B. Sc. SEMESTER – IV
CHM 242(T): Analytical Chemistry
Credit – 4, Hours – 60, Marks - 100

Course Outcomes:

The student will be able to

CO1: Know and understand about the principles of acid-base titrations, precipitation titrations and redox titrations
CO2: gain deeper knowledge about inorganic qualitative and quantitative analysis and the use of organic reagents in inorganic analysis
CO3: Know and recognize the importance of Errors to produce correct results.
CO4: Apply the knowledge for different analytical technics and develop results with precision

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	2	
CO2	2	2	2		1	1
CO3	2	2	2		1	
CO4	2	2	2	2	2	2

Unit-1 Acid-base titration **[25 marks]**
[15 hours]

Theory of acid-base titration, acid-base titration and ways of locating end point, titration of strong acid with strong base, titration of weak acid with strong base, titration of weak base with strong acid, titration of polyprotic acid, analysis of washing soda.

Unit-2
[A] Basic concepts of qualitative and quantitative analysis **[13 marks]**
[8 hours]

Introduction, solubility product principle, common ion effect, separation of cations into groups, detection and separation of cations of each groups, separation and detection of anions (acid radicals), introduction quantitative analysis, titration, end point and equivalence point, indicator, standard solution, primary standard, secondary standard, volumetric (titrimetric) calculation, calculation based on

normality and morality of the solution. Conditions for volumetric analysis and types of titrimetric analysis.

[B] Precipitation titration **[12 marks]**
[7 hours]

Feasibility of precipitation titration, Mohr's method, Fajan's method and Volhard method.

Unit-3

[A] Errors and treatment of analytical data
[13 marks]
[8 hours]

Significant figures, accuracy and precision, types of errors and minimization of errors. Ways of expressing accuracy and precision. Rejection of a result, test of significance (q-test, student t-test and f-test) correlation coefficient. Literature of analytical chemistry.

[B] Organic reagents used in quantitative analysis
[12 marks]
[7 hours]

Separation of methods with 8-hydroxy quinoline, cupferron and DMG

Unit-4 Redox titrations **[25 marks]**
[15 hours]

Theory of redox titration, study of redox titration by electrochemical potential method, ways of and redox titrations locating the end point for redox titration. Titration involving iodine: iodimetry and iodometry, titration with reducing agents and oxidising agents, metallic reductors.

REFERENCE BOOKS

1. 'Analytical Chemistry' by Dhruba Charan Dash, PHI Learning Pvt. Ltd., New Delhi, 2011.
2. 'Quantitative Analysis' by R. A. Day, A. L. Underwood, Prentice-Hall of India Pvt. Ltd., New Delhi, Sixth Edition, 2004.
3. 'Analytical Chemistry' by Gary D. Christian, John Wiely & Sons, INC, New York, Fifth Edition, 1994.
4. 'Analytical Chemistry an Introduction' by Douglas A. Skoog, Donald M. West, F. James Holler, Saunders College Publishing, Harcourt Brace College Publishers, Philadelphia, Sixth Edition, 1994.
5. 'A Textbook of Analytical Chemistry' by Y. Anjaneyulu, K. Chandrasekhar, Valli Manickam, Pharma Book Syndicate, Hyderabad, India, 2006.