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|------------------------------|--------------------------------------------|
| <b>Branch Name:</b>          | Chemistry                                  |
| <b>Program Code:</b>         | SC103                                      |
| <b>Course Name:</b>          | Chemistry practical                        |
| <b>Course Code:</b>          | 2SC1030505                                 |
| <b>Pre-requisite Course:</b> | Basic knowledge of the properties compound |

**Course Objectives:**

1. Sampling in chemical and pharmaceutical industries
2. To learn about maintenance and calibration of instruments,
3. To study about different type chemical synthesis.

**Teaching and Examination Scheme:**

| Teaching Scheme<br>(Hours per week) |              |               |        | Evaluation Scheme (Marks) |                       |                       |                       |               |
|-------------------------------------|--------------|---------------|--------|---------------------------|-----------------------|-----------------------|-----------------------|---------------|
| Lecture (L)                         | Tutorial (T) | Practical (P) | Credit | Theory (Marks)            |                       | Practical (Marks)     |                       | Total (Marks) |
|                                     |              |               |        | University Assessment     | Continuous Assessment | University Assessment | Continuous Assessment |               |
| -                                   | --           | 12            | 6      | -                         | -                     | 120                   | 80                    | 200           |

**List of Experiments:**

| Sr. No | Practical Exercise                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| 1.     | <b>Inorganic Chemistry practical</b><br><b>Qualitative analysis (Minimum 10)</b><br>Inorganic mixture should be comprised of six radicals. 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.     | <b>Organic Chemistry practical</b><br><b>(A) Estimation of functional groups: (Minimum 03)</b> <ol style="list-style-type: none"> <li>1. Estimation of Ester</li> <li>2. Estimation of Amide</li> <li>3. Estimation of Ascorbic acid</li> <li>4. Estimation of Aspirin</li> </ol> <b>(B) Synthesis of Organic Compounds (Minimum 05)</b> <ol style="list-style-type: none"> <li>1. Preparation of m-Dinitro benzene from Nitrobenzene</li> <li>2. Preparation of p-Nitro acetanilide from Acetanilide</li> <li>3. Preparation of Acetanilide from Aniline</li> <li>4. Preparation of Aspirin from Salicylic acid</li> <li>5. Preparation of Di-benzyl acetone from Benzaldehyde</li> <li>6. (6) Preparation of 2,4,6-Tribromo aniline from Aniline [Liquid component must be neutral in nature]</li> </ol> |
| 3.     | <b>Physical Chemistry</b><br><b>[A] Instruments: (Minimum 05)</b> <ol style="list-style-type: none"> <li>1. To determine normality and amount of HCl and CH<sub>3</sub>COOH in the given solution by Conductometric titration against 0.2N (exact) NaOH solution.</li> <li>2. To determine the solubility product and solubility of sparingly soluble salts PbSO<sub>4</sub> by</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                 |

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|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Conductometry.</p> <ol style="list-style-type: none"> <li>To determine Normality and amount of each acid in the given mixture of HCl + CH<sub>3</sub>COOH by pH metrically.</li> <li>To determine the strength of strong and weak acid in a given mixture by Potentiometric titration using 0.1 N NaOH</li> <li>To determine the concentration of Nickel in the given solution by Colorimetric estimation.</li> <li>To determine the concentration of unknown solution from given KMnO<sub>4</sub> solution by Colorimetric.</li> </ol> <p><b>[B] Kinetics &amp; Distributions: (Minimum 03)</b></p> <ol style="list-style-type: none"> <li>To determine the order of the reaction between K<sub>2</sub>S<sub>2</sub>O<sub>8</sub> and KI.</li> <li>To determine the order of the reaction between H<sub>2</sub>O<sub>2</sub> and HI.</li> <li>To determine the distribution coefficient of Iodine between CCl<sub>4</sub>/CHCl<sub>3</sub>. &amp; water at a given temperature.</li> <li>To study the distribution of Benzoic acid between Benzene and water at room Temperature and prove the dimidiation of Benzoic acid in Benzene.</li> </ol> |
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#### Text Books:

- Vogel's textbook of quantitative inorganic analysis Chemistry, Inorganic. 1. Jeffery, G. H. 1909- . II.
- Vogel's textbook of practical organic chemistry FIFTH EDITION by Brian S. Furniss Antony J. Hannaford Peter W. G. Smith Austin R. Tatchell

#### Reference Books:

- Advanced Practical Organic Chemistry First Edition by Dorothy Bartlett ,2009
- Advanced Practical Physical Chemistry, PB. by **J B Yadav**

#### List of Open Source Software/learning website:

- <https://www.pdfdrive.com/chemistry-with-inorganic-qualitative-analysis>
- [https://fac.ksu.edu.sa/sites/default/files/vogel\\_-\\_practical\\_organic\\_chemis](https://fac.ksu.edu.sa/sites/default/files/vogel_-_practical_organic_chemis)

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

| CLO  | Description                                                                                        | Bloom's Taxonomy Level |
|------|----------------------------------------------------------------------------------------------------|------------------------|
| CLO1 | <b>Identify</b> the physical state of the inorganic substance.                                     | 1 Remembering          |
| CLO2 | <b>Classify</b> the different test for inorganic qualitative analysis.                             | 2 Understanding        |
| CLO3 | <b>Use</b> the different types of reagents for organic synthesis.                                  | 3 Applying             |
| CLO4 | <b>Conclude</b> the present positive and negative radical in inorganic substance.                  | 4 Analyzing            |
| CLO5 | Find out the <b>Value</b> of concentration for solution by using instrumentation titration method. | 5 Evaluating           |
| CLO6 | <b>Modify</b> the reactant with reagent for different organic synthesis.                           | 6 creating             |

### Mapping of CLOs with POs & PSOs

| Course Learning Outcomes | Programme Outcomes (POs) |     |     |     |     |     |     |     |     |
|--------------------------|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
|                          | PO1                      | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
| CLO1                     | M                        | M   |     | L   |     |     |     |     |     |
| CLO2                     | L                        | M   |     |     | M   |     |     |     |     |
| CLO3                     |                          |     | L   |     | M   |     |     |     |     |
| CLO4                     |                          | L   |     |     |     |     |     |     |     |
| CLO5                     |                          | H   | M   |     |     |     |     |     |     |
| CLO6                     |                          | H   | M   |     |     |     |     |     |     |

**H: High, M: Medium, L: Low**