

LJ UNIVERSITY

LJ INSTITUTE OF PHARMACY

SEMESTER: III

Subject Name: PHARMACEUTICAL ANALYSIS-I

Subject Code: BP303TP

Scope: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs.

Objectives: Upon completion of this course the student should be able to

1. understand the principles of volumetric and electro chemical analysis
2. carryout various volumetric and electrochemical titrations
3. develop analytical skills

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	75	25	35	15

Sr. No.	Course Contents	Hours
1	(a) Pharmaceutical analysis- Definition and scope i) Different techniques of analysis ii) Methods of expressing concentration iii) Primary and secondary standards. iv) Preparation and standardization of various molar and normal solutions Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate (b) Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figure. (c) Pharmacopoeia, Sources of impurities in medicinal agents	10
2	(a) Acid base titration: Theories of acid base, Common ion effect, Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves (b) Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate. (c) Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium Sulphate, and Calcium Gluconate.	15
3	(a) Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. (b) Redox Titration: Concepts of oxidation and reduction, types of Redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, diazotization titration with potassium iodate (c) Precipitation titrations: Solubility Product constant, Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.	08
4	Electrochemical methods of analysis (a) Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications. (b) Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration	07

	and applications.	
5	Chromatography: Basics of Chromatography, Paper Chromatography, and Thin layer Chromatography, Column Chromatography.	05
Total Hours		45

Practical

Preparation and standardization of

- (1) Sodium hydroxide
- (2) Sulphuric acid
- (3) Sodium thiosulfate
- (4) Potassium permanganate
- (5) Ceric ammonium sulphate

Assay of the following compounds along with Standardization of Titrant

- (1) Ammonium chloride by acid base titration
- (2) Ferrous sulphate by Cerimetry
- (3) Copper sulphate by Iodometry
- (4) Calcium gluconate by complexometry
- (5) Sodium benzoate by non-aqueous titration
- (6) Sodium Chloride by precipitation titration
- (7) Aspirin by Acid-Base Titration
- (8) Ascorbic acid by Redox Titration

Determination of Normality by electro-analytical methods

- (1) Conductometric titration of strong acid against strong base
- (2) Conductometric titration of strong acid and weak acid against strong base
- (3) Potentiometric titration of strong acid against strong base

Recommended Books: (Latest Editions):

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.