

Satyaniketan 's
Adv. M.N.Deshmukh Art's , Sci. and Commerce College Rajur,
T.Y. B.Sc.Chemistry : Analytical Chemistry-1
(CBCS 2019 Pattern) SEMESTER-V (Frist Term)
TEACHING PLAN 2023-2024

Sr.No.	MONTH	TOPIC	LECTURE
1	JUNE - '23	Gravimetry Introduction to gravimetric analysis: Precipitation methods. The colloidal state, Supersaturation and precipitate formation: The purity of the precipitate. Co-precipitation Conditions of precipitation. Precipitation from homogeneous solution, Washing the precipitate: Ignition of the precipitate quantitative separations based upon precipitation methods: Fractional precipitation, Organic precipitants (8-droxyquinoline, DMG. Cupferron, Nitron and Benzoin-alla oxime, Anthranilic acid), Application of Gravimetry: Determination of Al(III) by 8-hydroxyquoline Determination of calcium as oxalate Determination of potassium as potassium tetraphenylborate. Determination of phosphate as ammonium molybdophosphate, Numericals	09 L
2	JULY- '23	Inorganic Qualitative Analysis Basic principle, common ion effect, solubility, solubility product, properation of original solution, classification of basic radical in groups, separations of basic radicals removal of interfering anions (phosphate and borate, detection of acid radicals	07 L
3	AUG-'23	Thermal methods of analysis General discussion, Thermogravimetry, Experimental factors affecting TG analysis, instruments for thermogravimetry, Applications: Thermogravimetric analysis of CaCO HO, CuSO, SHO, Differential Thermal Analysis: Introduction, instrumentation for DTA and DSC, experimental and instrumental factors, applications: DTA of copper sulphate pentahydrate, Purity of pharmaceutical by DSC	06 L
4	SEPT - '23	Parameters of instrumental analysis Techniques, Methods, Procedures and Protocols, Selecting an Analytical Method, Accuracy, Precision, Sensitivity. Selectivity, Robustness and Ruggedness, Scale of Operation, equipment, Time and Cost, Making the Final Choice, Developing the Procedure, Calibration and Standardization, Sampling, Validation, Protocols	04 L
5	OCT - '23	UV-Visible Spectroscopy Introduction, Theory of spectrophotometry and colorimetry-Beer's law, Application of Beer's Law, Spectrophotometry Wavelength selection by prism and diffraction grating. Radiation Source, cells, data presentation, single-beam spectrophotometer, Double-beam spectrophotometers, Choice solvent, general procedure for colorimetric estimation, simultaneous analysis, Application Estimation of metal ions from aqueous solution: Boron in steel, Chromium in steel with diphenyl carbazide reagent, ammonia in water, Chloride,	10 L

		Primary amine, Determination of phenol, spectrophotometric titration (example Cu(II) with EDTA). Determination of pKa value of indicator, Determination of composition of metal complexes using Job's method of continuous variation and mole ratio method	
6	NOV - '23	Holiday (SEMESTER – VI Second Term)	
7	DEC - '23	Solvent extraction Introduction to solvent extraction, organic phase, Partition the theory of extraction (distribution coefficient, Distribution ratio, solute remaining unextracted. Separation coefficient), Factors favouring solvent extraction, Quantitative treatment to solvent extraction equilibrium, Ion association complexes, synergic extraction, some extraction reagent specifically used for inorganic ions (Acetylacetone, 8-Hydroxyquinoline, Diphenylthiocarbazone, Sodium diethyldithiocarbamate, Ammonium pyrrolidine dithiocarbamate), some practical aspects. Applications: determination of copper as the diethyldithiocarbamate complex. Determination of Fe(III) with 8-hydroxyquinoline, determination of nickel by synergistic extraction. Solid phase extraction	08 L
8	JAN-'24	Instrumental Methods of Chromatographic Analysis Principles of Chromatographic Separations, classification, Theory of Column Efficiency in Chromatography, (theoretical plate, rate theory of chromatography-the Van Deemter equation, efficiency and particle size in HPLC, retention factor efficiency and resolution High Performance Liquid Chromatography Introduction, Types of liquid chromatography (liquid-solid, liquid-liquid, bonded phases), Choice of mode of separation, Equipment for HPLC: mobile phase, sample injection and column design (mobile phase, optimization of mobile phase, gradient	04 L 02 L
9	FEB-'24	elution, solvent delivery and sample injection, sample injection system, the column (effect of column length and column diameter), Choosing the Detector, Ultraviolet detector, Luminescence detector, RI detector, electrochemical detector, Column efficiency, HPLC chromatogram and its characteristics (retention time, peak height, peak area), method of quantitative analysis by HPLC, Example: determination of aspirin, phenacetin and caffeine in a mixture, numerical Gas Chromatography Introduction, Apparatus: A supply of carrier gas from a high-pressure cylinder, Sample injection system and derivatization, the column (Packed columns, Open tubular columns), the detector (properties, hot wire detector or TCD, FID, ECD), Quantitative analysis by GC (Area normalization method and internal standard addition method), Elemental analysis	04 L 06 L

10	MAR-'24	Atomic Absorption Spectroscopy Introduction, Elementary theory, Instrumentation, flames, the nebulizer-burner system, non-flame techniques, (graphite furnace, cold vapour technique), resonance line sources, monochromator, detectors, interferences, chemical interferences, background correction methods, Atomic absorption spectrophotometers, Experimental preliminaries (calibration curve methods, standard addition method) Preparation of sample (wet ashing, fusion, Dry ashing, microwave dissolution, concentration procedures), Detection limits, Estimation of Ca and Mg in water.	08 L
11	APRIL-'24	Flame Emission Spectroscopy Introduction, emission spectra, flame emission spectroscopy, flame photometers Evaluation methods, calibration curve procedure, the standard addition technique. Applications: determination of alkali metals by flame photometry, determinations of trace elements in contaminated soil by AAS.	04 L



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