BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

DEPARTMENT: HUMANITIES AND SCIENCES

LESSON PLAN

SUBJECT: - APPLIED CHEMISTRY & EVS (TH-3)

ACADEMIC SESSION:-2026-27

1ST YEAR

SECTION: E, F

BRANCH: COMPUTER SCIENCE AND ENGINEERING (CSE), DIGITAL MANUFACTURING TECHNOLOGIES(DMT)

Prepared by Smt. SULAGNA DAS

(Senior Lecturer in Chemistry)

Lesson Plan

Discipline : CSE (E)	Year : 1st ; Branch- CSE Section-E	Name of Faculty : Smt. Sulagna Das
Subject: Applied Chemistry & Enviromental Science	**No. of days per week Class allotted: 4P (Mon, Tue, Wed, Fri)**	**Session From Date: 17-08-2026 to 17-04-2027**

Week	Class Day	Theory Topics
1st	1	**Unit– 1 Air and, Noise Pollution** Definition of pollution and pollutant, classification of pollutant(primary andsecondary)
	2	Natural and man made sources of air pollution
	3	Air Pollutants: Types, Particulate Pollutants: Classification & Effects
	4	Control of Particulate Pollutants(Bag filter, Cyclone separator,)
2nd	5	Electrostatic Precipitator
	6	Gaseous Pollution Control : Absorber & Catalytic Converter
	7	Effects of air pollution due to Refrigerants, I.C., Boiler
	8	Noise pollution: Definition & sources of pollution
3rd	9	Effects of Noise pollution
	10	Control of Noise pollution
	11	CLASS TEST
	12	**Unit- 2 Water and Soil Pollution** Sources of water pollution, Types of water pollutants
4th	13	Characteristics of water pollutants Turbidity, pH, total suspended solids
	14	Total solids BOD and COD
	15	Waste Water Treatment: Primary methods: sedimentation, froth floatation
	16	Secondary methods: Activated sludge treatment, Bioreactor
5th	17	Tertiary Method: Membrane separation technology, RO (reverse osmosis).
	18	Soil Pollution: Definition & Causes
	19	Effects and Preventive measures of Soil Pollution
	20	Effects of Excessive use of Fertilizers on Soil Pollution
6th	21	Effects of Excessive use of Pesticides and Insecticides on Soil Pollution
	22	Effects of excessive Irrigation on Soil Pollution
	23	Effects of E-waste on Soil Pollution
	24	CLASS TEST

Week	Class Day	Theory Topics
7th	25	**Unit-3 Solid Waste Management** Solid waste generation- Sources and characteristics of : Municipal solid waste,
	26	Sources and characteristics of E- waste, bio- medical waste
	27	Sources and characteristics of Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.
	28	Collection and disposal: MSW
8th	29	3R principles, energy recovery,
	30	sanitary landfill, Hazardous waste.
	31	Concept of Carbon Credit
	32	Concept of Carbon Footprint.
9th	33	Environmental management in fabrication industry
	34	**Unit-4 Electrochemistry & Corossion** Electronic concept of oxidation, reduction and redox reactions,**Definition of terms: electrolytes, non-electrolytes with suitable examples**
	35	Faradays 1st law of electrolysis and simple numerical problems
	36	Faradays 2nd law of electrolysis and simple numerical problems
10th	37	Industrial Application of Electrolysis –Electrometallurgy, Electroplating
	38	Industrial Application of Electrolysis Electrolytic refining
	39	Application of redox reactions in electrochemical cells – Primary cells – dry cell
	40	Secondary cell - commercially used lead storage battery
11th	41	Application of redox reactions in electrochemical cells - fuel cells.
	42	Introduction to Corrosion of metals - definition, types of corrosion (chemical and electrochemical)
	43	H2 liberation and O2 absorption mechanism of electrochemical corrosion
	44	factors affecting rate of corrosion.
12th	45	Internal corrosion preventive measures –Purification, alloying and heat treatment
	46	External corrosion preventive measures: a) metal (anodic, cathodic) coatings
	47	External corrosion preventive measures: b) organic inhibitors.
	48	CLASS TEST
	49	**Unit-5 Chemistry of Fuels and Lubricants** Definition of fuel, classification of fuels,

Week	Class Day	Theory Topics
20th	78	Hydrogen bond and anomalous properties of NH3, H2O due to hydrogen bonding,
	79	Solution – idea of solute, solvent and solution,
	80	methods to express the concentration of solution normality, molarity, molality
21st	81	Simple numerical baesed on normality, molarity, molality-
	82	methods to express the concentration of solution ppm, mass percentage, volume percentage and mole fraction.(with Simple numerical)
	83	Simple numerical baesed on ppm, mass percentage, volume percentage and mole fraction.
	84	**Unit-7 Water and Water Treatment** Graphical presentation of water distribution on Earth (pie or bar diagram) Classification as soft and hard water
22nd	85	Causes of hardness, unit of hardness
	86	simple numerical on water hardness and conversion
	87	Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler scale and sludge
	88	problems caused by the use of hard water in boiler foaming and priming, corrosion
23rd	89	Quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS)
	90	Quantitative measurement of water hardness by alkalinity estimation.
	91	Water softening techniques – zeolite process
	92	Water softening techniques – soda lime process, zeolite process and ion exchange process.
24th	93	Water softening technique – ion exchange process.
	94	Municipal water treatment (in brief only) – sedimentation, coagulation, filtration
	95	Municipal water treatment – sterilization
	96	**UNIT-8: Engineering Materials** Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix)flux, slag
25th	97	Metallurgy – brief account of general principles of metallurgy.
	98	Alloys – definition, purposes of alloying, ferrous alloys and nonferrous with suitable examples
	99	properties and applications of Brass, Bronze, Stainless Steel

Week	Class Day	Theory Topics
13th	50	calorific values (HCV and LCV)
	51	Liquid fuels petrol fuel rating octane number
	52	Liquid fuels diesel fuel rating cetane numbers
14th	53	Chemical composition, calorific values and applications of LPG, CNG,
	54	Chemical composition, calorific values and applications water gas, coal gas, producer gas and biogas.
	55	Lubricant – Definition, function, classification with examples
	56	Lubrication definition and mechanism hydrodynamic and boundary lubrication
15th	57	Lubrication definition and mechanism boundary lubrication
	58	Physical properties (viscosity and viscosity index, oiliness,
	59	Physical properties flash and fire point, cloud and pour point only)
	60	chemical properties - coke number, total acid number of lubricants
16th	61	chemical properties - saponification value of lubricants,
	62	characteristic properties of good lubricant
	63	**Unit-6 Atomic Structure, Chemical Bonding and Solutions** Rutherford model of atom and its failures,
	64	Bohr's theory (expression of energy and radius to be omitted),
17th	65	hydrogen spectrum explanation based on Bohr`s model of atom
	66	Quantum numbers – orbital concept. Shapes of s, p and d orbitals
	67	Pauli's exclusion principle
	68	Heisenberg uncertainty principle
18th	69	Aufbau principle
	70	Hund's rule of maximum multiplicity
	71	electronic configurations (up to atomic number 30)
	72	Concept of chemical bonding – cause of chemical bonding
19th	73	types of bonds: ionic bonding (NaCl example)
	74	covalent bond (H2, F2, HF),
	75	Basic concept of orbital overlapping sigma and pi bonds, Concept of hybridization, hybridization in BeCl2, BF3, CH4, NH3, H2O),
	76	Coordination bond inNH4 + ion
	77	metallic bonding

Week	Class Day	Theory Topics
	100	properties and applications of Alnico, Duralumin.
26th	101	Polymers – monomer, homo and co polymers, degree of polymerization,
	102	addition polymerization and condensation polymerization
	103	Simple reactions involved in preparation and their application of thermoplastics plastics using PVC, PS, PTFE
	104	Simple reactions involved in preparation and their application of thermosetting plastics using nylon – 6, nylon-6,6
27th	105	Simple reactions involved in preparation and their application of thermosetting plastics using Bakelite
	106	Rubber and vulcanization of rubber. Advantages of vulcanized rubber over natural rubber.
	107	**Unit-9 Ecosystem** Structure of ecosystem, Biotic & Abiotic components
	108	Food chain & Food web
28th	109	Aquatic (Lentic and Lotic) ecosystem
	110	Terrestrial (grassland, forest, desert) ecosystem
	111	Carbon, Nitrogen Cycles
	112	Sulphur, Phosphorus cycle.
29th	113	Global warming -Causes, effects, process
	114	Green House Effect, Ozone depletion
	115	**Unit– 10 Renewable sources of Energy** Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector.
	116	Importance of coating. Advanced collector
30th	117	Solar pond. Solar water heater
	118	Solar dryer. Solar stills
	119	Biomass: Overview of biomass as energy source, Thermal characteristics of biomass as fuel
	120	Anaerobic digestion. Biogas production mechanism
31st	121	Utilization and storage of biogas.
	122	Wind energy: future prospects of wind energy.
	123	Wind energy in India. Environmental benefits and problem of wind energy.
	124	New Energy Sources: Need of new sources. Different types new energy sources
32nd	125	Applications of (Hydrogen energy),
	126	Applications of (Tidal energy conversion)
	127	Concept, origin and power plants of geothermal energy

Week	Class Day	Theory Topics
	128	Previous Year Question Discussion

BOOK REFERNCE:

1	Applied Chemistry by Dr. Anju Rawlley (Download from https://ekumbh.aicteindia.org/dbook.php)
2	Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi,
3	Jain&Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
4	Environmental Science (English) by Dr. Subrat Roy (Download from
5	S.C. Sharma& M.P. Poonia, Environmental Studies, Khanna Publishing House,New Delhi
6	B. Sathpathy and A P Dash Environmental Science Kalyani Publishers

Das 31/07/2026

Concerned faculty:
Smt. Sulagna Das
Sr. Lect. (Chemistry)

HOD 31/07/2026
Dr. B. Mohanty

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