



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (P) Chemistry						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
IV	Skill Enhancement Course	BASIC ANALYTICAL CHEMISTRY	2			2
Teacher/Instructor(s)		Dr. Anil Kumar				
Session		2021-2022				

Course Objective: The objective of this course is to make students aware about the importance and the concepts of chemical analysis of water and soil, using separation techniques like chromatography and instrumentation techniques like flame photometry and spectrophotometry

Course Learning Outcomes: By the end of this course, students will be able to:

- Handle analytical data
- Determine composition and pH of soil, which can be useful in agriculture
- Do quantitative analysis of metal ions in water
- Separate mixtures using separation techniques
- Estimate macro nutrients using Flame photometry

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
1.	Introduction	1	Introduction to analytical chemistry and its interdisciplinary nature
		2	Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements.
		3	Significant figures.
		4	Presentation of experimental data and results.
2.	Analysis of soil	5	Composition of soil
		6	Concept of pH and its measurement
		7	Complexometric titrations, chelation, chelating agents, use of indicators
3.	Analysis of water	8	Definition of pure water
		9	sources responsible for contaminating water
		10	water sampling methods

		11	Water purification methods
4.	Chromatography	12	Definition and general introduction on principles of chromatography
		13	Paper chromatography
		14	thin layer chromatography
		15	Column chromatography
		16	ion-exchange chromatography

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		12
	• Quiz		
	• Class Test		
	• Attendance		
	• Assignment		
2.	End Semester Examination	3 hr	38

Details of the Course		
Unit	Contents	Contact Hours
1. Introduction	Introduction to Analytical Chemistry and its interdisciplinary nature. Concept of sampling. Importance of accuracy, precision and sources of error in analytical measurements. Presentation of experimental data and results, from the point of view of significant figures.	6
2. Analysis of soil	Composition of soil, Concept of pH and pH measurement, Complexometric titrations, Chelation, Chelating agents, use of indicators a. Determination of pH of soil samples. b. Estimation of Calcium and Magnesium ions as Calcium carbonate by complexometric titration.	8
3. Analysis of water	Definition of pure water, sources responsible for contaminating water, water sampling methods, water purification methods. a. Determination of pH, acidity and alkalinity of a water sample. b. Determination of dissolved oxygen (DO) of a water sample.	8
4.	Definition and general introduction on principles of chromatography. Paper chromatography, thin layer chromatography, Column chromatography and ion-exchange chromatography.	8

Chromatography		
	Total	30
Suggested Books:		
Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
-1	Christian, G.D., Analytical Chemistry , John Wiley & Sons.	(2004)
2	Harris, D. C, Exploring Chemical Analysis , W.H. Freeman and Co.	(2007)
3	Skoog, D.A.; Holler F.J.; Nieman, T.A, Principles of Instrumental Analysis , Thomson Asia Pvt. Ltd.	(2005)
4	Mendham, J.; Denney, R.C.; Barnes, J.D.; Thomas, M.J.K., Vogel's Quantitative Chemical Analysis , 6th Edition, Prentice Hall.	(2007)
Mode of Evaluation:	Internal Assessment / End Semester Exam	



Dr. Anil Kumar
Department of Chemistry