# **KTU Students**

| CYL | ENGINEERING CHEMISTRY LAB | CATEGORY | L | T P |   | CREDIT |  |
|-----|---------------------------|----------|---|-----|---|--------|--|
| 120 |                           | BSC      | 0 | 0   | 2 | 1      |  |
|     |                           |          |   |     |   |        |  |

**Preamble:** To impart scientific approach and to familiarize with the experiments in chemistry relevant for research projects in higher semesters

**Prerequisite:** Experiments in chemistry introduced at the plus two levels in schools

Course outcomes: After the completion of the course the students will be able to

| CO 1 | Understand and practice different techniques of quantitative chemical analysis to         |  |  |  |  |  |  |  |
|------|---|--|--|--|--|--|--|--|
|      | generate experimental skills and apply these skills to various analyses                   |  |  |  |  |  |  |  |
| CO 2 | Develop skills relevant to synthesize organic polymers and acquire the practical skill to |  |  |  |  |  |  |  |
|      | use TLC for the identification of drugs   |  |  |  |  |  |  |  |
| CO 3 | Develop the ability to understand and explain the use of modern spectroscopic             |  |  |  |  |  |  |  |
|      | techniques for analysing and interpreting the IR spectra and NMR spectra of some          |  |  |  |  |  |  |  |
|      | organic compounds   |  |  |  |  |  |  |  |
| CO 4 | Acquire the ability to understand, explain and use instrumental techniques for chemical   |  |  |  |  |  |  |  |
|      | analysis  |  |  |  |  |  |  |  |
| CO 5 | Learn to design and carry out scientific experiments as well as accurately record and     |  |  |  |  |  |  |  |
|      | analyze the results of such experiments   |  |  |  |  |  |  |  |
| CO 6 | Function as a member of a team, communicate effectively and engage in further             |  |  |  |  |  |  |  |
|      | learning. Also understand how chemistry addresses social, economical and                  |  |  |  |  |  |  |  |
|      | environmental problems and why it is an integral part of curriculum                       |  |  |  |  |  |  |  |

# Mapping of course outcomes with program outcomes

|      | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | РО | РО | РО |
|------|------|------|------|------|------|------|------|------|------|----|----|----|
|      |      |      |      |      |      | 75-  |      | 711  |      | 10 | 11 | 12 |
| CO 1 | 3    |      |      |      | 2    |      |      |      |      |    |    | 3  |
| CO 2 | 3    |      |      |      | 3    |      |      |      |      |    |    | 3  |
| CO 3 | 3    |      |      |      | 3    | -(1) |      |      |      |    |    | 3  |
| CO 4 | 3    |      |      |      | 3    |      |      |      |      |    |    | 3  |
| CO 5 | 3    |      |      |      | 1    |      |      |      |      |    |    | 3  |
| CO 6 | 3    |      |      |      | 1    |      |      |      |      |    |    | 3  |

## Mark distribution

| Total Marks | CIE<br>marks | ESE<br>marks | ESE Duration(Internal) |
|-------------|--------------|--------------|------------------------|
| 100         | 100          | -            | 1 hour                 |

#### **Continuous Internal Evaluation Pattern:**

Attendance : 20 marks
Class work/ Assessment/Viva-voce : 50 marks
End semester examination (Internally by college) : 30 marks
End Semester Examination Pattern: Written Objective Examination of one hour

### **SYLLABUS**

## LIST OF EXPERIMENTS (MINIMUM 8 MANDATORY)

- 1. Estimation of total hardness of water-EDTA method
- 2. Potentiometric titration
- 3. Determination of cell constant and conductance of solutions.
- 4. Calibration of pH meter and determination of pH of a solution
- 5. Estimation of chloride in water
- 6. Identification of drugs using TLC
- 7. Determination of wavelength of absorption maximum and colorimetric estimation of Fe<sup>3+</sup> in solution
- 8. Determination of molar absorptivity of a compound (KMnO<sub>4</sub> or any water soluble food colorant)
- 9. Synthesis of polymers (a) Urea-formaldehyde resin (b) Phenol-formaldehyde resin
- 10. Estimation of iron in iron ore
- 11. Estimation of copper in brass
- 12. Estimation of dissolved oxygen by Winkler's method
- 13. (a) Analysis of IR spectra (minimum 3 spectra) (b) Analysis of <sup>1</sup>H NMR spectra minimum 3 spectra)
- 14. Flame photometric estimation of Na<sup>+</sup> to find out the salinity in sand
- 15. Determination of acid value of a vegetable oil
- 16. Determination of saponification of a vegetable oil

## **Reference Books**

- 1. G. Svehla, B. Sivasankar, "Vogel's Qualitative Inorganic Analysis", Pearson, 2012.
- 2. R. K. Mohapatra, "Engineering Chemistry with Laboratory Experiments", PHI Learning, 2017.
- 3. Muhammed Arif, "Engineering Chemistry Lab Manual", Owl publishers, 2019.
- 4. Ahad J., "Engineering Chemistry Lab manual", Jai Publications, 2019.
- 5. Roy K Varghese, "Engineering Chemistry Laboratory Manual", Crownplus Publishers, 2019.
- 6. Soney C George, Rino Laly Jose, "Lab Manual of Engineering Chemistry", S. Chand & Company Pvt Ltd, New Delhi, 2019.