

AMR/CHEM/BOS/2024-25/MOM/1

Date : 24-09-2024

DEPARTMENT OF CHEMISTRY

MINUTES OF MEETING - BOARD OF STUDIES (BOS)

The Meeting of the Board of Studies of Chemistry was held on 24th September 2024 at 02.30 PM through online (Zoom Meeting Platform). The following members were attended the online meeting.

S.No	Name of the Member	Designation/occupation	category	Signature
1	SK.Karimulla	Head of the Department	Chairman	
2	Dr. S.Satyaveni	Asst.Professor,Chemistry Department, UCEK, JNTUK, Kakinada	University Nominee	
3	Dr. T L M V Subba Rao	Professor, Department of Chemistry, Venkatadri Institute of Technology Guntur	Subject experts outside parent university	
4	Dr. N C Gangi Reddy	Professor, Department Chemistry, Yogi Vemana University		
5	Mr. V Bhaskar Reddy	Senior software engineer, Capgemini	Industrialist	
6	Dr. G Bhasakr Reddy	H & S HoD	Faculty Members	
7	Mr. N.V.Krishna Reddy	Asst. Professor		

The Meeting began with chairman, Board of studies extending a warm welcome to all the members of participating in the meeting.

The following points were discussed and approved during the meeting

1. The following proposed AMR-24 Course Structure and the detailed syllabi of Chemistry related subjects of I-I, I-II were presented, discussed and approved.

1. For Group – A (CSE , EEE)

GROUP –A – COURSES (CSE ,EEE)					
I Year – I SEM					
S.No.	Title	Credits	S. No.	Title	Credits
1	Communicative English	2	6	Communicative English Lab	1
2	Chemistry	3	7	Chemistry Lab	1
3	Linear Algebra & Calculus	3	8	Engineering Workshop	1.5
4	Basic Civil & Mechanical Engineering	3	9	Computer Programming Lab	1.5
5	Introduction to Programming	3	10	Health and wellness, Yoga and Sports	0.5
I SEM - TOTAL CREDITS					20.5
I Year – II SEM					
1	Engineering Physics	3	6	IT Workshop	1
2	Differential Equations & Vector Calculus	3	7	Engineering Physics Lab	1
3	Basic Electrical and Electronics Engineering	3	8	Electrical and Electronics Engineering Workshop	1.5
4	Engineering Graphics	3	9	Data Structures Lab / Electrical Circuits Lab	1.5
5	Data Structures / Electrical Circuit Analysis – I (Branch specific)	3	10	NSS/NCC/Scouts & Guides/Community Service	0.5
II SEM - TOTAL CREDIT					19.5

2. For Group –B (ECE, CE, AGE, Cyber Security)

GROUP –B – COURSES (Cyber Security ,ECE,MECH,CE, AGE)					
I Year – I SEM					
S. No.	Title	Credits	S. No.	Title	Credits
1	Engineering Physics	3	6	IT Workshop	1
2	Linear Algebra & Calculus	3	7	Engineering Physics Lab	1
3	Basic Electrical & Electronics Engineering	3	8	Electrical & Electronics Engineering Workshop	1.5
4	Engineering Graphics	3	9	Computer Programming Lab	1.5
5	Introduction to Programming	3	10	NSS/NCC/Scouts & Guides/Community Service	0.5
I SEM - TOTAL CREDITS					20.5
I Year – II SEM					
1	Communicative English	2	6	Communicative English Lab	1
2	Engineering Chemistry / Chemistry	3	7	Engineering Chemistry / Chemistry Lab	1
3	Differential Equations & Vector Calculus	3	8	Engineering Workshop	1.5
4	Basic Civil & Mechanical Engineering	3	9	Engineering Mechanics & Building Practices Lab Engineering Mechanics Lab / Network Analysis and Simulation Lab / Data structures Lab	1.5
5	Engineering Mechanics/ Network Analysis/ Data structures (Branch specific)	3	10	Health and wellness, Yoga and Sports	0.5
II SEM - TOTAL CREDITS					19.5

2. Detailed Syllabus of Chemistry (T) (Annexure -1) , Chemistry Lab (L) I Year – I Sem (Annexure -2) , Engineering Chemistry (T) (Annexure -3), Engineering Chemistry Lab (L) (Annexure -4)

The following points were suggested for future possible implementations:

1. Suggested to prepare the course structure for all 4 years of B.Tech.
2. Suggested to make use of autonomy of changing the syllabus upto 20% by the next BoS.



A.M. REDDY MEMORIAL COLLEGE OF ENGINEERING AND TECHNOLOGY

Approved by AICTE, New Delhi, Affiliated to JNTU - Kakinada, Accredited by NAAC

An Autonomous Institution

Web : www.amreddyengineering.ac.in, E-mail: principal.amreddyengineering@gmail.com Ph : 98664 14252

Vinukonda Road, Petturivaripalem, Narasaraopet, Palnadu District, Andhra Pradesh - 522 601.



Dr. S. Satya Veni

Dr.G. Bhaskar Red...

Dr.T.L.M.V Subba...

Madhuri Swaraj

Chemistry Theory Syllabus (AMR-24).

L	T	P	C
3	0	0	3

Assessment Method	Marks
Continuous Internal Assessment	30
Semester End Examination	70
Total	100

Sponsored by ATLURI MASTAN REDDY EDUCATIONAL SOCIETY, REG.NO. 450/2003

Dr. S. Satya Veni



Dr.G. Bhaskar Red...

Dr.T.L.M.V Subba...

SYLLABUS

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in port land Cement
7. Preparation of nanomaterials by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter

Sponsored by ATLURI MASTAN REDDY EDUCATIONAL SOCIETY, REG.NO. 450/2003

Dr. S. Satya Veni

Dr.G. Bhaskar Red...

Dr.T.L.M.V. Subba...

Madhuri Swaraj

[Handwritten signatures]

[Handwritten signature]
Chairman

BoS – Dept. of Chemistry

Copy to:

1. Principal
2. IQAC

ANNEXURE – 1

AMR- 24

Chemistry

(Common to EEE, ECE, CSE, IT & allied branches)

L	T	P	C
3	0	0	3

Course Objectives:

- To familiarize engineering chemistry and its applications
- To understand the significance of Schrodinger wave equation and molecular orbital theory
- To train the students on the principles and applications of electrochemistry and polymers
- To introduce advanced instrumental Techniques.

Course Outcomes: At the end of the course, the students will be able to:

CO1: Illustrate the Schrodinger wave equation and molecular orbital theory

CO2: Demonstrate and distinguish the principle of band diagrams in the application of semi-conductors, conductors & superconductors

CO3: Compare the materials of construction for battery and electrochemical sensors.

CO4: Explain the preparation, properties, and applications of thermoplastics and thermosetting, elastomers & conducting polymers

CO5: Summarize the concepts of Instrumental methods.

UNIT I

Structure and Bonding Models:

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2 , particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronuclear diatomic molecules – energy level diagrams of O_2 and CO , etc. π -molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT II

Modern Engineering materials

Semiconductors – Introduction, basic concept, application

Super conductors- Introduction basic concept, applications.

Super capacitors: Introduction, Basic Concept-Classification – Applications.

Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nano particles






UNIT III

Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, **potentiometry**- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conduct metric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygen fuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT IV

Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibers.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT V

Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation.

IR spectroscopies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications

Textbooks:

1. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition



ANNEXURE -2

AMR- 24

Chemistry Lab Syllabus

(Common to EEE, ECE, CSE, IT & allied branches)

Course Objectives:

Verify the fundamental concepts with experiments.

Course Outcomes:

At the end of the course, the students will be able to

CO1: Determine the cell constant and conductance of solutions.

CO2: Prepare advanced polymer Bakelite materials.

CO3: Measure the strength of an acid present in secondary batteries.

CO4: Analyze the IR spectra of some organic compounds.

CO5: Calculate strength of acid in Pb-Acid battery.

List of Experiments:

1. Measurement of 10Dq by spectrophotometric method
2. Conduct metric titration of strong acid vs. strong base
3. Conduct metric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nano materials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

Note: Out of 12 experiments any 9 experiments are to be conducted.

Reference Books:

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar






ANNEXURE – 3

AMR- 24

Engineering Chemistry

(Common to Civil, Chemical, Mechanical Engineering and allied branches)

Course Objectives:

- To familiarize engineering chemistry and its applications
- To impart the concept of soft and hard waters, softening methods of hard water
- To train the students on the principles and applications of electro chemistry, polymers, surface chemistry, and cement
- To understand the essentially of fuel technology, lubrication & significance of nano materials.

L	T	P	C
3	0	0	3

Course Outcomes: At the end of the course, the students will be able to

CO1: Understand the difference between soft and hard water and way it matters in daily life and industries

CO2: Demonstrate the corrosion prevention methods and factors affecting corrosion.

CO3: Explain the preparation, properties, and applications of thermoplastics and thermosetting, elastomers & conducting polymers

CO4: Explain the setting and hardening of cement.

CO5: Summarize the concepts of colloids, micelle and nanomaterials .

UNIT - I

Water Technology

Soft and hard water, Estimation of hardness of water by EDTA Method, Estimation of dissolved Oxygen - Boiler troubles – Priming, foaming, scale and sludge, Caustic embrittlement, Industrial water treatment – Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization (WHO) standards, Ion-exchange processes - desalination of brackish water, reverse osmosis (RO) and electro dialysis.

UNIT - II

Electrochemistry and Applications

Electrodes – electrochemical cell, Nernst equation, cell potential calculations.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium ion batteries- working principle of the batteries including cell reactions; Fuel cells-Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell.

Corrosion: Introduction to corrosion, electrochemical theory of corrosion, differential aeration cell corrosion, galvanic corrosion, metal oxide formation by dry electrochemical corrosion, Pilling Bed worth ratios and uses, Factors affecting the corrosion, cathodic and anodic protection, electroplating and electro less plating (Nickel and Copper).






UNIT - III

Polymers and Fuel Chemistry

Introduction to polymers, functionality of monomers, Mechanism of chain growth, step growth polymerization.

Thermoplastics and Thermo-setting plastics:- Preparation, properties and applications of poly styrene. PVC Nylon 6,6 and Bakelite.

Elastomers – Preparation, properties and applications of Buna S, Buna N, Thiokol rubbers.

Fuels – Types of fuels, calorific value of fuels, numerical problems based on calorific value; Analysis of coal (Proximate and Ultimate analysis), Liquid Fuels, refining of petroleum, Octane and Cetane number- alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel

UNIT - IV

Modern Engineering Materials

Composites- Definition, Constituents, Classification- Particle, Fiber and Structural reinforced composites, properties and Engineering applications

Refractories- Classification, Properties, Factors affecting the refractory materials and Applications.

Lubricants- Classification, Functions of lubricants, Mechanism, Properties of lubricating oils – Viscosity, Viscosity Index, Flash point, Fire point, Cloud point, saponification and Applications. Building materials- Portland Cement, constituents, Setting and Hardening of cement

UNIT- V

Surface Chemistry and Nanomaterials

Introduction to surface chemistry, colloids, nanometals and nanometal oxides, micelle formation, synthesis of colloids (Braggs Method), chemical and biological methods of preparation of nanometals and metal oxides, stabilization of colloids and nanomaterials by stabilizing agents, adsorption isotherm (Freundlich and Longmuir), BET equation (no derivation) applications of colloids and nanomaterials – catalysis, medicine, sensors, etc.

Textbooks:

- 1.Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
- 2.Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

- 1.H.F.W. Taylor, Cement Chemistry, 2/e, Thomas Telford Publications, 1997.
- 2.D.J. Shaw, Introduction to Colloids and Surface Chemistry, Butterworth- Heineman, 1992.
- 3.Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition



ANNEXURE – 4

AMR- 24

Engineering Chemistry Lab Syllabus

(Common to Civil, Chemical, Mechanical Engineering and allied branches)

Course Objectives:

To verify the fundamental concepts with experiments

L	T	P	C
0	0	2	1

Course Outcomes:

At the end of the course, the students will be able to

CO1: Determine the cell constant and conductance of solutions.

CO2: Prepare advanced polymer materials.

CO3: Determine the physical properties like surface tension, adsorption and viscosity.

CO4: Estimate the Iron and Calcium in cement.

CO5: Calculate the hardness of water.

List of Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method
3. Determination of Strength of an acid in Pb-Acid battery
4. Preparation of a polymer (Bakelite)
5. Determination of percentage of Iron in Cement sample by colorimetry
6. Estimation of Calcium in port land Cement
7. Preparation of nanomaterials by precipitation method.
8. Adsorption of acetic acid by charcoal
9. Determination of percentage Moisture content in a coal sample
10. Determination of Viscosity of lubricating oil by Redwood Viscometer 1
11. Determination of Viscosity of lubricating oil by Redwood Viscometer 2
12. Determination of Calorific value of gases by Junker's gas Calorimeter

Note: Out of 12 experiments any 9 experiments are to be conducted.

Reference:

1. "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C. Denney, J.D. Barnes and B. Sivasankar




