

CO-wise Syllabus			
1	CO-1	Statement	Understand atomic and molecular structure, chemistry of advanced Materials and green chemistry.
		Syllabus	<p>Atomic and Molecular Structure: Molecular orbital's of diatomic molecules, Bond Order, Magnetic characters and numerical problems.</p> <p>Chemistry of Advanced Materials: Liquid Crystals; Introduction, Types and Applications of liquid crystals, Industrially important materials used as liquid crystals. Graphite and Fullerene; Introduction, Structure and applications. Nanomaterials; Introduction, Preparation, characteristics of nanomaterials and applications of nanomaterials, Carbon Nano Tubes (CNT).</p> <p>Green Chemistry: Introduction, 12 principles and importance of green Synthesis, Green Chemicals, Synthesis of typical organic compounds by conventional and Green route (Adipic acid and Paracetamol), Environmental impact of Green chemistry on society.</p>
2	CO-2	Statement	Apply spectroscopic techniques and stereochemistry to identify the compounds, elements etc.
		Syllabus	<p>Spectroscopic Techniques and Applications: Elementary idea and simple applications of UV, IR and NMR, Numerical problems.</p> <p>Stereochemistry: Optical isomerism in compounds without chiral carbon, Geometrical isomerism, Chiral Drugs.</p>
3	CO-3	Statement	Apply concepts of electrochemistry, batteries, corrosion and chemistry of engineering Materials like cement.
		Syllabus	<p>Electrochemistry and Batteries: Basic concepts of electrochemistry. Batteries; Classification and applications of Primary Cells (Dry Cell) and Secondary Cells (Lead Acid battery).</p> <p>Corrosion: Introduction to corrosion, Types of corrosion, Cause of corrosion, Corrosion prevention and control, Corrosion issues in specific industries (Power generation, Chemical processing industry, Oil & gas industry and Pulp & paper industries). Chemistry of Engineering Materials: Cement; Constituents, manufacturing, hardening and setting, deterioration of cement, Plaster of Paris (POP).</p>
4	CO-4	Statement	Apply concepts of electrochemistry, batteries, corrosion and chemistry of engineering Materials like cement.
		Syllabus	<p>Water Technology: Sources and impurities of water, Hardness of water, Boiler troubles, Techniques for water softening (Lime-Soda, Zeolite, Ion Exchange and Reverse Osmosis process), Determination of Hardness and alkalinity, Numerical problems.</p> <p>Fuels and Combustion: Definition, Classification, Characteristics of a good fuel, Calorific Values, Gross & Net calorific value, Determination of calorific value by Bomb Calorimeter, Theoretical calculation of calorific value by Dulong's method, Ranking of Coal, Analysis of coal by Proximate and Ultimate analysis method, Numerical problems, Chemistry of Biogas production from organic waste materials and their environmental impact on society.</p>
5	CO-5	Statement	Understand polymers, polymerization, polymer blends, polymer composites and organometallic compounds.
		Syllabus	<p>Materials Chemistry: Polymers; Classification, Polymerization processes, Thermosetting and Thermoplastic Polymers, Polymer Blends and Composites, Conducting and Biodegradable polymers, Preparation, properties, industrial applications of Teflon, Lucite, Bakelite, Kelvar, Dacron, Thiokol, Nylon, Buna-N and Buna-S and their environmental impact on society, Speciality polymers.</p> <p>Organometallic Compounds: General methods of preparation and applications of Organometallic compounds (RMgX and LiAlH₄).</p>

B.Tech First Year: Regular Course Lecture Plan Session 2023-24

Subject Name	Engineering Chemistry (BAS 102/BAS202)
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CO No.	Unit Name	Syllabus Topics	Lecture No
1	Atomic and Molecular Structure	Molecular orbital theory and its application to homo diatomic molecules.	1
		Molecular orbital theory and its application to hetero diatomic molecules.	2
		Liquid crystals, their classification, properties and applications. Industrially important materials used as liquid crystals.	3
		Concepts, Properties & Applications of Nano-Science & Nano-materials	4
		Nanomaterials: Graphite and fullerenes.	
		Carbon Nano Tubes (CNT)	5
		Synthesis of typical organic compounds by conventional and Green route (Adipic acid and Paracetamol), Environmental impact of Green chemistry on society	
Green Chemistry: Introduction, 12 principles and importance of green Synthesis, GreenChemicals	6		
2	Spectroscopic techniques and applications	Spectroscopy: Overview of wavelength, frequency & wavelength	7
		Beer Lamberts Law and its numerical. U.V. and Visible spectroscopy: Electronic transitions	
		auxochromes, chromophores and shifts.factors causing shifts,application of U.V.-Visible spectroscopy	8
		Woodward Fieser Rule and calculation of λ_{max} .	9
		Elementary idea and simple applications of IR	10
		factors affecting IR vibrational modes & its numerical	
		NMR spectroscopy: principle , chemical shift,shielding and deshielding effect	11
		NMR spectrum and application and numerical	
		structural illucidation on the basis of IR & NMR	12
		Stereochemistry: Optical isomerism in compounds without chiral carbon	13
Stereochemistry : Geometrical Isomerism, Chiral Drugs.	14		
3	Electrochemistry, corrosion and phase rule	Electrochemistry: Electrochemical and electrolytic cells, Electrochemical series and its uses.	15
		Derivation of Nernst equation, numerical and applications of Nernst equation.	16
		Gibbs Helmholtz equation, Relation of EMF with thermodynamic functions (ΔH , ΔS and ΔF) and numerical.	17
		Batteries, their types, construction and working of lead acid storage battery.	18
		Working and reaction of Leclanche cell	19
		Corrosion: Types of corrosion, its causes.	20

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CO No.	Unit Name	Syllabus Topics	Lecture No
		Factors affecting corrosion, Electrochemical theory of corrosion. Preventive measures of corrosion.	21
		Corrosion issues in specific industries (Power generation, Chemical processing industry, Oil & gas industry and Pulp & paper industries).	22
		Chemistry of Engineering Materials: Cement; Constituents, manufacturing, hardening and setting, deterioration of cement, Plaster of paris	23
4	Water Analysis, and fuels	Hardness, its units and types, associated boiler trouble	24
		how to calculate hardness and alkalinity, internal treatment methods.	25
		Zeolite Process, Ion exchange resins, numericals on zeolite process. Reverse osmosis	26-27
		Lime soda process and its numericals.	28-29
		Fuels and their classification, comparison of solid, liquid and gaseous fuels, characteristics of good fuels.	30
		Theoretical and experimental determination of GCV & NCV	31
		coal and its classification, Proximate and ultimate	32
		Numericals on proximate and ultimate analysis.	33
		Air Combustion & Numerical	34
Chemistry of Biogas production from organic waste materials and their environmental impact on society	35		
5	Polymers and organometallic compounds	Basic definitions, characteristics of polymers,	36
		Weight average and number average molecular weights, Classification of polymers.	37
		Mechanism of polymerization (free radical , cationic & anionic)	38
		Preparations and applications of some industrially important polymers (Teflon, Lucite, Bakelite, Kelvar, Dacron, Thiokol, Nylon, Buna-N and Buna-S and their environmental impact on society)	39
		Conducting polymers and Biodegradable polymers: Preparation, Properties & Applications	40
		Blends & Composites: Properties & Applications	41
		Organometallic compounds, their classification and general methods of preparations.	42
		Grignard Reagent and its applications.	43
		LiAlH ₄ reagent and its applications.	44