1+p0z2ZbAGSfsyfLITzgZQ==#>
- 2 <https://www.slideshare.net/AZCPh/heterocyclic-compounds-organic-chemistry-b-pharm>
3. <https://www.slideshare.net/PradeepNarwat/chromatography-152439782>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understanding the fundamentals analytical chemistry	1. Remembering 2. Understanding
CLO2	Calculation of various Concentration Units	5-Evaluate
CLO3	Understanding various separation techniques for biochemical applications	2 Understanding 3- Applying
CLO4	Calculation of various parameters of chromatography	3- Applying
CLO5	Concepts of spectroscopy.	4Analyze
CLO6	Understanding of AAS and FES compare with ICPAES	2 Understanding

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Outcomes(POs)								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CLO1	H	L	L	L	L	H	L	L	L
CLO2	L	M	L	H	M	L	H	L	H
CLO3	L	H	L	H	M	L	M	L	L
CLO4	L	L	L	H	M	L	H	H	M
CLO5	L	L	L	M	M	L	M	M	L
CLO6	L	M	L	M	H	L	H	L	L

H:High, M:Medium, L:Low