Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim- Goa

Name of Faculty: Dr. Sagar Narayan Patil	**Subject:** Analytical Chemistry	
Paper code: CHD-101 ;Basic Topics in Analytical Chemistry	**Program: TYBSc**	**Division: -**
Academic year:June 2024- 2025	**Semester: V**	**Total Lectures: 15**

Course Objectives:

To define the terms involved in analytical chemistry, sampling techniques, data handling, chromatographic Techniques and electroanalytical methods. • To explain scope and importance of analytical chemistry, different types of sampling and the types of solvent extractions. • To classify different types of chromatographic techniques and errors with examples. • To study the principles of volumetric analysis and gravimetric analysis and the basic principles of instrumentation of electrogravimetry, coulometry and polarographic analysis. • To interpret steps involved in chemical analysis. • To describe the basic components of instruments of electroanalytical methods. • To draw the schematic diagrams of different electroanalytical methods. • To solve numericals of evaluation of data and solvent extractions. • To discuss the applications of different chromatographic techniques and electroanalytical methods.

Student Learning Outcome:

• At the end of the course students will be able to • Define the terms, state the laws and principles involved in involved in sampling techniques, data handling, chromatographic techniques, solvent extractions, volumetric analysis and gravimetric analysis. • Explain sampling of liquid, solid and gases, different types of tests related to data handling, scope and importance of analytical chemistry. • Draw and describe the basic components of instruments of electroanalytical methods. • Classify and explain different types of errors, sampling and chromatographic techniques. • Derive and use the equations of linear least squares and method of averages and solvent extraction to solve numerical. • Interpret steps involved in chemical analysis. • To discuss the applications of different chromatographic techniques and electroanalytical methods

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	29/06/2023		1	Introduction Scope and importance of analytical chemistry, chemical analysis and analytical chemistry.	Structures and problems	PPT/ Smart Board	1. Baliga and Shetty, College Analytical Chemistry, 15th edition, Himalaya Publishing House, 2004 2. K. Raghuraman, D. V. Prabhu, C. S. Prabhu and P. A. Sathe, 5th Edn., Sheth Publishers Pvt. Ltd. Page 87 of 225 Reference Books: 1. G. D. Christan Analytical Chemistry by, 5th edition Wiley publications. 2. G. Chatwal and S. Anand, Instrumental Methods of Chemical Analysis 5th edition (reprint 2003), Himalaya publication. 3. Vogels Textbook of Quantitative Inorganic Analysis 4th edition ELBS.

July	06/07/2024	27/07/2024	4	Classification of instrumental methods, analytical process (steps involved in chemical analysis): defining the problem, sampling, separation of desired components, actual analysis, presentation and interpretation of results.	**ISA-I preparation** Assignment	Smart Board	Listed as above
August	03/08/2024	31/08/2024	5	Principles of volumetric analysis: Theories of acid-base, redox, complexometric, iodometric and precipitation titrations - choice of indicators for these titrations.	**ISA-II preparation** Assignment	Smart Board	Listed as above
September	07/9/2024	28/09/2024	4	Principles of gravimetric analysis: precipitation, coagulation, peptization, coprecipitation, post precipitation, digestion, filtration and washing of precipitate, drying and ignition.			Listed as above
October	05/10/2024	19/10/2024	3	**Sampling Techniques** Terms encountered in sampling: the population or the universe, Sample,	revisions problems therein	Smart Board	2. G. Chatwal and S. Anand, Instrumental Methods of Chemical Analysis 5th edition (reprint 2003), Himalaya

				Sampling unit, increment, the gross sample, the sub sample, Analysis sample, Bulk ratio, Size to weight ratio, Random sampling, Systematic sampling, Multistage sampling, Sequential sampling. Sampling of Gases, Liquids and Solids. Preservation, storage and preparation of sample solution.			publication. 3. Vogels Textbook of Quantitative Inorganic Analysis 4th edition ELBS.

Practical Plan

Name of the college: Government college of Arts Science and commerce Sanquelim Goa.

Name of Faculty: Dr. Sagar Narayan Patil	**Subject:** Anaytical Chemistry	
Paper code: CHD-101	**Program: T.Y.B.Sc**	**Division: -**
Academic year: June 2024- 2025	**Semester: V**	**Total Practical's/Labs: 15**

Credits: 2

Course Objectives:-• To understand and develop the problem-solving skills and hands on experience with reference to concepts studied in theory (ion exchange chromatography, colorimetry, statistical data).

Student Learning Outcome:

Students will be able to • Understand the concepts based on ion exchange chromatography, colorimetry and to estimate acidic and basic radicals quantitatively. • Develop skills to prepare different plates of th chromatography. • Solve numericals based on statistical data obtained from experimental results.

Month	Practicals/Labs Scheduled Date	No. of Practical's/Labs planned	List of Experiments	Reference books
July	01/07/2024-29/07/2024	5	1. Determination of iron by salicylic acid by colorimetry. 2. Determination of nitrite in water by colorimetry. 3. Separation of organic compounds by TLC. (Demonstration)	-
August	05/08/2024-26/08/2024	4	4. Zn2+ /Mg2+ separation by an anion exchanger & volumetric estimation of Magnesium with standard EDTA. 5. Zn2+ /Mg2+ separation by an anion exchanger & volumetric estimation of Zinc with standard EDTA. 6. Estimation of Na+ in NaCl by cation exchange resin using standard NaOH.	A.I. Vogel, A.R. Tatchell, B. S. Furniss, Hannaford, Vogel's Textbook of Practic Chemistry, 5th Ed., Prentice Hall; 2011.
September	02/09/2024-30/09/2024	5	7. Estimation of Ca in calcium tablet by oxalate method and titration with KMnO4. 8. Determination of hardness of water by EDTA i.e. estimate Ca as CaCO3 and report analysis in ppm. (The candidate should record more than 5 observations and carry out statistical analysis to find out mean, median, range, standard deviation, absolute error, relative error and possibly Q test.	A.I. Vogel, A.R. Tatchell, B. S. Furniss, Hannaford, Vogel's Textbook of Practic Chemistry, 5th Ed., Prentice Hall; 2011.
October	07/10/2024-21/10/2024	3	Revision/repetition/ Journal certification	