

20MSC504T					Analytical Chemistry I					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	0	0	0	2	25	50	25	--	--	100

**COURSE OBJECTIVES**

- 1 Gaining the factual knowledge of analytical techniques
- 2 Acquiring basic principles applied for analytical data analysis.
- 3 Learning the fundamental principal of various acid base equilibria and solutions
- 4 Attaining necessary basic knowledge of volumetric and gravimetric concepts for chemical analysis
- 5 Learning the basic experimental techniques of various analytical systems comprising titrations, detection of unknown elements, pH metery.

**UNIT 1 Data Analysis****6 Hrs.**

Mean and standard deviations, reliability of results, confidence interval, comparison of results, comparison of two samples, correlation and regression, correlation coefficient and liner regression

**UNIT 2 Acid Base Equilibria and Buffer Solutions****10 Hrs.**

Acid-base theories, Definition of pH and pH scale (Sorenson and operational definitions), and its significance, Hammett acidity function, pH at elevated temperatures, pH for aqueous solutions of very weak acid and base, pH for salts of weak acid and weak bases, polyprotic acids. Buffer solutions, buffer capacity, applications of buffers

**UNIT 3 Theory of Volumetric and Gravimetric Analysis:****10 Hrs.**

Introduction, Titrimetric analysis, classifications of reactions in titrimetric analysis, standard solutions, preparation of standard solutions, primary and secondary standards, Indicators, theory of indicators, Acid–base titrations in non-aqueous media.

Gravimetric Analysis, Impurities in precipitates, Gravimetric calculations, precipitation equilibria (Solubility product, common ion effect, stoichiometry), organic precipitation.

**UNIT 4 Complexometric equilibria:****8 Hrs.**

Introduction, Titration curves, Types of EDTA titrations, Methods of end point Detection Indicators, Applications of Complexometric Titrations.

**Max. 32 Hrs.****COURSE OUTCOMES**

On completion of the course, student will be able to

**CO1** - understand the basic principal of data analysis and will be able to calculate and interpret analytical data.

**CO2** - Student will learn the theoretical aspects of Acid-base equilibria, buffer solutions and can corelate this knowledge with various analytical applications.

**CO3** - Student will acquire the knowledge of volumetric and gravimetric principles and will be able to interpret and analyse various chemical compounds.

**CO4** – Students can describe the technique to analyse the chemical complexes by advance complexometric fundamentals.

**CO5** - Students will be able to explain the working principal of pH metry and calculations based on pH of various chemicals.

**TEXT/REFERENCE BOOKS**

1. G. H. Geefferyetal, Vogel's Text Book of Quantitative Chemical Analysis, ELBS Edn, 1989

2. D. A. Skoog, D.M. West, F.J Holler, S.R Crouch, Fundamentals of Analytical Chemistry, 8th edition, Thomson Brooks Cole, 2004
3. F. Rouessac and A. Rouessac, Chemical Analysis: Modern Instrumentation
4. Methods and Techniques, 2nd edn, John Wiley and Sons
5. D. A. Skoog, E. J. Holler, S. R. Crouch, Principles of Instrumental Analysis, 6th edition, Thomson Brooks Cole, 2007
6. Instrumental Methods of Analysis: Chatwal and Anand
7. Instrumental Methods of Inorganic Analysis (ELBS): A.I. Vogel
8. Chemical Instrumentation: A Systematic approach- H.A. Strobel.

#### END SEMESTER EXAMINATION QUESTION PAPER PATTERN

**Max. Marks: 100**

Part A/Question: 10 multiple choice questions 1 mark each

Part B/Question: 10 Questions of 2 marks each with internal choice

Part C/Question: 4 Questions of 15 marks each with internal choice

Part D/Question: 1 Questions of 10 marks with internal choice

**Exam Duration: 3 Hrs**

10 Marks

20 Marks

60 Marks

10 Marks