SCHEME OF COURSE WORK

Course Title	**: Engineering Chemistry**		
Course Code	**: 22BC1101**	**L T P C**	**3 0 0 3**
Program:	**: B.Tech.**		
Specialization:	**: ECE**		
Semester	**: II**		
Prerequisites	**:Fundamentals of chemistry**		
Courses to which it is a prerequisite	**: For CSE, ECE, EEE & IT.**		

Course Outcome (CO): After the completion of the course, the student will be able to:

COURSE OUTCOMES (CO s)		**LEARNING OUTCOMES**
CO 1	Construct electrochemical cells and measure electrode potentials (L3)	1. Illustrate the construction of electrochemical cells. (L3) 2. explain the significance of electrode potentials.(L2) 3. use ion selective electrodes. (L3)
CO 2	Demonstrate the working of energy storage devices (L3)	1. classify different types of batteries. (L2) 2. compare the merits of different cells. (L2) 3. apply redox principles for construction of batteries and fuel cells. (L3)
CO 3	Illustrate various sources of renewable energy and applications of solar energy (L3)	1. discuss different renewable sources of energy. (L2) 2. illustrate the construction of a p-n junction diode. (L3) 3. explain how photovoltaic cells convert light into energy. (L2)
CO 4	Apply different polymers to specific applications (L3)	1. use different types of polymers for various applications (L3) 2. explain the preparation, properties and applications of Bakelite and Nylon-6,6 (L2) 3. describe the role of vulcanisation process

		in improving the mechanical properties of polymers (L2)
CO 5	Describe the importance of nano materials and molecular machines (L2)	1. explain the synthesis and characterization methods of nano materials. (L2) 2. discuss role of nanomaterials in wastewater treatment and other applications (L2) 3. discuss the concepts of artificial molecular machines (L2)

Program Outcomes (POs):

A graduate of Electronics and Communications Engineering will be able to

PO-1	Graduates will be able to apply the knowledge of mathematics, science, engineering fundamentals to solve complex electronics and communication engineering problems.
PO-2	Graduates will attain the capability to identify, formulate and analyze problems related to electronics and communication engineering and substantiate the conclusions using the first principles of sciences and engineering.
PO-3	Graduates will be in a position to design solutions for electronics and communication engineering problems and design system components and processes that meet the specified needs with appropriate consideration for public health and safety.
PO-4	Graduates will be able to perform analysis and interpretation of data by using research methods such as design of experiments to synthesize the information and to provide valid conclusions.
PO-5	Graduates will be able to select and apply appropriate techniques from the available resources and modern electronics and communication engineering and software tools, and will be able to predict and model complex engineering activities with an understanding of the practical limitations.
PO-6	Graduates will be able to carry out their professional practice in electronics and communication engineering by appropriately considering and weighing the issues related to society and culture and the consequent responsibilities.
PO-7	Graduates will be able to understand the impact of the professional engineering solutions on environmental safety and legal issues.

PO-8	Graduates will transform into responsible citizens by resorting to professional ethics and norms of the engineering practice.
PO-9	Graduates will be able to function effectively in individual capacity as well as a member in diverse teams and in multidisciplinary streams.
PO-10	Graduates will be able to communicate fluently on complex engineering activities with the engineering community and society, and will be able to prepare reports and make presentations effectively.
PO-11	Graduates will be able to demonstrate knowledge and understanding of the engineering and management principles and apply the same while managing projects in multidisciplinary environments.
PO-12	Graduates will engage themselves in independent and life-long learning in the broadest context of technological change while continuing professional practice in their specialized areas of electronics and communication engineering.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1	Specify, analyze, design, prototype and test electronic systems that perform analog and digital signal processing.
PSO2	Analyze and design wired and wireless/RF communication systems
PSO3	Specify, design and implement prototype HW/SW for VLSI and Embedded Systems

Course Outcome-PO matrix

Subject: Chemistry

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	3	3							2			
CO-2	3	3							2			
CO-3	3	3							2			2
CO-4	3	3							2			2
CO-5	3	3							2			2

3 - Strongly correlated, *2* - *Moderately* correlated, *1 –Slightly correlated*

Course outcomes vs Program Specific Outcomes

COs	PSO1	PSO2	PSO3
CO-1	-	-	-

CO-2	-	-	-
CO-3	-	-	-
CO-4	-	-	-
CO-5	-	-	-

Course Outcome-Assessment

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	TEACHING-LEARNING STRATEGY	Assessment Method & Schedule
1	Electrode potential ,type of cells	CO1	Q) Derive the Nernst equation for electrode potential.	▫ Lecture / Discussion ▫ Problem solving	Assignment-I (Week - 4) Midtest-I (Week-8)
2	Construction and working principles of glass electrode	CO1	Q) Explain the determination of P^H of solution using glass electrode	▫ Lecture / Discussion ▫	Assignment-I (Week - 4) Mid test-I (Week-8)
3.	Reference electrodes	CO1	Q) Describe the construction and working of Calomel electrode	▫ Lecture / Discussion	Assignment-I (Week - 4) Mid test-I (Week-8)
4	Batteries-primary batteries	CO2	Q) Explain the construction and working of Dry cell	▫ Lecture / Discussion	Quiz-I (Week-7) Mid test-I (Week-8)
5	Batteries-secondary Batteries	CO2	Q) Describe the principle and working of Lithium ion battery	▫ Lecture / Discussion	Quiz-I (Week-7) Mid test-I (Week-8)
6	Fuel cells/ alkaline fuel cells	CO2	Q)Explain the principle and construction of alkaline fuel cell	▫ Lecture / Discussion	Quiz-I (Week-7) Mid test-I (Week-8)
7	Sources of renewable energy	CO3	Q) Discuss various sources of renewable energy	▫ Lecture / Discussion ▫	Mid test-I (Week-8)
8	**MID TEST-I**			▫	
9	Physical and chemical properties of silicon, Production of solar grade silicon from quartz	CO3	Q) Discuss few physical & Chemical properties of Silicon and Describe the	▫ Lecture / Discussion	Assignment-II (Week-12)

			production of Silicon from quartz.		
10	Silicon Photovoltaic cells	CO3	Q) Explain the principle and construction of Silicon photovoltaic cell	▫ Lecture / Discussion	Assignment-II (Week-12) Mid test-II (Week-16)
11	Polymerisation,Types of polymerization and mechanism	CO4	Q) Differentiate addition polymerization from condensation polymerization.	▫ Lecture / Discussion	Assignment-II (Week-12) Mid test-II (Week-16)
12	Plastics, types, differences, Synthesis of plastics	CO4	Q) Differentiate thermoplastic and thermosetting polymers	▫ Lecture / Discussion	Assignment-II (Week-12) Mid test-II (Week-16)
13	Natural Rubber, Vucanization, Elastomers-preparation, properties and application of synthetic rubber	CO4	Q) Write the chemical structure of natural rubber and explain its vulcanization process	▫ Lecture / Discussion	Assignment-II (Week-12) Mid test-II (Week-16)
14	Nanomaterials, Carbon Nano tubes, Fullerenes and Nanoclusters	CO5	Q) Discuss the properties and applications of fullerenes	▫ Lecture / Discussion	Quiz-II (Week-15) Mid Test-II (Week-16)
15	Molecular Machines and Molecuar Swtiches	CO5	Q) Explain the applications of Rotaxanes	▫ Lecture / Discussion	Quiz-II (Week - 15) Mid Test-II (Week-16)
16	**MID TEST -II**				
17	**END EXAM**				