



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि० नर्मदा Rajpipla, Dist. Narmda

Established by Tribal Development Department, Govt. of Gujarat

School of Science

B.Sc. (Chemistry) Programme

Subject Code & Name: - BS04MICHE1 Analytical Chemistry-II

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage (%)			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
3	-	1	4	35	15	35	15

Programme Name	B.Sc.
Semester	IV
Course Code	BS04MICHE1
Course Title	Analytical Chemistry-II
Course Content Type (Th./Pr.)	Theory & Practical
Course Credit	3 + 1
Sessions+ Lab. Per Week	3 +2
Total Teaching/Lab. Hours	45 Theory Hours + 30 Practical Hours
* 2 Laboratory = 1 Session	

Learning Objectives

1. Students should grasp the underlying principles of analytical chemistry, including quantitative and qualitative analysis, different types of errors and hypothesis testing using statistical analysis.
2. Students should learn to evaluate experimental data for accuracy and precision, understand the sources of errors (both systematic and random), and interpret statistical results to draw meaningful conclusions.
3. To learn back titration and its necessity in analysis.
4. To learn concept and types of volumetric and gravimetric analysis.
5. Learn to safely set up chromatography apparatus and handle solvents and samples.
6. Identify and compare techniques such as paper chromatography, thin-layer chromatography (TLC), gas chromatography (GC), and high-performance liquid chromatography (HPLC)

Prerequisites (if any)





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Learning Outcomes

On the Completion of this course, students will able to:

1. Analyzing water and air pollutants.
2. Estimating clinical compounds.
3. Conducting classical and instrumental chemical experiments.
4. Understanding the different methods used for identifying substances and measuring their amounts.
5. Explore its use in pharmaceuticals, environmental testing, forensics, food safety, and biotechnology.

Detailed Contents

UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Volumetric Titration-I (Acid Base & Redox Titrations) Standard solution and acid-base indicators, Titration of strong acid with strong base, Titration of weak acid with weak base, Titration of weak base with strong acid, Factors determining the exact form of a pH curve, Color change range of an indicator, Indicator error,	15
II	Volumetric Titration-II Theory of complexometric titration involving EDTA, Study of EDTA complex formation taking disodium salt of EDTA and Effect of pH, ways of locating the end point, Estimation of calcium and magnesium by complexometric titration by EDTA, Theory of precipitation titration, Preparation of solutions and indicators, Mohr's Volhard's and Fajan's methods and Factors affecting solubility	15
III	Separation Technique and Chromatography Introduction, Importance of separations in analytical chemistry, Introduction of different separation techniques (filtration, liquid filtration etc.), Introduction and classification of Chromatography, Types of chromatography; Paper Chromatography, TLC, Glass Chromatography, Column Chromatography, Gas Chromatography, Liquid Chromatography and HPLC	15

Text Book(s)





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Reference Books

1. Fundamentals of Analytical Chemistry by Skoog, West, Holler
2. Analytical Chemistry, Gary D. Christian.
3. Quantitative Analysis 6th Edition, R.A.Day, Jr., A. L. Underwood
4. Analytical Chemistry, Dr. Alka Gupta, Pragati Prakashan
5. Analytical Chemistry by Dhruba Charan Dash, PHI Learning Pvt.Ltd, New Delhi, 2011

Web Resources

1. Google books, INFLIBNET, Google Web

Required Software(s) (if any)

Practical(s)

Analytical Chemistry Practicals (any Four)

1. To determine turbidity of given water sample.
2. To determine total dissolved solids and total solids of given water sample.
3. To determine acidity of given water sample.
4. To determine alkalinity of given water sample.
5. To determine hardness of given water sample.
6. To determine chlorides of given water sample.

30

L:: Lecture, **T::** Tutorial, **P::** Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE:: Semester End Evaluation

