



GAYATRI VIDYA PARISHAD INSTITUTE OF HIGHER LEARNING AND RESEARCH

(Deemed to be University under Distinct Category under Section 3 of the UGC Act,
1956)

B.Tech (CIVIL, MECHANICAL, MRB); I SEMESTER CHEMISTRY OF MATERIALS

Lecture plan

Unit	Lecture No.	Topic / Sub-topic	CO
Unit –I Corrosion and its control	1	Corrosion: Definition and types of corrosion	CO1
	2	Dry corrosion	
	3	Electrochemical corrosion	
	4	Galvanic corrosion and Differential aeration corrosion	
	5	Factors affecting corrosion. Corrosion Control Methods- Proper design	
	6	Cathodic protection methods-Sacrificial anode and impressed-current cathodic protection	
	7	Electroplating and electroless plating.	
	8	Smart Corrosion Monitoring- Linear polarization resistance (LPR) for monitoring corrosion	
	9	Revision/Test/Tutorial	
UNIT- II Water treatment and sustainable water management	10	Water Quality Parameters- Water quality parameters for industrial use- pH, alkalinity,	CO2
	11	Hardness, total dissolved solids (TDS), dissolved oxygen (DO),	
	12	Chemical oxygen demand (COD), and biochemical oxygen demand (BOD)	
	13	Municipal water treatment-Industrial Boiler Troubles	
	14	Scale formation, sludge deposition	
	15	Caustic embrittlement, and boiler corrosion	
	16	Advanced Filtration Methods- Reverse osmosis (RO), Nanofiltration (NF)	
	17	Sustainable Water Management-Zero liquid discharge (ZLD) and green disinfection	
	18	Revision/Test/Tutorial	
UNIT-III Engineering materials	19	Lubricants- Functions and classification of lubricants.	CO3
	20	Mechanisms of Lubrication -Hydrodynamic lubrication, boundary lubrication, and extreme- pressure lubrication	
	21	Properties-Viscosity, flash point, fire point, cloud point	
	22	Properties-Pour point, aniline point and mechanical stability	
	23	Cement- Portland cement- Constituents; manufacture of Portland cement	
	24	Cement, chemistry of setting and hardening of cement,	
	25	Refractories- Definition, classification heat characteristics.	
	26	Failure of refractories	
	27	Revision/Test/Tutorial	
	28	Polymers: Definition, classification, Polymerization methods	CO4
	29	Addition, condensation, copolymerization	

UNIT-IV Polymers and smart materials	30	Effect of polymer structure on properties, effect of heat on polymers. Plastics	
	31	Thermoplastic (recyclable), thermosetting(non-recyclable) plastics,	
	32	Plastic waste management - plastic to fuel conversion, construction materials and composite materials.	
	33	Conducting polymers: Preparation, properties and applications of Polyacetylene, polyaniline.	
	34	Smart Materials-Introduction, Characteristics and applications of Piezoelectric materials	
	35	Shape memory alloys (SMA), Electrochromic and Photochromic Materials.	
	36	Revision/Test/Tutorial	
UNIT-V Fuels and Fuel Cells	37	Fuels- Classification and characteristics of fuels, calorific value	CO5
	38	Conventional fuels and their environmental impacts	
	39	Coal, petrol, diesel, LPG, and CNG. Biofuels- Production, advantages, and limitations of biodiesel and bioethanol	
	40	Hydrogen as a Fuel of the Future-Types of hydrogen based on their sources	
	41	Challenges associated with hydrogen storage and transportation	
	42	Electrochemical cells and their EMF, merits and demerits of fuel cells.	
	43	Construction and working principles of hydrogen–oxygen fuel cells	
	44	Construction and working principle of polymer electrolyte membrane fuel cells (PEMFCs).	
	45	Revision/Test/Tutorial	