

## Faculty of Science and Humanities

### M.Sc.(Chemistry) Semester -I

Effective from Academic Year 2026-27

|                              |                                        |
|------------------------------|----------------------------------------|
| <b>Branch Name:</b>          | M.Sc. Chemistry                        |
| <b>Program Code:</b>         | SC203                                  |
| <b>Course Name:</b>          | Chemistry Practical-I                  |
| <b>Course Code:</b>          | 2SC2030105                             |
| <b>Pre-requisite Course:</b> | Basics chemistry practical up to B.Sc. |

#### Course Objectives:

- To develop laboratory skills by performing basic and advanced chemistry experiments accurately and safely.
- To understand and apply fundamental chemical principles through hands-on experiments in analytical, physical, organic, and inorganic chemistry.
- Learn how to interpret experimental observations and analyze data using appropriate calculations, graphs, and error analysis.
- To enhance problem-solving and critical thinking abilities through experimental design and result interpretation.

#### Teaching and Examination Scheme:

| Teaching Scheme<br>(Hours per week) |                 |                  |        |   | Evaluation Scheme (Marks) |                          |                          |                          |                  |
|-------------------------------------|-----------------|------------------|--------|---|---------------------------|--------------------------|--------------------------|--------------------------|------------------|
| Lecture<br>(L)                      | Tutorial<br>(T) | Practical<br>(P) | Credit |   | Theory(Marks)             |                          | Practical(Marks)         |                          | Total<br>(Marks) |
|                                     |                 |                  | T      | P | University<br>Assessment  | Continuous<br>Assessment | University<br>Assessment | Continuous<br>Assessment |                  |
| -                                   | -               | 16               | -      | 8 | -                         | -                        | 100                      | 100                      | 200              |

#### List of Experiment:

##### 1 Inorganic Chemistry Practical-I

Qualitative analysis (Minimum 6)

Inorganic mixture should be comprised of six radicals along with one rare element. Candidate if required should be guided once for the wrong group and marks deducted for wrong group. Maximum of five marks can be deducted for wrong group. There shall be no deduction of marks for reporting wrong radicals

##### 2 Organic Chemistry Practical-I

Functional group estimation (Minimum 3)

Natural Product Isolation (Minimum 3)

##### 3 Physical Chemistry Practical-I

(Minimum 6)

###### 1. Adsorption

- Study the variation of surface tension of solution of n-propyl alcohol with concentration.
- Study the kinetic of the reaction between Potassium per sulphate and Potassium Iodide.

[Determine rate constant and order of the reaction

Study the influence of ionic strength on the rate constant.

###### 2. pH Metry

- Determination of dissociation constant of weak like acetic and monochloro acetic acid.

### 3. Conductometry

- To determine the solubility product and solubility of sparingly soluble salts-PbSO<sub>4</sub> and BaSO<sub>4</sub>.

### 4. Potentiometry

- Redox Titration Ferrous ammonium sulphate –KMnO<sub>4</sub>, K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
- To determine potentiometrically the formula of Silver ammonia complex.

### 5. Distribution method

- Determination of the formula of the complex formed between cupric ion and ammonia (1M) by distribution method.
- Distribution of CH<sub>3</sub>COOH between H<sub>2</sub>O and CHCl<sub>3</sub>/ CCl<sub>4</sub>

## 4 Analytical Chemistry Practical-I

Water analysis (Minimum 6)

- Water Analysis for TDS.
- Water Analysis for Ca and Mg.
- Water Analysis for carbonate and bicarbonate.
- Water Analysis for Chloride.
- Water Analysis for Sulphate.
- Water Analysis for Total hardness.
- Water Analysis for Nitrate.

### Reference Books:

- Comprehensive Practical Organic Chemistry by V. K. Ahluwalia.
- Advanced Inorganic Chemistry by Dr. Keemtilal.
- Practical Physical Chemistry by Renu Gupta.

**Course Learning Outcomes (CLO):** On completion of this course, the students will be able to:

| CLO  | Description                                                                                                                                                                                                               | Bloom's Taxonomy Level                          |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| CLO1 | Perform systematic qualitative analysis of inorganic mixtures to identify radicals using standard laboratory procedures.                                                                                                  | 2. Understanding<br>3. Applying<br>4. Analyzing |
| CLO2 | Identify functional groups in organic compounds by standard estimation procedure.                                                                                                                                         | 2. Understanding<br>3. Applying                 |
| CLO3 | To isolating natural products using appropriate extraction and purification techniques.                                                                                                                                   | 2. Understanding<br>4. Analyzing                |
| CLO4 | Conduct physical chemistry experiments involving adsorption, chemical kinetics, pH metry, conductometry, potentiometry, and distribution methods to determine physicochemical parameters and interpret experimental data. | 3. Applying<br>4. Analyzing<br>5. Evaluating    |
| CLO5 | Analyze water samples for important physicochemical parameters such as TDS, calcium, magnesium, carbonate, bicarbonate, chloride, sulphate, nitrate, and total hardness using standard analytical methods.                | 4. Analyzing<br>5. Evaluating                   |
| CLO6 | Calculate experimental results, analyze errors, interpret observations, and prepare laboratory reports with appropriate conclusions.                                                                                      | 4. Analyzing<br>5. Evaluating                   |

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### Mapping of CLO with PO and PSO

| Course Learning Outcomes | Program Outcomes (POs) |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    | PSOs |   |
|--------------------------|------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|------|---|
|                          | 1                      | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 1    | 2 |
| CLO1                     |                        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    | 2    | 2 |
| CLO2                     | 2                      |   |   |   | 2 | 2 |   |   |   |    |    |    |    |    |    |    | 3    | 2 |
| CLO3                     | 2                      |   |   |   |   | 1 |   |   |   |    |    |    |    |    |    |    | 3    | 3 |
| CLO4                     |                        |   |   |   | 1 | 2 |   |   |   | 2  |    |    |    |    |    |    | 2    | 3 |
| CLO5                     |                        |   |   |   |   |   |   |   |   | 1  |    |    |    |    |    |    | 2    | 2 |
| CLO6                     |                        |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    | 2    | 3 |

**3:High, 2:Medium, 1:Low**