

# MARWADI UNIVERSITY

## B.Pharm SEMESTER: I

**Subject Name: PHARMACEUTICAL ANALYSIS-I**

**Subject Code: 13PH0102**

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

**Objectives:** Upon completion of the course student shall be able to

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

Sr No	Course Contents	Total Hrs
1	<b>(a) Pharmaceutical analysis-</b> 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 and ceric ammonium sulphate <b>(b)Errors:</b> Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures <b>(c)Pharmacopoeia,</b> Sources of impurities in medicinal agents,limit tests	10
2	<b>Acid base titration:</b> 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:</b> Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl	10
3	<b>Precipitation titrations:</b> Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride. <b>Complexometric titration:</b> Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. <b>Gravimetry:</b> Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. Basic Principles,methods and application of diazotisation titration.	10
4	<b>Redox titrations:</b> (a) Concepts of oxidation and reduction (b) Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate	8
5	<b>Electrochemical methods of analysis</b> <b>Conductometry-</b> Introduction, Conductivity cell, Conductometric titrations, applications. <b>Potentiometry -</b> 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 and applications. <b>Polarography -</b> Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications	7

## 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) Hydrogen peroxide by Permanganometry
- (6) Sodium benzoate by non-aqueous titration
- (7) Sodium Chloride by precipitation 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.