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
Seetharampuram, W.G.DT., Narsapur-534280, (Andhra Pradesh)

DEPARTMENT OF BASIC SCIENCES AND HUMANITIES

TEACHING PLAN

Course Code	Course Title	Semester	Branches	Contact Periods /Week	Academic Year	Date of commencement of Semester
20BS1T02	ENGINEERING CHEMISTRY	I	CIVIL, CSE, AIML & IT	7	2021-22	29.11.2021

COURSE OUTCOMES

1	Explain the impurities present in raw water, problems associated and how to avoid them (K2)
2	Explain the advantages of Polymers in daily life (K2)
3	Explain the theory of construction of battery and fuel cells and theories of corrosion and prevention methods (K2)
4	Differentiate conventional and non-conventional energy sources and their advantages and disadvantages. (K2)
5	Identify the usage of advanced materials in day to day life (K2)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/Activity	Text Book / Reference	Contact Hour	Delivery Method
I WATER TECHNOLOGY	1 / K2	1.1	Hardness of water-Types & disadvantages	T1	1	Chalk & Talk, PPT
	1 / K2	1.2	Estimation of hardness by EDTA Method	T1, R1,	1	Chalk & Talk, PPT
	1 / K2	1.3	Potable water –Specifications and Purification of portable water	T2, R3,W2	1	PPT, Video presentation
	1 / K2	1.4	Sterilization and Disinfection, Break point of chlorination	T2, R3, W4	1	PPT, Video presentation
	1 / K2	1.5	Boiler feed water – Boiler troubles – priming &foaming, Sludge&Scale formation	T1, R2	1	Chalk & Talk, PPT
	1 / K2	1.6	Boiler corrosion, Caustic embrittlement,	T2, R3	1	Chalk & Talk, PPT
	1 / K2	1.7	Softening method: 1. Zeolite process	T1, R1	1	Chalk & Talk, PPT
	1 / K2	1.8	Method: 2. Demineralization process	T2, R1, W3	1	PPT, Video presentation
	1 / K2	1.9	Desalination: 1. Electro Dialysis	T1, R2	1	Chalk & Talk, PPT
	1 / K2	1.10	Desalination: 2 Reverse osmosis	T1, R1	1	Chalk & Talk, PPT

Content beyond Syllabus	1 / K2	1.11	L-S method	T1, R1, W4	1	PPT, Video presentation
				Total	**11**	
II **POLYMERS AND COMPOSITE MATERIALS**	2 / K2	2.1	Introduction to Polymers and types.	T1, R2, W1	1	PPT, Video presentation
	2 / K2	2.2	Preparation, Properties and uses of PS, PVC and Bakelite	T2, R3	1	Chalk & Talk, PPT
	2 / K2	2.3	Plastics-Thermoplastics and Thermo setting plastics	T1, R1	1	Chalk & Talk, PPT
	2 / K2	2.4	Compounding of plastics	T2, R1	1	Chalk & Talk, PPT
	2 / K2	2.5	Fabrication methods (4)of plastics	T1, R1, W5	1	PPT, Video presentation
	2 / K2	2.6	Elastomers: Natural rubber drawbacks Vulcanization of rubber.	T1, R1	1	Chalk & Talk, PPT
	2 / K2	2.7	Vulcanization of rubber.	T1, R1		Chalk & Talk, PPT
	2 / K2	2.8	Synthetic rubbers: Preparation, properties and uses of Buna-S Buna-N	T1, R2, W6	1	PPT, Video presentation
	2 / K2	2.9	Fiber reinforced plastics, Recycling of e-waste	T2, R1, W1	1	PPT, Video presentation
	2 / K2	2.10	biodegradable polymers, biomedical polymers	T1, R3	1	Chalk & Talk, PPT
Content beyond Syllabus	2 / K2	2.11	Preparation, Properties and uses of PE and Thiokol rubber	T1, R1, W10	1	PPT, Video presentation
				Total	**11**	
III - A **ELECTRO CHEMICAL CELLS**	3 / K2	3.1	Electrode potentials-standard Electrode potentials, Determination of Single electrode potential	T1, R1, W1	1	PPT, Video presentation
	3 / K2	3.2	Electro chemical cell (galvanic cell) and Electrochemical series and applications	T_1, R2	1	Chalk & Talk, PPT
	3 / K2	3.3	Reference electrodes-Standard hydrogen Electrode and Calomel Electrode	T_1, R3	1	Chalk & Talk, PPT
	3 / K2	3.4	Determination of pH by glass electrode	T_1, R2	1	Chalk & Talk, PPT
	3 / K2	3.5	Batteries - Primary cell: Dry cell	T2, R2, W3	1	PPT, Video presentation
	3 / K2	3.6	Secondary cell: Lead accumulator battery, Secondary cell: a Li-Ion battery	T2, R1	1	Chalk & Talk, PPT
	3 / K2	3.7	Fuel Cells – Hydrogen – Oxygen Fuel cell, Methanol – Oxygen Fuel cell.	T_1, R2, W4	1	PPT, Video presentation

Content beyond Syllabus	3 / K2	3.8	Alkaline battery	T_1, R2, W10	1	PPT, Video presentation
				Total	**08**	
MID I EXAMINATION DURING NINTH WEEK						
III - B CORROSION	3 / K2	3.10	Introduction - Theories of corrosion- (i) Dry corrosion	T1, T2	1	Chalk & Talk, PPT
	3 / K2	3.11	(ii) Wet corrosion			
	3 / K2	3.12	Types of corrosion – Galvanic corrosion, Differential Aeration Corrosion	T2, R1	1	Chalk & Talk, PPT
	3 / K2	3.13	Stress corrosion	T2, R1	1	
	3 / K2	3.14	Factors influencing corrosion: Nature of metal, Nature of the environment.	T1,T2	1	Chalk & Talk, PPT
	3 / K2	3.15	Corrosion control methods – Cathodic protection - surface coatings	T2, R3, W9	1	PPT, Video presentation
	3 / K2	3.16	Metallic coatings: Galvanizing and Tinning.	T2, R2	1	Chalk & Talk, PPT
	3 / K2	3.17	Metallic Coatings: Electro plating and Electroless plating.	T1, R1,W2	1	PPT, Video presentation
Content beyond Syllabus	3 / K2	3.18	Paints	T1, R1, W4	1	PPT, Video presentation
				Total	**8**	
IV CONVENTIONAL AND NONCONVENTIONAL ENERGY RESOURCES	4 / K2	4.1	Introduction to fuels, Classification, Merits and demerits of solid , liquid, gaseous fuels	T2, R1	1	Chalk & Talk, PPT
	4 / K2	4.2	Calorific value and its determination by Bomb calorie meter	T2, R3	1	Chalk & Talk, PPT
	4 / K2	4.3	Coal – Proximate analysis, ultimate analysis	T2, R3	1	Chalk & Talk, PPT
	4 / K2	4.4	Problems based on calorific values	T2, R2, W7	1	PPT, Video presentation
	4 / K2	4.5	Petroleum – Refining process	T2, R2	1	Chalk & Talk, PPT
	4 / K2	4.6	Cracking process (Fixed bed, Moving bed)	T1, R1, W10	1	PPT, Video presentation
	4 / K2	4.7	Octane and cetane numbers and Knocking	T1, R3, W8	1	PPT, Video presentation
	4 / K2	4.8	Gaseous fuels – Natural gas – LPG and CNG	T2, R1	1	Chalk & Talk, PPT
	4 / K2	4.9.	Solar Cells (PV-cell) Construction working and uses.	T2, R2		Chalk & Talk, PPT
	4 / K2	4.10	Hydro power energy sources	T1, R1, W9	1	PPT, Video presentation
	4 / K2	4.11	Geo thermal power sources, Tidal and wave power sources	T1, R1	1	Chalk & Talk, PPT

Content beyond Syllabus	4 / K2	4.12	OTEC	T2, R2, W1	1	PPT, Video presentation
				Total	**12**	
V **CHEMISTRY OF MATERIALS**	5 / K2	**5.1**	Nano materials significance and sol-gel preparation method.	T1,T2	1	Chalk & Talk, PPT
	5 / K2	**5.2**	Charecterization of materials morphology by SEM techniques.	T1, R2, W9	1	PPT, Video presentation
	5 / K2	**5.3**	Charecterization of nano materials size and structure by SEM techniques	T1, R2	1	Chalk & Talk, PPT
	5 / K2	**5.4**	Carbon nanotubes and fullerenes	T2,R3, W9	1	PPT, Video presentation
	5 / K2	**5.5**	Semiconductor materials properties and Preparation methods: Distillation	T1,T2, W2	1	PPT, Video presentation
	5 / K2	**5.6**	Cement, Hardening and setting process.	T2, R1, W6	1	PPT, Video presentation
	5 / K2	**5.7**	Deterioration of cement concrete.	T1, R2	1	Chalk & Talk, PPT
	5 / K2	**5.8**	Types and applications of refractories	T2, R3, W4	1	PPT, Video presentation
	5 / K2	**5.9**	Properties of refractory materials	T1, R1,W6	1	PPT, Video presentation
Content beyond Syllabus	5 / K2	**5.10**	Solar reflectors and Green chemistry	T2, R3, W5	1	PPT, Video presentation
				Total	**10**	
			CUMULATIVE PROPOSED PERIODS		**60**	
			MID II EXAMINATION DURING EIGHTEENTH WEEK			
			END EXAMINATIONS			

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1.	N. Y. S. Murthy, V. Anuradha & K. Ramana Rao , A Text Book of Engineering Chemistry, Maruthi Publications, 2018.
2.	K. Sesha Maheswaramma, Mridula Chugh, A Text Book of Engineering Chemistry, Pearson Publications, 2018.

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1.	Jain & Jain, Engineering Chemistry, 15th Edition, Dhanpat Rai Publishing Company, 2017.
2.	Shashi Chawla, Text Book of Engineering Chemistry Dhanpat Rai & Co. (P) Limited, 2017.
3.	Prasanta Rath, Subhendu Chakroborthy, Chemistry, Cengage publications, 2018.

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

		Name	Signature with Date
i.	Faculty	Mr. K.Srinivasa Rao	04/01/22
ii.	Faculty II (for common Course)	Mr. M. V. Krishna Mohan	4/1/22
iii.	Faculty III (for common Course)	Mrs. K. Janaki	4/1/22
iv.	Course Coordinator	Mr. K.Srinivasa Rao	04/01/22
v.	Module Coordinator	Not Applicable	
vi.	Programme Coordinator	Dr. V. Swaminadham	

Principal

DEPARTMENT OF BASIC SCIENCES AND HUMANITIES

LAB LESSON PLAN

Course Code	Course Name	Regulation	Academic year	Year / Semester	Branches	Contact Periods/Week	Sections
20BS1L02	**Engineering Chemistry Lab**	**R-20**	**2021- 2022**	**I B.Tech / I Sem**	Common to Civil, CSE, IT & AI & ML	**3**	

COURSE OUTCOMES

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

CO1: Identify the concentration of given solution by different methods of chemical analysis (**K3**)

CO2: Analyze the water purity by checking hardness, DO and Acidity. (**K4**)

CO3: Estimate the Cu^{+2}, Fe^{+3}, Ca^{+2}, Mg^{+2} ions and Ascorbic acid present in given solution. (**K4**)

CO4: Identify the pour and cloud point of lubricants. (**K3**)

CO5: Understand the principles of conductometric and potentiometric titrations. (**K2**)

WEEK	COURSE OUTCOMES	EXPT NO	DESCRIPTION	NO. OF SESSIONS
1,2	**CO1:** Identify the concentration of given solution by different methods of chemical analysis	1	Estimation of HCl using standard Na_2CO_3 through acid-base titration.	1
		2	Estimation of $KMnO_4$ using standard $H_2C_2O_4$ through redox titration method.	1
3,4	**CO2:** lyze the water y by checking ness, DO and cidity. (**K4**)	3	Estimate the total hardness of water using standardized EDTA solution through complexometric titration.	1
		4	Estimation of Dissolved Oxygen in given water sample by Wrinkler's Method	1

WEEK	COURSE OUTCOMES	EXPT NO	DESCRIPTION	NO. OF SESSIONS
5,6,7	**CO3** Estimate the Cu^{+2},	5	Determination of Copper (II) using standard hypo solution.	1

	Fe^{+3}, Ca^{+2}, Mg^{+2} ions and Ascorbic acid present in given solution. (**K4**)	**6**	Determination of Ferric (Fe^{+3}) ions using standard $K_2Cr_2O_7$ solution	**1**
		7	Determination of Vitamin 'C'.	**1**
8	**CO4.** Identify the pour and cloud point of lubricants. **(K3)**	**8**	Determination of Pour and Cloud Point of lubricating oils	**1**
9, 10, 11	**CO5** Understand the principles of conductometric and potentiometric titrations. (**K2**)	**9**	Estimation of strong acid by using strong base through conductometric titration method.	**1**
		10	Estimation of strong acid by using strong base through potentiometric titration method.	**1**
		11	Preparation of polymer (Demo).	**1**
CUMULATIVE PROPOSED SESSIONS				**11**
LAB INTERNAL EXAM				
LAB END EXAMINATION				

		Name	Signature with Date
i.	Faculty	Mr. K.Srinivasa Rao	05/01/22
ii.	Faculty II (for common Course)	Mr. M. V. Krishna Mohan	
iii.	Faculty III (for common Course)	Mrs. K. Janaki	
iv.	Course Coordinator	Mr. K.Srinivasa Rao	05/01/22
v.	Module Coordinator	Not Applicable	
vi.	Programme Coordinator	Dr. V. Swaminadham	

Principal