

**RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**B.TECH. DEGREE PROGRAMME**

**FIRST SEMESTER**

**(2020 ADMISSIONS)**

<b>100908/CH922S</b>	<b>ENGINEERING CHEMISTRY LAB</b>
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**SYLLABUS**

Rajagiri Valley, Kakkanad,  
Kochi 682 039, Kerala, INDIA

[www.rajagiritech.ac.in](http://www.rajagiritech.ac.in)

<b>COURSE CODE</b>	<b>COURSE NAME</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>CREDIT</b>	<b>YEAR OF INTRODUCTION</b>
<b>100908/CH922S</b>	<b>ENGINEERING CHEMISTRY LAB</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>2020</b>

- 1. Preamble:** To impart scientific approach and to familiarize with the experiments in chemistry relevant for research projects in higher semesters.
- 2. Prerequisite:** Experiments in chemistry introduced at the plus two levels in schools

### 3. 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  $\text{Fe}^{3+}$  in solution
8. Determination of molar absorptivity of a compound ( $\text{KMnO}_4$  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  $^1\text{H}$  NMR spectra (minimum 3 spectra)
14. Flame photometric estimation of  $\text{Na}^+$  to find out the salinity in sand
15. Determination of acid value of a vegetable oil
16. Determination of saponification of a vegetable oil

### 4. 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.

**5. Course Outcomes:** After the completion of the course the student will be able to

**CO 1:** Understand and practice different techniques of qualitative and 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 various chromatographic techniques like TLC for the identification of drugs and chemical compounds

**CO 3:** Develop the ability to understand and explain the use of modern spectroscopic techniques for analysing molecular chemical structure by interpreting IR and NMR spectra of 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

**CO 7:** An ability to analyze the quality of water by determining its chemical parameter

## 6. Mapping of course outcomes with program outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3				2							3
CO2	3				3							3
CO3	3				3							3
CO4	3				3							3
CO5	3				1							3
CO6	3				1							3
CO7	3		1			1	1					

## 7. Mark Distribution

Total	CIE			
	Attendance	Internal Examination (ESE)	Lab work/ Record/Viva-voce	Total
100	20	30	50	100

## 8. End Semester Examination Pattern

Written Objective Examination of one hour