

P.B.SIDDHARTHA COLLEGE OF ARTS & SCIENCE
DEPARTMENT OF CHEMISTRY
M.Sc – CHEMISTRY (ORGANIC CHEMISTRY)
IV SEMESTER
W.E.F 2022-23 (R22 Regulations)

Title of the Paper: MOOCS – ANALYTICAL CHEMISTRY

Course Code	20CH4M2	Course Delivery Method	Class Room / Blended Mode - Both
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2022-2023	Year of Offering:	Year of Revision:----	Percentage of Revision: New

S.No	COURSE OUTCOMES	PO'S
	After the completion of the course, Students will be able to	
1	Memorize basic concepts of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry.	2,7
2	Understand the principle, theory and advanced aspects of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry.	1,3,7
3	Display the knowledge gained in the areas of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry in chosen job role.	1,6,4
4	Analyse the role of analytical chemistry, chemical equilibrium, absorption spectrometry, thermal methods of analysis and potentiometry as and when required.	1,5,7

Syllabus

Unit	Learning Units	Lecture Hours
I	Basic introduction to nature of analytical chemistry Quantitative methods Qualitative methods , Flow diagrams ,Chemistry in toxicology ,Examples for quantitative and qualitative methods, real life examples ROLE : sample preparation basic techniques for analysis physical separation , separation in liquids ,micro analytical balance ,filtration techniques ,wet washing ,dry Ashing , crucibles, filter paper uses of crucibles and filter papers stereo chemical modes are applied [supra +supra] : supra-anta Antra, supra Antra- anta.	12
II	Chemical equilibria , Chemical equilibria in nature chemical equilibria in analytical chemistry, equilibria between strong and weak acids , equilibrium state, different acids, types of equilibria as basis of chemical analysis, equilibria and equilibria constants , importance in analytical chemistry, salt hydrolysis, titration curves , common ion effect , formation constant for complex ions, Introduction from different titrimetric methods, henderson hesselbalch equation, spectro chemical methods , acid base titrations, acid base titration indicators.	12
III	Absorption Spectrometry , instruments , beers law, different transitions , chromophores , d-d , f-f, C-T transitions and	12

	applications, chromophoric reagents , analysis of mixture , applying beers law to mixtures , applications – photometric titrations, spectro photometric titrations, A) complexing agent B) complex ion in solution , infrared absorption spectroscopy A)theory B) principle C) instrumentation for IR, FTIR techniques A) theory B) principle, instrumentation of FTIR , uses and interterometer.	
IV	Thermal method of analysis , Introduction ,dynamic measurement, thermo gravimetric analysis, differential thermal analysis , differential scanning calorimerty, thermo balance, thermal techniques and uses , thermal analysis – solids , Standardisation, geometric estimation, water content, TG-plot , thermo gravimetry – example, mixture of solids in TG, introduction of DTG, samples , furnaces and crucibles, DT, uses of DTG data, food analysis, introduction to DTG, DTA , instruments, uses and applications, DSC, instruments uses and applications, Introduction, electron transfer reactions, electrodes, electrode potential, standard electrode potential, nernest equation, applications of nernest equation, precipitaion /complex ions in nernest equation, electro chemical method of analysis, potentiometry, reference electrode.	12
V	Potentiometers , cells, potentiometric titrations, Use of oxidising and reducing agents , redox potential, potentiometric titrations, uses of oxidising and reducing agents, electrode potentials, IR drop In electrochemical cells, ohmic potential electro gravimetric method , controlled potential coulometry, Its uses in synthesis , colorimetric titrations Applications, electrochemical methods, volumetric methods, analytical method , voltametry, cyclic voltametry – waveforms , CV plot, CV and its application to identity, potential pulses, Differential pulses.	12

Reference Books:

1. Physical chemistry, G.K. Vemulapalli (Prentice Hall of India).
2. Physical chemistry, P.W. Atkins. ELBS.
3. Text book of Physical Chemistry, Samuel Glasstone, Macmillan pub.
4. Quantitative Analysis, A.I.Vogel, Addison Wesley Longmann Inc.
5. Fundamentals of Analytical Chemistry, Skoog & West
6. Quantitative Analysis, Day & Underwood.
7. Instrumental Methods of Analysis, H.H.WAILLARD, Merritt.Jr and J.A.D.Can
8. Instrumental Methods of Analysis, Ewing W.Wend & Pand
9. Instrumental Methods of Analysis, B.K.Sharma
10. Instrumental Methods of Analysis, Chatwel & Anand.
11. Analytical Chemistry, An introduction, D.A.Skoog, D.M.West & F.J.Holler, Sanders college Publishing, Newyork.

**M.Sc. DEGREE EXAMINATION
FOURTH SEMESTER**

Paper-I :: MOOCS

Time: 3 hours

Maximum Marks: 70

SECTION – A

Answer all the questions. Each question carries 2 marks.

(10x2=20M)

1. What is toxicology and explain with a suitable example. (L-2)
2. Discuss any one method of quantitative analysis. (L-1)
3. Explain equilibria between strong and weak acids. (L-2)
4. Discuss salt hydrolysis in detail. (L-2)
5. Explain Beers law in detail. (L-2)
6. Discuss chromophores in detail. (L-2)
7. Explain uses of oxidizing and reducing agents. (L-1)
8. Discuss IR drop in electrochemical cells. (L-2)
9. Explain thermo gravimetric analysis. (L-3)
10. Discuss differential thermal analysis. (L-2)

SECTION – B

(10x5=50M)

UNIT – I

11. a) Explain flow diagrams in detail. (L-2)
- (Or)**
- b) Explain (i) Micro analytical balance (ii) Filtration techniques. (L-2)

UNIT – II

12. a) Explain the types of equilibria on basis of chemical analysis. (L-2)
- (Or)**
- b) Discuss in detail (i) Titration curves (ii) Common ion effect. (L-2)

UNIT – III

13. a). Explain d – d, f – f transitions and its applications in detail. (L-2)
- (Or)**
- b) Discuss chromophoric reagents and applying Beers law to mixtures. (L-2)

UNIT – IV

14. a) Discuss the (i) differential scanning calorimetry (ii) TG – plot. (L-3)
- (Or)**
- b) Discuss (i) Geometric estimation (ii) Furnaces and crucibles (L-2)

UNIT - V

15. a) Discuss in detail potentiometric titrations with a neat labeled diagram. (L-2)
- (Or)**
- b) Explain controlled potential coulometry with a neat labeled diagram. (L-3)
