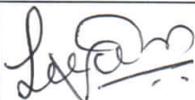
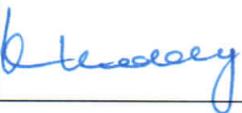


BOARD OF STUDIES FOR CHEMISTRY

MINUTES OF THE MEETING

The meeting of the Board of Studies for Chemistry was held on 19.08.2025 at 03:30 PM through Online mode.

The following members attended the meeting:

S. No	Name	Designation	Role	Signature
1	Dr. A. Raji Reddy	Director, CMR Technical Campus	Special Invitee	
2	Dr. C. Amaravathi	Assoc. Professor, Department of Chemistry, CMR Technical Campus	Chairman	
3	Dr. P. Aparna	Professor of Chemistry, JNTUH UCETH,	University Nominated Member	
4	Dr. A. Aditya Prasad	Professor of Chemistry, MR CET, Hyderabad	Subject Expert	
5	Dr. Harika Patmala	Asst. Professor, MLR Institute of Technology, Hyderabad.	Subject Expert	
6	Dr. T. Leena Vinolia	Assoc. Professor, Department of Chemistry, CMR Technical Campus	Subject Expert	
7	Dr. D T V Dharmajee Rao	Professor & Dean Academics, CMR Technical Campus	Special Invitee	
8	Dr. V. Kesava Reddy	Professor & Head, Department of H&S, CMR Technical Campus	Special Invitee	

Dr. C. Amaravathi, Associate Professor of Chemistry & Chairman, Board of Studies welcomed all the members and presented the **R25** scheme & syllabus (w.e.f.: Academic Year 2025-26).

The members discussed thoroughly and made the following suggestions and recommendations:

- **UNIT-II:** addition of Nernst Equation Derivation Part and removal of Numerical Problems.

(P.T.O.)

Electrochemistry has been revised to the derivation and application of the NERNST equation, a crucial concept in electrochemistry.

- **UNIT-III:** Batteries has been updated to include construction and applications of lithium batteries, as an example of Primary batteries instead of the LPG & CNG composition and uses.
- **UNIT-IV:** Polymers has been modified from Fiber reinforced plastics to thermosetting plastics, with Bakelite example added.
- **UNIT-V:** Spectroscopy has been introduced with an introduction, principles of spectroscopic techniques, replaces the topic of Bio- sensors
- **LABORATORY:** A new experiment focusing in Volumetric analysis on determining the alkalinity of a water sample is added, Replacing the pH metry experiment for acid concentration.

The same has been modified accordingly and approved the **R25** scheme & syllabus of Engineering Chemistry (w.e.f.: Academic Year 2025-26).

The Chairman concluded the meeting and thanked all the members for attending and sharing their views.

unit - V

Instead of Biosensor
include. Refractories → Introduction
classification & Application





Chairman,

Board of studies,

Department of Chemistry,

CMR Technical Campus.

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. I Year Syllabus

Common for CSE & ECE

I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	25MA101BS	Matrices and Calculus	3	1	0	4
2	25CH102BS	Engineering Chemistry	3	0	0	3
3	25EN103HS	English for Skill Enhancement	3	0	0	3
4	25EC104ES	Basic Electronics	3	0	0	3
5	25CS105ES	Programming for Problem Solving	3	0	0	3
6	25CH106BS	Engineering Chemistry Lab	0	0	2	1
7	25EN107HS	English Language and Communication Skill Lab	0	0	2	1
8	25CS108ES	Programming for Problem Solving Lab	0	0	2	1
9	25EC109ES	Idea & Innovation Lab	0	0	2	1
10		Induction Program				
		Total Credits	15	1	8	20

II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	25MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	25PH202BS	Advanced Engineering Physics	3	0	0	3
3	25EC203ES	Basic Electrical Engineering	3	0	0	3
4	25CS204ES	Data Structures	3	0	0	3
5	25ME205ES	Computer Aided Engineering Graphics	0	1	2	2
6	25PH206BS	Advanced Engineering Physics Lab	0	0	2	1
7	25EC207ES	Basic Electrical Engineering Lab	0	0	2	1
8	25CS208ES	Data Structures Lab	0	0	2	1
9	25CS209ES	Python Programming Lab	0	0	2	1
10	25CS210ES	IT Workshop	0	0	2	1
		Total Credits	12	2	12	20

K. V. Reddy

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CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. I Year Syllabus

Common for CSE [AI & ML] & CSE[DS]

I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	25MA101BS	Matrices and Calculus	3	1	0	4
2	25PH102BS	Advanced Engineering Physics	3	0	0	3
3	25EC103ES	Basic Electrical Engineering	3	0	0	3
4	25CS104ES	Programming for Problem Solving	3	0	0	3
5	25ME105ES	Computer Aided Engineering Graphics	0	1	2	2
6	25PH106BS	Advanced Engineering Physics Lab	0	0	2	1
7	25EC107ES	Basic Electrical Engineering Lab	0	0	2	1
8	25CS108ES	Programming for Problem Solving Lab	0	0	2	1
9	25CS109ES	Python Programming Lab	0	0	2	1
10	25CS110ES	IT Workshop	0	0	2	1
11		Induction Program				
		Total Credits	12	2	12	20

II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	25MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2	25CH202BS	Engineering Chemistry	3	0	0	3
3	25EN203HS	English for Skill Enhancement	3	0	0	3
4	25EC204ES	Basic Electronics	3	0	0	3
5	25CS205ES	Data Structures	3	0	0	3
6	25CH206BS	Engineering Chemistry Lab	0	0	2	1
7	25EN207HS	English Language and Communication Skill Lab	0	0	2	1
8	25CS208ES	Data Structures Lab	0	0	2	1
9	25EC209ES	Idea & Innovation Lab	0	0	2	1
		Total Credits	15	1	8	20

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DEPARTMENT OF HUMANITIES & SCIENCES
UGC AUTONOMOUS
CMR TECHNICAL CAMPUS



Accredited by NBA & NAAC with 'A' Grade
Kandlakoya (V), Medchal Road, Hyderabad - 501 401

ENGINEERING CHEMISTRY

B. Tech. I Year

L T P C

3 0 0 3

Course Objectives:

1. To develop adaptability to new advances in Engineering Chemistry and acquire the essential skills to become a competent engineering professional.
2. To understand the industrial significance of water treatment, fundamental principles of battery chemistry, and the impact of corrosion along with its control methods for structural protection.
3. To impart foundational knowledge of various energy sources and their practical applications in engineering.
4. To understand the fundamentals synthesis, general properties of polymers and other engineering materials.
5. To equip students with an understanding of smart materials and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

1. Students will be able to understand the fundamental properties of water and its applications in both domestic and industrial purposes.
2. Students will gain basic knowledge of electrochemical processes and their relevance to corrosion and its control methods.
3. Students will comprehend the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
4. Students will learn the basic concepts and properties of polymers and other engineering materials.
5. Students will be able to apply the principles of UV-Visible, IR spectroscopy and Raman spectroscopy in analyzing pollutants in dye industries and biomedical applications.

UNIT-I: Water and its treatment: [8]

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. **Boiler troubles:** Scales, Sludges and Caustic embrittlement. Internal treatment of boiler feed water - Calgon conditioning, Phosphate conditioning, Colloidal conditioning. External treatment methods - Softening of water by ion- exchange processes. Desalination of brackish water – Reverse osmosis. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break-point chlorination. Defluoridation - Nalgonda technique.

Unit-II: Electrochemistry and Corrosion: [8]

Introduction- Electrode potential, standard electrode potential, Nernst equation - derivation, electrochemical cell - Galvanic cell, cell representation, EMF of cell. Types of electrodes, reference electrodes - Primary reference electrode - Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode. Construction, working and determination of pH of unknown solution using SHE and Calomel electrode.

Corrosion: Introduction- Definition, causes and effects of corrosion – Theories of corrosion, chemical and electrochemical theories of corrosion, Types of corrosion: galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion - Nature of the metal, Nature of the corroding environment. Corrosion control methods - Cathodic protection Methods - Sacrificial anode and impressed current methods.

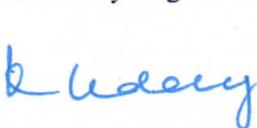
UNIT-III: Energy sources: [8]

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of lithium, Lithium-ion and Zn-air battery. Fuel Cells – Differences between a battery and a fuel cell, Construction and applications of Direct Methanol Fuel Cell (DMFC).

Fuels: Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulong's formula, Numerical problems.

Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking - Moving bed catalytic cracking.

Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.











UNIT - IV: Polymers: [8]

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerizations - Addition (free radical addition mechanism) and condensation polymerization.

Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6, Bakelite). Differences between thermoplastics and thermo setting plastics.

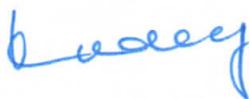
Conducting polymers: Definition and Classification with examples - Mechanism of conduction in trans-poly-acetylene and applications of conducting polymers.

Biodegradable polymers: Polylactic acid and its applications.

UNIT-V- Advanced Functional Materials: [8]

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol, Piezoelectric materials – quartz and their engineering applications.

Introduction, principles and Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Under Control- CO sensor (Passive Infrared detection), Raman spectroscopy (application) - Tumour detection in medical applications.

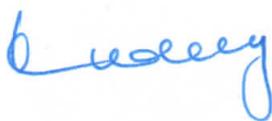


SUGGESTED TEXT BOOKS:

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8. E-books:
<https://archive.org/details/EngineeringChemistryByShashiChawla/page/n111/mode/2u>











ENGINEERING CHEMISTRY LABORATORY

B.Tech. I Year II Sem.

L T P C

0 0 2 1

Course Description:

The course includes experiments based on fundamental principles of chemistry essential for engineering students, aiming to develop practical skills and reinforce theoretical concepts.

Course Objectives

1. Students will understand and perform experiments based on core chemical principles relevant to engineering applications.
2. Students will learn to estimate the hardness of water to assess its suitability for drinking purposes.
3. Students will acquire the ability to perform acid-base titrations using instrumental methods such as conductometry, potentiometry.
4. Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, 6 in the laboratory.
5. Students will learn to determine the unknown concentration of potassium permanganate (KMnO_4) using a calibration curve.

Course Outcomes:

1. Students will develop practical skills through hands-on chemistry experiments relevant to engineering.
2. Students will learn to determine important parameters such as water hardness and the corrosion rate of mild steel under various conditions.
3. Students will be able to apply techniques like conductometry, potentiometry to determine concentrations or equivalence points in acid-base reactions.
4. Students will gain experience in synthesizing polymers such as Bakelite and Nylon-6,6.
5. Students will understand the working principle of colorimetry and the relationship between absorbance and concentration (Beer-Lambert Law).

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List of Experiments:

- I. **1. Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.
2. Determine the alkalinity in a sample of water.
- II. Conductometry:
 1. Estimation of the concentration of strong acid by Conductometry.
 2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.
- III. Potentiometry:
 1. Estimation of concentration of Fe^{+2} ion by Potentiometry using KMnO_4 .
 2. Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone
- IV. **Colorimetry:** Verification of Lambert-Beer's law using KMnO_4 .
- V. Preparations:
 1. Preparation of Bakelite.
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- VI. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
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Nitinol, Piezoelectric materials – quartz and their engineering applications.

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Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Under Control-CO sensor (Passive Infrared detection), Raman spectroscopy (application) - Tumour detection in medical applications.



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2. Determination of alkalinity in sample of water

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1. Estimation of the concentration of strong acid by Conductometry.
2. Estimation of the concentration of strong and weak acid in an acid mixture by Conductometry.

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1. Estimation of concentration of Fe^{+2} ion by Potentiometry using KMnO_4 .
2. Estimation of concentration of strong acid with strong base by Potentiometry using quinhydrone

IV. Colorimetry: Verification of Lambert-Beer's law using KMnO_4 .

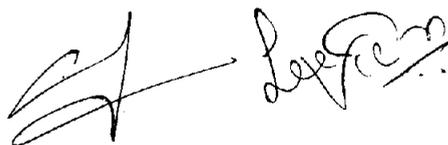
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1. Preparation of Bakelite.
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VI. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

VII. Virtual lab experiments:

1. Construction of Fuel cell and it's working.
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