

Gandhinagar Institute of Pharmacy

Bachelor of Pharmacy (Undergraduate)

Semester I



Subject Code: BP102T	Subject Title: Pharmaceutical Analysis (Theory)
Pre-requisite: --	

Course Objective: Upon completion of the course student shall be able to

1. Describe principles and applications of various types of volumetric and electrochemical methods of pharmaceutical analysis.
2. Describe principle and applications of gravimetric analysis.
3. Perform calculations necessary to prepare desired concentration of standard, test solutions and calculation related to titration curve for various types of volumetric methods of pharmaceutical analysis.
4. Describe various errors involved in pharmaceutical analysis, their sources and proposing mitigation strategies for analytical errors.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
3	1	4	75	10	15	100

Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	Pharmaceutical analysis Definition and scope, Different techniques of analysis, Methods of expressing concentration, Primary and secondary standards, 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. Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision, and significant figures. Pharmacopoeia: Sources of impurities in medicinal agents, limit tests.	10 Hours	22.22%

2.	<p>Acid base titration: 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.</p> <p>Non-aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl.</p>	10 Hours	22.22%
3.	<p>Precipitation titrations: Mohr's method, Volhard's, Modified Volhard's methods, Fajan's method, estimation of sodium chloride.</p> <p>Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.</p> <p>Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.</p>	10 Hours	22.22%
4.	<p>Redox titrations</p> <p>a) Concepts of oxidation and reduction</p> <p>b) Types of redox titrations (Principles and applications) i.e., Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Diazotization, Titration with potassium iodate.</p>	8 Hours	17.77%
5.	<p>Electrochemical methods of analysis</p> <p>Conductometry: Introduction, Conductivity cell, Conductometric titrations, applications</p> <p>Potentiometry: Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrodes), methods to determine endpoint of potentiometric titration and applications.</p> <p>Polarography: Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications</p>	7 Hours	15.55%

Gandhinagar Institute of Pharmacy

Bachelor of Pharmacy (Undergraduate)

Semester I



Subject Code: BP102P	Subject Title: Pharmaceutical Analysis (Practical)
Pre-requisite: --	

Course Objective: Upon completion of the course student shall be able to

1. Prepare and standardize various titration solutions.
2. Perform various experimental tasks for volumetric and electrochemical titration.
3. Handle and operate various laboratory instruments for electrochemical analysis.
4. Describe principle and various terminologies related to volumetric and electrochemical analysis.
5. Analyze the problem, communicate suggested solution, and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
Practical	Credit	Theory			Total
		University Assessment	Continuous Assessment	Internal Assessment	
4	2	35	5	10	50

List of Practical:

Sr. No.	Title of the Unit
1	Limit test of the following
	(a) Chloride
	(b) Sulphate
	(c) Iron
	(d) Arsenic
2	Preparation and standardization of
	(a) Sodium hydroxide
	(b) Sulphuric acid
	(c) Sodium thiosulfate
	(d) Potassium permanganate
(e) Ceric ammonium sulphate	
3	Assay of the following compounds along with
	(a) Ammonium chloride by acid base titration
	(b) Ferrous sulphate by Cerimetry
	(c) Copper sulphate by Iodometry

	(d) Calcium gluconate by Complexometry.
	(e) Hydrogen peroxide by Permanganometry.
	(f) Sodium benzoate by non-aqueous titration
	(g) Sodium Chloride by precipitation titration
4	Determination of Normality by electro-analytical methods
	(a) Conductometric titration of strong acid against strong base
	(b) Conductometric titration of strong acid and weak acid against strong base
	(c) Potentiometric titration of strong acid against strong base

Recommended Study Material:

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone, Press of University of London
2. A.I. Vogel, Textbook of Quantitative Inorganic Analysis, Longman Sc & Tech
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, Vallabh Prakashan
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry, Oxford University Press
5. John H. Kennedy, Analytical chemistry principles, Brooks/Cole
6. Indian Pharmacopoeia, Ministry of Health and Family Welfare, Govt. of India.
7. Gary D. Christian, Analytical Chemistry, Willey Publishers
8. Douglas Skoog, Stanley R. Crouch, Fundamental of Analytical Chemistry, Brooks/Cole.