University of Calcutta under Graduate Curriculum under Choice Based Credit System (CBCS)
Lesson Plan with Syllabus for Chemistry (G) Semester-VI
Total Marks-100 (Credits: Theory-04, Practical-02)
(Theory: 50; Practical: 30; Internal Assessment: 10; Attendance: 10)
[Marks obtained in this course will be taken to calculate SGPA & CGPA]

Tentative may subject to change: Theory Class					
Months	**Week**	**Unit**	**Topic**	**No. of Lectures** for Each Section	**Teacher**
February	3rd	1	***Optical Methods of Analysis*** ▪ Origin of spectra and interaction of radiation with matter ▪ Fundamental laws of spectroscopy and selection rules	2	PKD
		2	***Thermal methods of analysis*** ▪ Theory of thermogravimetry (TG)	2	SM
		4	***Chromatography*** ▪ Classification, principle, and efficiency of the technique	2	TKL
March	1st	1	***Optical Methods of Analysis*** ▪ Beer-Lambert's law and its validity	2	PKD
		2	***Thermal methods of analysis*** ▪ the basic principle of instrumentation	2	SM
		4	***Chromatography*** ▪ Mechanism of separation: adsorption, partition & ion exchange	2	TKL
	2nd	1	***UV-Visible Spectrometry*** ▪ Basic principles of instrumentation for single and double beam instrument	2	PKD
		2	***Thermal methods of analysis*** ▪ Techniques for quantitative estimation of Ca and Mg from their mixture	2	SM
		4	***Chromatography*** ▪ Development of chromatograms: frontal, elution, and displacement methods	2	TKL
	3rd	1	***Basic principles of quantitative analysis*** ▪ Estimation of metal ions from aqueous solution	2	PKD
		3	***Electroanalytical methods*** ▪ Classification of electroanalytical methods, the basic principle of pH metric	2	SM
		4	***Chromatography*** • Qualitative and quantitative aspects of chromatographic methods of analysis: IC, GLC	2	TKL
	4th	1	• **Basic principles of quantitative analysis** Concept of geometrical isomers and keto-enol tautomer	2	PKD
		3	***Electroanalytical methods*** ▪ potentiometric and conductometric titrations	2	SM
		4	***Chromatography*** ▪ Qualitative and quantitative aspects of chromatographic methods of analysis: GPC, TLC	2	TKL
	5th		****Student Lecture: On Absorption Spectroscopy***	1	PKD, SM, TKL

Months	Week	Unit	Topic	No. of Lectures for Each Section	Teacher
April	1st	1	***Basic principles of quantitative analysis*** ▪ Determination of the composition of metal complexes using Job's method	2	PKD
		3	***Electroanalytical methods*** ▪ Techniques used for the determination of equivalence points	2	SM
		4	***Chromatography*** ▪ Qualitative and quantitative aspects of chromatographic methods of analysis: HPLC	2	TKL
	2nd	1	***Infrared Spectrometry*** ▪ Basic principles of instrumentation for single and double beam instrument	2	PKD
		3	***Electroanalytical methods*** ▪ Techniques used for the determination of pKa values	2	SM
		4	▪ Stereoisomeric separation and analysis: Measurement of optical rotation, calculation of Enantiomeric excess (ee)	2	TKL
			McQ based Assessment for all 3-section on Unit-1, 2 and 4	1	PKD, SM, TKL
	3rd	1	***Infrared Spectrometry*** ▪ Interpretation of data and importance of isotope substitution	2	PKD
		4	***Separation techniques*** ▪ Solvent extraction: Classification, principle, and efficiency of the technique	2	SM
		4	▪ diastereomeric excess (de) ratios and determination of enantiomeric composition using NMR	2	TKL
	4th	1	***Flame Atomic Absorption and Emission Spectrometry*** ▪ Basic principles of instrumentation	2	PKD
		4	***Separation techniques*** ▪ Mechanism of extraction: extraction by solvation and chelation	2	SM
		4	• Chiral solvents and chiral shift reagents	2	TKL
May	1st		******* Library work assignment***		PKD, TKL, SM
	2nd	1	***Flame Atomic Absorption and Emission Spectrometry*** ▪ Techniques of atomization and sample introduction	2	PKD
		4	***Separation techniques*** ▪ The technique of extraction: batch, continuous, and counter-current extractions	2	SM
		4	▪ Chromatographic techniques using chiral columns (GC)	2	TKL

	3rd	1	***Flame Atomic Absorption and Emission Spectrometry*** ▪ Method of background correction and sources of chemical interferences	2	PKD
		4	***Separation techniques*** ▪ Qualitative and quantitative aspects of solvent extraction: extraction of metal ions from aqueous solution	2	SM
		4	• Chromatographic techniques using chiral columns (HPLC)	2	TKL
	4th	**1**	***Flame Atomic Absorption and Emission Spectrometry*** ▪ Techniques for the quantitative estimation of trace levels of metal ions from water samples	2	PKD
		4	***Separation techniques*** ▪ Extraction of organic species from the aqueous and nonaqueous media	2	SM
		4	▪ Role of computers in instrumental methods of analysis	2	TKL
June	1st		*****Guest Lecture***		
	2nd	**1**	***Flame Atomic Absorption and Emission Spectrometry*** *Continue..* ▪ Techniques for the quantitative estimation of trace levels of metal ions from water samples ▪ Some solutions to the question	2	PKD
		4	▪ Homework assignment ▪ Question solution	2	SM
		4	***Continue…*** ▪ Role of computers in instrumental methods of analysis ▪ Question solution	2	TKL
	3rd	**Internal Assessment**	**McQ based Internal Assessment for all sections**		PKD, SM, TKL

Tentative may subject to change: Practical Class

Months	Weeks	Topic	Teacher
March	1st to 2nd	***Separation Techniques*** ▪ Laboratory work discussion ▪ Discussion of Chromatography ▪ Detailed discussion of Paper chromatography (Principle)	PKD
	3rd to 4th	***Chromatography*** ▪ Separation and identification of the monosaccharides present in the given mixture (Glucose & fructose) by paper chromatography. Reporting the R_f values	
	5th	***Chromatography*** ▪ Detailed discussion of Thin Layer chromatography (TLC) (Principle)	
April	1st	***Chromatography*** ▪ Separate a mixture of Sudan yellow and Sudan Red by TLC technique and identify them based on their R_f values	PKD
	2nd	***Chromatography*** ▪ Chromatographic separation of the active ingredients of plants, flowers, and juices by TLC	
	2nd to 3rd	***Solvent Extractions*** ▪ To separate a mixture of Ni^{2+} and Fe^{2+} by complexation with DMG and extracting the Ni^{2+}-DMG complex in chloroform, and determine its concentration by spectrophotometry	
	4th to 5th	***Analysis of soil*** ▪ Determination of pH of soil	
May	1st to 2nd	***Analysis of soil*** ▪ Estimation of calcium, magnesium, phosphate	
	3rd	***Ion exchange*** ▪ Determination of exchange capacity of cation exchange resins and anion exchange resins	
	4th	***Spectrophotometry*** ▪ Determination of pK_a values of indicator using spectrophotometry	
June	1st	▪ Determination of chemical oxygen demand (COD)	
	2nd	▪ Determination of Biological oxygen demand (BOD)	