Sreyas Institute of Engineering and Technology
An Autonomous Institution
Approved by AICTE, Affiliated to JNTUH
Accredited by NAAC-A Grade, NBA (CSE, ECE & ME) & ISO 9001:2015 Certified

Department of Humanities and Sciences (Chemistry)

Board of Studies – First meeting on 14-08-2025 at 10:30 am

AGENDA

Item-1: Welcoming the distinguished Members of the Board of Studies for the BOS meeting by the Head of the Department.

Item-2: Review /Approval of the academic regulation for the B. Tech Program.

Item-3: Review /Approval of the course structure of B. Tech Program.

Item-4: Review/Approval of the detailed syllabus of Engineering Chemistry Theory.

Item-5: Review/Approval of the detailed syllabus of Engineering Chemistry Lab.

Item-6: Review/Approval of the detailed syllabus of Applied Chemistry Theory.

Item-7: Review/Approval of the detailed syllabus of Applied Chemistry Lab.

Item-8: Any other suggestions to the department.

Item-9: Vote of Thanks.

Md. Naseeruddin
Chairman of BoS and HoD of H&S Dept

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Department of Humanities and Sciences (Chemistry)

BoS - Members

S.No	Name of the Member	Designation & Address	BOS Position	Signature
1	Mr. Md.Naseeruddin	Assoc.Prof. of Chemistry, HoD (H&S) SIET	Chairman	
2	**Dr. K.Vidya**	**Assoc Prof. of Chemistry, JNTUH, UCESTH**	**Member JNTUH Nominee**	
3	**Dr.Ch.Subramanyam**	**Professor, Dept of Chemistry, IITH**	**Member Subject Expert-1**	
4	**Dr.Someshwar Pola**	**Asst.Prof, Dept of Chemistry, Osmania University**	**Member Subject Expert-2**	
5	Dr.A.Hymavathi	Assoc.Prof, SIET	Member Internal Faculty	
6	Mr.B.Rahul Omprakash	Assoc.Prof, SIET	Member Internal Faculty	
7	Mrs.G.Sujatha	Asst.Prof, SIET	Member Internal Faculty	
8	Dr.Y.Swetha	Asst.Prof, SIET	Member Internal Faculty	
9	Ms.G.Aswini Devi	Asst.Prof, SIET	Member Internal Faculty	
10	Mr.M.Srikanth	Asst.Prof, SIET	Member Internal Faculty	

The minutes of the meeting are as follows:

- The meeting commenced by the welcome note by the Domain Lead.
- Faculty members reviewed the syllabus in detail, and found it comprehensive and relevant to current academic year.
- It was decided that the syllabus aligns well with the specified POs and COs, ensuring intended learning objectives are met.
- **EC Chemistry:**

  Suggestions given by Dr. Subramanyam:

  - As per the outcomes of the BOS meeting, the following topics are suggested to be included in the syllabus respectively.
  - UNIT-II: Surface coatings, Metallic coatings, techniques of coating, hot dipping, Cementation and electroplating of Copper.
  - UNIT-III: Super capacitor, Sodium Battery concept instead of Lithium Battery.
  - In Continuous to the additions, UNIT-V name is suggested to be modified from Advanced Functional Materials to Chemistry of material Science
  - In UNIT-V suggested to be modified a sentence which is given as pollution under control- CO sensor to Pollution monitoring CO sensors.

  Suggestions given by Dr. Somesh Pola:

  In Unit-V as expert are suggested to specify dye industry which was represented in general.

  - **Engineering Chemistry Lab:** No Changes.

- **Applied chemistry:**

  Suggestions given by Dr. Subramanyam

  In UNIT-V suggested to be modified a sentence which is given as pollution under control- CO sensor to Pollution monitoring CO sensors.

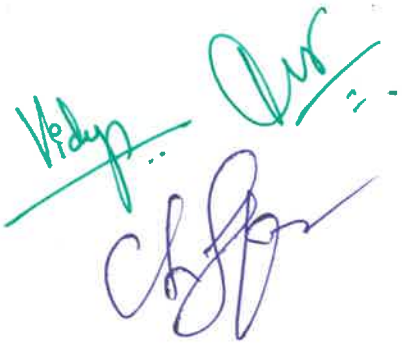
  Suggestions given by Dr. Somesh Pola

  In UNIT-V name is suggested to be modified from Advanced Functional Materials to Chemistry of material Science.

- **Applied chemistry Lab:** No Changes

List of enclosures:

1) R25 Regulations
2) Course Structure
3) Syllabus



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Common Syllabus for R25 B.Tech CSE/ECE/CSE(AIML)					SIET Hyderabad			
	CH102BS: ENGINEERING CHEMISTRY							
I B.Tech – I Sem					**L**	**T**	**P**	**C**
					3	**0**	**0**	**3**

Pre-requisite: Pre-university knowledge

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 equip students with an understanding of smart materials, biosensors, and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

1.
2.
3.
4.
5.

UNIT – I: Water and its treatment

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

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.

UNIT – II: Electrochemistry and Corrosion:

Introduction- Electrode potential, standard electrode potential, Nernst equation (no derivation), electrochemical cell - Galvanic cell, cell representation, EMF of cell - Numerical problems. Types of electrodes, reference electrodes - Primary reference electrode - Standard Hydrogen Electrode (SHE),Secondary reference electrode - 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

Batteries: Introduction – Classification of batteries - Primary, secondary and reserve batteries with examples. Construction, working and applications of Zn-air and Lithium ion battery. Fuel Cells –

Fuels: Introduction and characteristics of a good fuel, Calorific value – Units - HCV, LCV- Dulongs formula - Numerical problems.
Fossil fuels: Introduction, Classification, Petroleum - Refining of Crude oil, Cracking - Types of cracking- Moving bed catalytic cracking. LPG and CNG composition and uses.
Synthetic Fuels: Fischer-Tropsch process, Introduction and applications of Hythane and Green Hydrogen.

UNIT – IV: Polymers

Definition - Classification of polymers: Based on origin and tacticity with examples – Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization. Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6).Differences between themoplastics and thermo setting plastics.
Conducting polymers: Definition and Classification with examples - Mechanism of conduction in transpoly-acetylene and applications of conducting polymers.
Biodegradable polymers: Poly lactic acid and its applications.

UNIT – V: Advanced Functional Materials:

Smart materials: Introduction, Classification with examples - Shape Memory Alloys – Nitinol,
Piezoelectric materials – quartz and their engineering applications.
Biosensor - Definition, Amperometric Glucose monitor sensor.
Interpretative spectroscopic applications of UV-Visible spectroscopy for Analysis of pollutants in dye industry, IR spectroscopy in night vision-security, Pollution Monitoring- CO sensor (Passive Infrared detection).

TEXT BOOKS:

1. *Engineering Chemistry* by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010.
2. *Engineering Chemistry* by Rama Devi, Dr. P. Aparna and Rath, Cengage learning, 2025.

REFERENCE BOOKS:

1. *Engineering Chemistry:* by Thirumala Chary Laxminarayana & Shashikala, Pearson Publications (2020)
2. *Engineering Chemistry* by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. *Engineering Chemistry* by Shikha Agarwal, Cambridge University Press, Delhi 2015.
4. *Engineering Analysis of Smart Material Systems* by Donald J. Leo, Wiley, 2007.
5. *Challenges and Opportunities in Green Hydrogen* by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K Sinha.

Useful Links

1. E-Content- https://doi.org/10.1142/13094 | October 2023
2. E-books:
https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u

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Common Syllabus for R25 B.Tech Mech/CE					SIET Hyderabad			
	CH202BS: APPLIED CHEMISTRY							
I B.Tech – II Sem					**L**	**T**	**P**	**C**
					3	**0**	**0**	**3**

Pre-requisite: Pre-university knowledge

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 equip students with an understanding of smart materials, biosensors, and analytical techniques applicable in engineering, industrial, environmental, and biomedical fields.

Course Outcomes:

1.
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3.
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UNIT – I: Water and its treatment

Introduction- Hardness, types, degree of hardness and units. Estimation of hardness of water by complexometric method - Numerical problems. Potable water and its specifications (WHO) - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and breakpoint chlorination. Defluoridation - Nalgonda technique.

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.

UNIT – II: Electrochemistry and Corrosion:

Introduction - Electrode potential, standard electrode potential, types of electrodes, Nernst equation (no derivation), Galvanic cell, cell representation, EMF of cell- Numerical problems. Reference electrodes - Primary reference electrode – Standard Hydrogen Electrode (SHE), Secondary reference electrode - Calomel electrode.

Corrosion: Introduction - Definition, causes and effects of corrosion - Theories of corrosion, chemical and electrochemical corrosion - Mechanism of electrochemical 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

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

Fuels: Introduction and characteristics, Calorific value of fuel - HCV, LCV- Dulongs formula -Numerical problems.

Fossil fuels: Introduction, classification, Petroleum - Refining of Crude oil, Cracking - Moving bed catalytic cracking. LPG and CNG - composition and uses.

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

UNIT – IV: Polymers

Definition, classification of polymers: Based on origin and tacticity with examples - Types of polymerization - Addition (free radical addition mechanism) and condensation polymerization. Plastics, Elastomers and Fibers: Definition and applications (PVC, Buna-S, Nylon-6,6). Themoplastics and thermo setting plastics, **Conducting polymers:** Definition and classification with examples - Mechanism of conduction in trans polyacetylene and applications of conducting polymers.

Biodegradable polymers: Polylactic acid (PLA) and its applications.

UNIT – V: Applications of Materials:

Cement: Portland cement, its composition, setting and hardening.

Phase rule: Definition – Phase, component, degrees of freedom. Phase rule equation. Phase diagrams - One component system - water. Two component system - Lead silver system.

Lubricants: Definition and characteristics of a good lubricant – thin film mechanism of lubrication, properties of lubricants - viscosity, cloud and pour point, flash and fire point.

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).

TEXT BOOKS:

1. *Engineering Chemistry* by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010.
2. *Engineering Chemistry* by Rama Devi, Dr. P. Aparna and Rath, Cengage learning, 2025.

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2. *Engineering Chemistry* by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi 2011.
3. *Engineering Chemistry* by Shikha Agarwal, Cambridge University Press, Delhi 2015.
4. *Engineering Analysis of Smart Material Systems* by Donald J. Leo, Wiley, 2007.
5. *Challenges and Opportunities in Green Hydrogen* by Editors: Paramvir Singh, Avinash Kumar Agarwal, Anupma Thakur, R.K Sinha.

Useful Links

1. E-Content- https://doi.org/10.1142/13094 | October 2023
2. E-books: https://archive.org/details/EngineeringChemistryByShashiChawla/page/n11/mode/2u

Common Syllabus for R25 B.Tech CSE/ECE/CSE(AIML)					SIET Hyderabad			
	CH106BS: ENGINEERING CHEMISTRY LAB							
I B.Tech – I Sem					**L**	**T**	**P**	**C**
					0	**0**	**2**	**1**
Pre-requisite: Pre-university knowledge								
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, and pH metry.								
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.								
2.								
3.								
4.								
5.								
6.								
UNIT – I: Volumetric Analysis:								
Estimation of Hardness of water by EDTA Complexometry method.								
UNIT – 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								
UNIT – III: Potentiometry:								
Estimation of concentration of Fe^{+2} ion by Potentiometry using $KMnO_4$.								
UNIT – IV: pH Metry:								
Determination of an acid concentration using pH meter								
UNIT – V: Preparations:								
Preparation of Bakelite.								
UNIT – VI: Corrosion:								
Determination of rate of corrosion of mild steel in the presence and absence of inhibitor								
UNIT – VII: Virtual lab experiments:								
1. Construction of Fuel cell and it's working								
2. Smart materials for Biomedical applications								
3. Batteries for electrical vehicles.								

REFERENCE BOOKS:
1. *Lab manual for Engineering chemistry* by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. *Vogel's text book of practical organic chemistry* 5th edition
3. *Inorganic Quantitative analysis* by A.I. Vogel, ELBS Publications.
4. *College Practical Chemistry* by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).
Useful Links
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Common Syllabus for R25 B.Tech Mech/CE					SIET Hyderabad			
	CH207BS: CHEMISTRY LAB FOR ENGINEERS							
I B.Tech – II Sem					**L**	**T**	**P**	**C**
					0	**0**	**2**	**1**
Pre-requisite: Pre-university knowledge								
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, and pH metry.								
4. Students will gain hands-on experience in synthesizing polymers like Bakelite and Nylon – 6, 6 in the laboratory.								
Course Outcomes:								
1.								
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UNIT – I: Volumetric Analysis:								
Estimation of Hardness of water by EDTA Complexometry method.								
UNIT – 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								
UNIT – III: Potentiometry:								
Estimation of concentration of Fe+2ion by Potentiometry using $KMnO_4$.								
UNIT – IV: pH Metry:								
Determination of an acid concentration using pH meter								
UNIT – V: Preparations:								
Preparation of Bakelite.								
UNIT – VI: Corrosion:								
Determination of rate of corrosion of mild steel in the presence and absence of inhibitor								
UNIT – VII: Lubricants:								
1. Estimation of acid value of given lubricant oil.								
2. Estimation of viscosity of lubricant oil using Ostwald Viscometer								
UNIT – VII: Virtual lab experiments:								
1. Construction of Fuel cell and it's working.								
2. Smart materials for Biomedical applications.								
3. Batteries for electrical vehicles.								
4. Functioning of solar cell and its applications								

REFERENCE BOOKS:
1. *Lab manual for Engineering chemistry* by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. *Vogel's text book of practical organic chemistry* 5th edition
3. *Inorganic Quantitative analysis* by A.I. Vogel, ELBS Publications.
4. *College Practical Chemistry* by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).