



GAYATRI VIDYA PARISHAD INSTITUTE OF HIGHER LEARNING AND RESEARCH

(Deemed to be University under Distinct Category under Section 3 of the UGC Act,
1956)

B.Tech (Chemical Engineering); I SEMESTER PHYSICAL AND ANALYTICAL CHEMISTRY

Lecture plan

Unit	Lecture No.	Topic / Sub-topic	CO
Unit I Distribution Law	1	Nernst distribution law – Statement and explanation	CO1
	2	Limitations of distribution law, Problems	
	3	Modified distribution law – association of solute; dissociation of solute.	
	4	Problems, Applications of distribution Law, Desilverisation of lead	
	5	Determination of equilibrium constant from distribution coefficient.	
	6	Distribution indicators, Solvent extraction-Principle	
	7	Solvent extraction-Derivation and applications	
	8	Principle of partition chromatography-Applications	
	9	Revision/Test/Tutorial	
Unit II Chemical & Ionic Equilibrium	10	Dynamic nature of chemical equilibrium with examples	CO2
	11	Law of mass action, Le Chatelier's principle- Effect of temperature on equilibrium	
	12	Le Chatelier's principle- Effect of concentration and pressure on equilibrium.	
	13	Applications of chemical equilibrium – Haber process and Contact process	
	14	Strengths of acids and bases; dissociation of polyprotic acids	
	15	Titration curve of weak polyprotic acid (H_3PO_4); common-ion effect	
	16	pH, hydrolysis of salts, degree of hydrolysis	
	17	Buffer solutions-Working; Problems on PH, Ka, PKa.	
	18	Revision/Test/Tutorial	
Unit III UV-Visible	19	Electromagnetic spectrum-Regions, Interaction of electromagnetic radiation with matter	CO3

Spectrophotometry	20	Absorption, emission and scattering of radiation	
	21	Electronic transitions	
	22	Beer–Lambert law- Applications	
	23	Problems on Beer–Lambert law	
	24	Instrumentation of UV–Visible spectrophotometer	
	25	Single-beam and double-beam instruments	
	26	Applications of UV–Visible spectrophotometry	
	27	Revision/Test/Tutorial	
Unit IV IR Spectrophotometry	28	Principle of infrared spectroscopy	CO4
	29	Molecular vibrations	
	30	Functional-group region	
	31	Fingerprint region	
	32	Identification of functional groups using characteristic IR absorption frequencies	
	33	Instrumentation of an IR spectrometer	
	34	Sample-handling techniques in IR spectrometry	
	35	Interpretation and identification using functional-group and fingerprint regions	
	36	Revision/Test/Tutorial	
Unit V Flame Emission and Atomic Absorption Spectrometry	37	Principles absorption and atomic emission spectroscopy	CO5
	38	Atomic emission spectroscopy	
	39	Flame photometry – Working Principle	
	40	Instrumentation of Flame photometer – nebulizer, burner, optical system and detector	
	41	Atomic Absorption Spectroscopy – Working Principle	
	42	AAS – hollow cathode lamp, atomizer and monochromator	
	43	AAS – detector and complete instrumentation	
	44	Applications of FES and AAS for determination of metal ions	
	45	Revision/Test/Tutorial	