SYNERGY SCHOOL OF ENGINEERING DHENKANAL

LESSON PLAN

SESSION (2026-2027)

Discipline : Common to all branches	Name of the teaching faculty: Ms. Amrita Aiswarya Nanda Ms. Jyotirmayee Behera
Subject : TH-3 Applied chemistry and Environmental science	No of class per week- 04
	Start date-17.08.2026 End date- 17.04.2027

Week	Class day	Topic
1	1	**Unit 1 Air pollution**: Definition of pollution and pollutant.
	2	Classification of pollutant(primary and secondary),
	3	Natural and man-made sources of air pollution.
	4	Air Pollutants: Types, Particulate Pollutants
2	1	Effects and control of Bag filter,
	2	Effects and control of Cyclone separator,
	3	Effects and control of Electrostatic Precipitator
	4	Gaseous Pollution Control:
3	1	Catalytic Converter
	2	Effects of air pollution due to Refrigerants, I.C., Boiler
	3	Noise pollution: Definition and sources of pollution,
	4	Effects and control of Noise Pollution.
4	1	**Unit 2 Water pollution:** Sources and types of water pollutants
	2	Characteristics of water pollutants Turbidity, pH,total suspended solids
	3	Total solids BOD and COD
	4	Waste Water Treatment: Primary methods: sedimentation, froth floatation
5	1	Secondary methods, Activated sludge treatment, Bioreactor
	2	Tertiary Method: Membrane separation technology, RO (reverse osmosis)
	3	Soil Pollution: Definition and Causes
	4	Effects and Preventive measures of Soil Pollution
6	1	Effects of Excessive use of Fertilizers, Pesticides and Insecticides
	2	Irrigation, E-Waste on soil pollution
	3	Question and answer discussion
	4	Revision of chapter 1and 2
7	1	**UNIT-3: Solid Waste Management** :Solid waste generation- Sources and characteristics of: Municipal solid waste.
	2	E- waste biomedical waste
	3	Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries

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	4	Collection of MSW and Disposal of MSW(3R, principles)
8	1	Energy recovery, Sanitary landfill ; Hazardous waste
	2	Concept of Carbon Credit and Carbon Footprint
	3	Environmental management in fabrication industry
	4	Question and answer discussion
9	1	**UNIT-4: Electrochemistry & Corrosion** Electronic concept of oxidation, reduction and redox reactions.
	2	Definition of terms: electrolytes, non-electrolytes with suitable examples,
	3	Faradays 1st law of electrolysis and simple numerical problems.
	4	Faradays 2nd law of electrolysis and simple numerical problems.
10	1	Industrial Application of Electrolysis –Electrometallurgy,
	2	Electroplating, Electrolytic refining.
	3	Application of redox reactions in electrochemical cells – Primary cells – dry cell,
	4	Secondary cell - commercially used lead storage battery and fuel cells
11	1	Introduction to Corrosion of metals - definition, types of corrosion – i.chemical
	2	ii.electrochemical
	3	H2 liberation and O2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.
	4	Internal corrosion preventive measures –Purification, alloying and heat treatment
12	1	External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.
	2	Question and answer discussion
	3	Revision of chapter 3 and 4
	4	**UNIT-5: Chemistry of Fuels and Lubricants** :Definition and classification of fuels
13	1	Calorific values (HCV and LCV)
	2	Liquid fuels petrol and diesel
	3	Fuel rating (octane and cetane numbers)
	4	Chemical composition, calorific values and applications of LPG, CNG, water gas
14	1	Chemical composition, calorific values and applications of , coal gas, producer gas and biogas.
	2	Lubricant – Definition, function, classification with examples
	3	Lubrication definition and mechanism (hydrodynamic and boundary lubrication
	4	Physical properties (viscosity and viscosity index, oiliness,
15	1	Flash and fire point, cloud and pour point .
	2	Chemical properties (coke number, total acid number saponification value) of lubricants
	3	Characteristic properties of good lubricant.
	4	Question and answer discussion
16	1	**UNIT-6: Atomic Structure, Chemical Bonding and Solutions** : Rutherford model of atom and its failures
	2	Bohr's model of atom : postulates and failure

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	3	Hydrogen spectrum explanation based on Bohr's model of atom,
	4	Quantum numbers – orbital concept
17	1	Shapes of s, p and d orbitals
	2	Heisenberg uncertainty principle
	3	Pauli's exclusion principle
	4	Aufbau principle
18	1	Hund's rule of maximum multiplicity
	2	Electronic configurations (up to atomic number 30)
	3	5 Concept of chemical bonding – cause of chemical bonding
	4	types of bonds: ionic bonding (NaCl example)
19	1	Covalent bond (H2, F2, HF),
	2	Basic concept of orbital overlapping sigma and pi bonds
	3	Concept of hybridization, hybridization in BeCl2, BF3,
	4	Hybridization in CH4, NH3, H2O
20	1	Coordination bond inNH4 + ion, metallic bonding
	2	Hydrogen bond and anomalous properties of NH3, H2O due to hydrogen bonding
	3	Solution – idea of solute, solvent and solution ;Normality, molarity (with Simple numerical)
	4	Mass percentage, volume percentage and mole fraction.(with Simple numerical)
21	1	Question and answer discussion
	2	Revision of chapter 5 and 6
	3	**UNIT-7: Water and Water Treatment** (13 Periods) 7.1 Graphical presentation of water distribution on Earth (pie or bar diagram). Classification as soft and hard water
	4	Types of hardness
22	1	Causes of hardness, unit of hardness and simple numerical on water hardness and conversion
	2	Cause of poor lathering of soap in hard water,
	3	Problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc.)
	4	Quantitative measurement of water hardness by ETDA method
23	1	Total dissolved solids (TDS) alkalinity estimation
	2	Water softening techniques – soda lime process
	3	Water softening techniques – zeolite process
	4	Water softening techniques – ion exchange process.
24	1	Municipal water treatment – sedimentation, coagulation, filtration, sterilization.
	2	Question and answer discussion
	3	**UNIT-8: Engineering Materials** :Natural occurrence of metals – minerals
	4	Ores of iron, aluminium and copper, gangue (matrix)flux, slag,
25	1	General principles of metallurgy.
	2	Alloys – definition and purposes of alloying, properties and ferrous alloys and nonferrous with suitable examples
	3	Applications of Brass, Bronze, Stainless Steel, Alnico, Duralumin.

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	4	Question and answer discussion
26	1	Polymers – monomer, homo and co polymers, ,
	2	Degree of polymerization, addition polymerization and condensation polymerization
	3	Simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE)
	4	Simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (nylon – 6, nylon-6,6 and Bakelite),
27	1	Question and answer discussion
	2	Revision of chapter 7 and 8
	3	**UNIT-9: Ecosystem** :Structure of ecosystem, Biotic & Abiotic components
	4	Food chain and food web
28	1	Aquatic ecosystem (Lentic and Lotic)
	2	Terrestrial ecosystem (grassland, forest, desert)
	3	Bio-geochemical cycles-Carbon andNitrogen cycle
	4	Sulphur and Phosphorus cycle
29	1	Global warming -Causes, effects, process,
	2	GreenHouse Effect-Causes, effects, process
	3	Ozone depletion-Causes and effects
	4	Question and answer discussion
30	1	**UNIT-10: Renewable sources of Energy** : Solar Energy:Basics of Solar energy
	2	Flat plate collector (Liquid &Air).Theory of flat plate collector.
	3	Importance of coating. Advanced collector.
	4	Solar pond and Solar water heater,
31	1	solar dryer and Solar stills.
	2	Biomass:As an energy source ;Thermal characteristics of biomass as fuel.
	3	Anaerobic digestion. Biogas production mechanism and Utilization.
	4	Wind energy: Future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy
32	1	Need of new sources and Applications of (Hydrogen energy, Tidal energy conversion.)
	2	Origin and power plants of geothermal energy
	3	Question and answer discussion
	4	Revision of chapter 9 and 10

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