



SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

Accredited by National Board of Accreditation, AICTE, New Delhi, Accredited by
NAAC with 'A' Grade - 3 32 CGPA, Recognized under 2(f) & 12(B) of UGC Act 1956,
Approved by AICTE, New Delhi, Permanent Affiliation to JNTUK, Kakinada
Seetharampalem, W.G. Dist., Narsapur-534280. (Andhra Pradesh)

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
23BS2T03	ENGINEERING CHEMISTRY	II	Common to CIVIL MECHANICAL & ROBOTICS	5	2023-24	20.01.2024

COURSE OUTCOMES

CO1: Compare impurities present in raw water, problems associated and how to avoid them (K2)

CO2: Differentiate the corrosion prevention methods and factors affecting corrosion (K2)

CO3: Interpret the preparation, properties and applications of thermoplastics & thermosetting, elastomers, conducting polymers, calorific values, octane number, refining of petroleum and cracking of oils (K2)

CO4: Summarize the refractories, lubricants, and setting and hardening of cement (K2)

CO5: Apply the principle of Band diagrams in the application of conductors and semiconductors (K2)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Hour	Delivery Method
I Water Technology	1 / K2	1.1	Soft and hardwater.	T1	1	Lecture / Assignment / Interaction
	1/K2	1.2	Estimation of hardness of water by EDTA Method.	T1	1	
	1 / K2	1.3	Estimation of dissolved Oxygen	T1, R1,	1	
	1 / K2	1.4	Priming, foaming, scale and sludge, Caustic embrittlement,	T2, R3,W2	2	
	1 / K2	1.6	Bureau of Indian Standards(BIS)and World health organization(WHO) standards	T1, R2	2	
	1 / K2	1.7	Ion exchange method	T1, R2	1	
	1 / K2	1.8	Reverse osmosis	T1, R2	1	
	1 / K2	1.9	Electro dialysis	T1, R2	1	
	Content beyond Syllabus	1/K2	1.10	Zeolite method	T1, R2	
Total					11	



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II Electrochemistry and applications	2 / K2	2.1	Electrochemical cell- construction and working of Galvanic cell	T1, R2, W1	1	Lecture / Assignmen t/ Interaction
	2 / K2	2.2	Nernst equation and applications	T2, R3	1	
	2 / K2	2.3	cell potential calculations and numerical problems	T1, R1	2	
	2 / K2	2.4	Primary cells - Zinc-air battery	T2, R1	1	
	2 / K2	2.5	Secondary cells -lithium- ion batteries	T1, R1, W5	1	
	2 / K2	2.6	Fuel cells, hydrogen- oxygen fuel cell- working of the cells.	T1, R1	1	
	2 / K2	2.7	Introduction to corrosion, electrochemical theory of corrosion,	T1, R1	1	
	2 / K2	2.8	Differential aeration cell corrosion, galvanic corrosion,	T1, R2, W6	1	
	2 / K2	2.9	metal oxide formation by dry electrochemical corrosion, Pilling Bedworth ratios and uses.	Chalk & Talk, PPT	2	
	2 / K2	2.10	Factors affecting the corrosion	T1, R3	1	
	2 / K2	2.11	Cathodic protection (Sacrificial anodic and impressed current), electroplating and electro less plating (Nickel).	T1, R3	1	
Content beyond Syllabus			CH ₃ -O ₂ Fuel cell		1	
Total					14	
III Polymers and Fuel chemistry	3 / K2	3.1	Introduction to Polymers and types, functionality of monomers	T1, R1, W1	1	Lecture / Assignmen t/ Interaction
	3 / K2	3.2	chain growth polymerization, step growth polymerization	T1, R2	2	



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	3/K2	3.3	Plastics-Thermoplastics and Thermo setting plastics	T ₁ , R ₂	1	
	3 / K2	3.4	Preparation, Properties and uses PVC and Teflon Preparation, Properties and use of Bakelite and Nylon6,6	T ₁ , R ₂	2	
	3 / K2	3.5	Synthetic rubbers: Preparation, properties and uses of Buna-S and Buna-N	T ₂ , R ₂ , W ₃	1	
	3 / K2	3.6	Types of fuels, calorific value of fuels	T ₂ , R ₁	1	
	3 / K2	3.7	numerical problems based on calorific value;	T ₁ , R ₂ , W ₄	2	
	3 / K2	3.8	Proximate and Ultimate analysis	T ₁ , R ₂ , W ₁₀	2	
	3 / K2	3.9	Liquid Fuels, refining of petroleum	T ₁ , T ₂	1	
	3 / K2	3.10	Octaneand Cetane number, alternative fuels: bio diesel.	T ₁ , R ₁ , W ₄	1	
Content beyond the syllabus			Poly Glycolic Acid (PGA), Poly Lactic Acid (PLA)		1	
Total					15	
IV Building Materials & Lubricants	4/K2	4.1	Composites- Definition, Constituents of Fibre reinforced composites	1	1	
	4/K2	4.2	properties and Engineering applications	1	1	Lecture / Assignmen t/ Interaction
	4 / K2	4.3	Refractories- Classification, Properties	1	1	
	4 / K2	4.4	Factors affecting the refractory materials and applications	1	1	
	4 / K2	4.5	Lubricants- Classification, Functions of lubricants, Mechanism,.	1	1	
	4 / K2	4.6	Properties of lubricating	1	1	



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			oils -Viscosity, Viscosity Index			
	4 / K2	4.7	Flash point, Fire point, Cloud point, saponification and Applications.	1	1	
	4 / K2	4.8	Building materials- Portland Cement, constituents	1	1	
	4 / K2	4.9	Setting and Hardening of cement.	1	1	
Content beyond the syllabus	4 / K2	4.10	Effect of CO ₂ , chlorides and sulphides on cement concrete.		1	
Total					10	
V Modern Engineering Materials	5 / K2	5.1	Semiconductors - Introduction, Semiconductors basic concept,	T1,T2	1	Lecture / Assignmen t/ Interaction
	5 / K2	5.2	Semiconductor preparation by distillation method and purification by Zone refining.	T1, R2, W9	1	
	5 / K2	5.3	Properties and applications of semiconductors	T1, R2	1	
	5 / K2	5.4	Super conductors-Introduction	T2,R3, W9	1	
	5 / K2	5.5	Properties and applications of Super conductors	T1,T2, W2	1	
	5 / K2	5.6	Nano materials: Introduction, classification	T1, R2	1	
	5 / K2	5.7	properties and applications of Fullerenes	T2, R3, W4	1	
	5 / K2	5.8	properties and applications of Carbon Nano tubes	T1, R1,W6	1	
	5 / K2	5.9	Properties and applications Graphines nano particles.		1	
Content beyond the syllabus	5 / K2	5.11	Super capacitors-Introduction, classification and applications.		1	
Total					10	
CUMULATIVE PROPOSED PERIODS					60	
MID II EXAMINATION DURING EIGHTEENTH WEEK						
END EXAMINATIONS						



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Text Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1.	Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2.	Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.
Reference Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1.	Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2.	D. Lee, Concise Inorganic Chemistry, 5 th Edition, Wiley Publications, Feb.2008
3.	Textbook of Polymer Science, Fred W. Billmeyer Jr, 3rd Edition
Web Details	
1.	chemicalelements.com
2.	chemistry-chemists.com
3.	americanchemistry.com
4.	organic-chemistry.org
5.	chemicalaid.com
6.	chemgapedia.de
7.	chemistryworld.com
8.	sciencenotes.org
9.	chemieonline.de
10.	sciencemadness.org

S.NO	Faculty Name	Signature with Date
1	Faculty I (for common Course)	Mrs. K. Janaki K.f. 16/3/11/25
2	Course Coordinator	Mr. K. Srinivasa Rao K.S. 31/01/25
3	Programme Coordinator	Dr. V. Swaminadham V. Swa


 Principal