Chitkara College of Pharmacy
Chitkara University, Rajpura, Punjab
Chandigarh–Patiala National Highway, Punjab – 140 401, India

Institute/School Name	Chitkara College of Pharmacy		
Department Name	Pharmacy		
Programme Name	B.Pharmacy		
Course Name	Pharmaceutical Analysis-I	**Session**	July-Dec 25
Course Code	BP-102T	**Semester/Batch**	1st /2025
L-T (Per Week)	3-1	**Course Credits**	4
Pre-requisite	Fundamentals of analytical chemistry and principles of electrochemical analysis of drugs	**NHEQF Level**	5.5
Course Coordinator	Ms. Monika Saini/ Dr. Paranjeet Kaur		
SDG	SDG 3, SDG 4		

Objectives of the Course: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs. Upon completion of the course student shall be able to understand the principles of volumetric and electrochemical analysis; carry out various volumetric and electrochemical titrations; develop analytical skills

Course Outcomes (COs)

Students should be able to:

	COs	**Program Outcomes (PO)**	**NHEQF Level Descriptor**	**No. of Lectures**
CO01	Develop ideas with the fundamental of analytical chemistry.	PO1	Q1	**10**
CO02	Construct the fundamental methodology to prepare different strength of solutions.	PO1, PO11.	Q2	**10**
CO03	Critically Predict the potential sources of mistakes and errors in analytical processes.	PO3, PO6	Q3	**5**
CO04	Develop the fundamentals of volumetric Analytical skills & electrochemical analytical techniques.	PO1, PO4	Q4	**10**
CO05	Comprehend the research oriented basic knowledge in the analytical processes.	PO1, PO11	Q1	**6**
CO06	Interpret and analyze the course content in terms of choice of analytical techniques	PO3	Q3	**4**
Total Contact Hours				**45**

***NHEQF-**

CO-PO Mapping

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**Type of Assessment's**
CO01	3											Formative/Summative
CO02	3										2	Formative/Summative
CO03			3			2						Formative/Summative
CO04	2			2								Formative/Summative
CO05	2										2	Formative/Summative

CO06			2									Formative/Summative

3=High, 2=Medium, 1=Low

Recommended Books:

B01: A.I. Vogel, Text Book of Quantitative Inorganic analysis
B02: A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press
B03: R.M. Verma, Analytical Chemistry Theory and Practice, Third edition
B04: J Mendham, RC Denny, J D Barnes, M Thomas, B Sivasankar, Vogel's Textbook of Quantitative Chemical Analysis
B05: John H. Kennedy, Analytical chemistry principles
BO6: Indian PharmacopoeiaOther readings and relevant websites:

Serial No	Link of Journals, Magazines, websites and Research Papers
1.	www.pubmed.com
2.	www.sciencedirect.com
3.	www.google.com
4.	www.googlescholar.com

Lecture Plan

Lect. No.	Topics	Book No, CH No, Page No	TLM[1]	ALM[2]	Web References	Audio-Video
1-2	Introduction	B3 , Ch 1, Page No. 3-12	Lecture, Active learning	Group Discussion		
3	Introduction	B3 , Ch 1, Page No. 3-12	Discussion, Inductive teaching and learning	Group Discussion		
4-5	Definition and scope	B3 , Ch 1, Page No. 3-12	Lecture, Active learning	Quiz/Test Questions		
6-7	Different techniques of analysis; Methods of expressing concentration;	B3 , Ch 1, Page No. 33-41	Discussion, Inductive teaching and learning	Student-Created Ppt		
8-9	Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate,	B3 , Ch 1, Page No. 33-41	Lecture, Active learning	Group Discussion		

10-12	sulphuric acid, potassium permanganate and ceric ammonium sulphate	B3 , Ch 1, Page No. 33-41	Lecture, Active learning	Quiz/Test Questions		
13	Primary and secondary standards	B1, Ch 10, Page No. 295	Discussion, Inductive teaching and learning	Quiz/Test Questions		
14-15	**Errors**: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures	B3, Ch 2 , Page No. 13-32 B1, Ch 4, Page No. 104	Lecture, Active learning	Statement – Opinion		
16-17	Pharmacopoeia, Sources of impurities in medicinal agents, limit tests	B3, Ch 2 , Page No. 13-32 B1, Ch 4, Page No. 104	Discussion, Inductive teaching and learning	Group Discussion		
18-19	**Acid base titration**: Theories of acid base indicators, classification of acid base titrations	B3, Ch - 7 , Page No. 154-194	Lecture, Active learning	Group Discussion	7.2: Lab - Titrations - Chemistry LibreTexts	
20-21	Theory involved in titrations of strong, weak, and very weak acids and bases,	B3, Ch - 7 , Page No. 154-194	Lecture, Active learning	Student-Created Ppt		
22	Neutralization curves	B1, Ch-10, Page No. 302-312	Inductive teaching and learning	Group Discussion Group Discussion		
23	**Non aqueous titration**: Solvents,	B3, Ch-9, Page No. 195-202 B1, Ch-10, Page No. 314 -317	Lecture, Active learning	Group Discussion		
24	Alkalimetry titration, estimation of Ephedrine HCl	B3, Ch - 7 , Page No. 154-194	Discussion, Inductive teaching and learning	Quiz/Test Questions		
25	Acidimetry titration, estimation of Ephedrine HCl	B3, Ch - 7 , Page No. 154-194	Inductive teaching and learning	Group Discussion		

26	**Complexometric titration**: Classification, masking and demasking reagents,	B3, Ch 11, Page No. 245-264 B1. Ch 10, Page No. 326-334	Lecture, Active learning	Group Discussion	Complexometric Calcium Determination (Experiment) - Chemistry LibreTexts	
27	Metal ion indicators, estimation of Magnesium sulphate, and calcium gluconate.	B1. Ch 10, Page No. 335-345	Discussion, Inductive teaching and learning	Group Discussion		
28-29	**Precipitation titrations:** Mohr's method, Fajans method	B1, Ch-10, Page No. 345- 357 B3, Ch 11, Page No. 245=264	Lecture, Active learning	Group Discussion		
30	Volhard's, Modified Volhard's,	B1, Ch-10, Page No. 345- 357 B3, Ch 11, Page No. 245=264	Inductive teaching and learning	Group Discussion		
31	Estimation of sodium chloride.	B1, Ch-10, Page No. 345- 357 B3, Ch 11, Page No. 245=264	Lecture, Active learning	Quiz/Test Questions		
32-33	**Gravimetry:** Principle and steps involved in gravimetric analysis.	B1, Ch-11 , Page No. 398-414 B3, Ch-6, Page No. 113-142	Lecture, Active learning	Group Discussion		
34	Purity of the precipitate: co-precipitation and post precipitation	B1, Ch-10, Page No. 345- 357 B3, Ch 11, Page No. 245=264	Inductive teaching and learning	Group Discussion		
35	Estimation of barium sulphate.	B1, Ch-10, Page No. 345- 357	Lecture, Active learning	Group Discussion		

		B3, Ch 11, Page No. 245=264				
36-37	Basic Principles, methods and application of diazotisation titration.	B3, Ch-14, Page No. 305-338	Discussion, Inductive teaching and learning	Group Discussion	Diazotization - an overview | ScienceDirect Topics	
38-39	**Electrochemical methods of analysis**: Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications	B3, Ch-14, Page No. 305-338	Lecture, Active learning	Quiz/Test Questions		
40-41	Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode), Indicator electrodes (metal electrodes and glass electrode),	B3, Ch-14, Page No. 305-338	Discussion, Inductive teaching and learning	Student-Created Ppt		
42-44	Methods to determine end point of potentiometric titration, Polarography - Principle, Ilkovic equation, Construction and working of dropping mercury electrode, rotating platinum electrode, applications.	B3, Ch-14, Page No. 305-338	Lecture, Active learning	Group Discussion		
45	Cerimetry, Iodometry, Dichromatry and bromatometry, Titration with potassium iodate	B3, Ch-14, Page No. 305-338	Lecture, Active learning	Quiz/Test Questions		

Teacher in-charge Assistant Dean Dean