

Engineering Chemistry

Semester No 2	Code CH-112	Credit Hours 3-0
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COURSE DESCRIPTION:

The objective of this course is to impart introductory and applied knowledge about Engineering Chemistry

1. Gain sufficient knowledge about atmospheric chemistry, concentration expression, and chemistry of environment.
2. Identify working of various electrochemical cells.
3. Estimate heat, enthalpy and entropy associated with various chemical reaction.
4. Gain sufficient knowledge of corrosion control techniques.
5. Understand the various fuels, polymers and other engineering materials

TEXT AND MATERIAL

Textbooks:

Engineering Chemistry by S. C. Bhatia, 2013
Concise Engineering Chemistry by N. Geol & S. Kumar 5th Ed
2019
Engineering Chemistry by S. S. Dara, 2004
Engineering Chemistry by H. K. Chopra & A Parmar, 2007
Physical Chemistry (5th Ed.) by P. W. Atkins, 11th Ed, 2017
Advance Inorganic Chemistry by Cotton & Wilkson, 6th Ed.
1999.

COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student should be able to:

S No	CLO Statement	PLO	Learning Domain and level
1	Comprehend the fundamental concepts of material science and engineering with focus on Internal atomic structure, crystal structures, crystal systems in metals, crystal imperfections, diffusion. Explain concepts of origin of mechanical properties and structure-property relationship.	1	C2
2	Concept and application of phase diagrams and TTT diagrams. Understand ferrous and non-ferrous alloys, their manufacturing processes, Heat treatments and surface treatments. Knowledge of polymeric, ceramic and composite materials, along with advanced materials (shape Memory Alloys, rapidly solidified alloys).	1	C3

ASSESSMENT SYSTEM:

Quizzes	10-15%
Assignments	5-10%
OHTs	30-40%
ESE	40-50%

TOPICS COVERED WITH THEIR CONTRIBUTION TO PLOs:

Week No	Description	Ref Book Chapter Number	Quizzes	Assignment	CLO No
1-4	Atmospheric Chemistry: Atmospheric composition, structure, temperature, and pressure profile. Barometric Law for gases at equilibrium. Ozone Layer, ozone hole, ozone protection, and consequences of ozone depletion. Environmental pollution.				
5-6	Electrochemistry: Oxidation and reduction, Faraday's laws of Electrolysis, Electrochemical series, Electrochemical cells and their types (Galvanic/ Voltaic cells, lead storage battery, Zinc- Carbon dry cell, Alkaline dry cell etc), Fuel cells.		02	01	1&2
7	OHT-1				
8-9	Corrosion: Types of Corrosion, Electrochemical and chemical corrosion, Composition cells, concentration cells and stress cells, corrosion prevention; metallic coating, non-metallic coating and cathodic protection etc.				
10-11	Thermo-Chemistry: Chemical thermodynamic laws, Enthalpy, Relationship between H & U, Hess's Law of heat summation, Standard states of elements, Physical state of Reactants & Products, Heat of Reaction, Heat of Formation, Heat of Combustion, Exo and endothermic reactions, Activation energy, Measurement of heat of reaction.		02	01	1&2

13	OHT-2				
12-13	Fuels & Combustion: Classification of Fuels: Gaseous & Liquid fuels, Criteria for the selection of fuels (Calorific value, Flash point, Octane number, Cetane number and Adiabatic Flame Temperature etc), Parameters of lubricant quality (dropping point, viscosity index etc).				
14-15	Polymers: Types of Polymers: Natural, Semi-synthetic and synthetic polymers. Addition polymerization and condensation polymerization. Thermoplastic and thermosetting behavior, Homo-polymers, Copolymers, Silicon polymers, electrically conducting polymer (Polythiazyl).				
16	Chemistry of Engineering Materials: Different grades of iron (Cast iron, Wrought iron, Steel), Ferrous alloys, Nonferrous alloys, Copper alloys, Aluminum alloys, Nickel alloys etc.				
18	END SEMESTER EXAMINATION		02	01	1&2