



# 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: - BS03MDCHE1 Analytical Chemistry-I

#### 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                         | III                                  |
| Course Code                      | BS03MDCHE1                           |
| Course Title                     | Analytical Chemistry-I               |
| Course Content Type<br>(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.

#### Prerequisites (if any)

#### Learning Outcomes

1. Recognizing different types of errors, evaluating data and performing statistical tests.
2. Learning about different sampling methods and their application in speciation studies.
3. Applying knowledge to solve analytical problems.
4. Preparing scientific reports and communicating results effectively.







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| Detailed Contents   |  |                |
|---|--|----------------|
| UNIT  | TOPIC/SUB-TOPIC  | TEACHING HOURS |
| I   | <b>Introduction to Analytical Chemistry</b><br>Classification of classical and electro analytical techniques, Literature of analytical chemistry (Names of author and publishers for any ten Books, Journals and Reviews), Criterion for selection of analytical techniques, Analytical data treatment, Error, Types of Errors, Accuracy and Precision, Qualitative and Quantitative Analysis. | 15             |
| II  | <b>Statistical Terms in Analytical Chemistry</b><br>Mode, Average, Median, Deviation, Average Deviation, Relative Average Deviation, Standard Deviation, Coefficient of Variance, Q-Test for the rejection of result and related numerical   | 15             |
| III   | <b>Titrimetric Methods in Analysis</b><br>Introduction, Definitions: Standard solutions, Equivalent point, Indicators, End point, Titration general aspects of : Primary standards, Desirable properties of standard solution, Secondary Standard, Volumetric calculations.  | 15             |
| <b>Text Book(s)</b>   |  |                |
| <b>Reference Books</b>  |  |                |
| 1. Fundamentals of Analytical Chemistry by Skoog, West, Holler<br>2. Analytical Chemistry, Gary D. Christian.<br>3. Quantitative Analysis 6 <sup>th</sup> Edition, R.A. Day, Jr., A. L. Underwood<br>4. Analytical Chemistry, Dr. Alka Gupta, Pragati Prakashan |  |                |
| <b>Web Resources</b>  |  |                |
| 1. Google books, INFLIBNET, Google Web  |  |                |
| <b>Required Software(s) (if any)</b>  |  |                |
| <b>Practical(s) (if any)</b>  |  |                |
| <b>Analytical Chemistry Practicals</b>  |  |                |
| 1. Standardization of HCl with Borax.   |  |                |







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2. Determine the number of water molecules of crystallization in sodium carbonate (washing soda) using 0.1 N HCl Solution.
3. Determine the amount of Acetamide in the given solution.
4. Determine the amount of Glucose in the given solution.
5. To measure the pH of unknown water sample with the help of a pH meter.
6. To determine the conductivity of water sample conductometrically.

**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

