

JHARSUGUDA ENGINEERING SCHOOL, JHARSUGUDA
DEPARTMENT OF MATH & SCIENCE



LESSON PLAN
APPLIED CHEMISTRY AND EVS
FOR
1ST YEAR DIPLOMA STUDENTS
(COMMON TO ALL BRANCHES)

Prepared By:
Gouranga Badhei
Sr. Lecturer (Chemistry)
&
Dr. Shabna Patel
Lect-II (Chemistry)
Jharsuguda Engineering School, Jharsuguda

LESSON PLAN

Session: 2026 – 27

Course Name: Applied Chemistry and EVS	Progressive Assessment: 30 Marks
Course Code: TH-3	Final Exam: 70 Marks
Periods per Week: 04	Duration of End Exam: 3 Hours
Total Periods: 128	No of Credits: 04
Duration: 17/08/2026 to 17/04/2027	

Periods	Week	Class Day	UNIT	Topics to be covered
1	1 st	1 st	1. Air Pollution and Noise Pollution	1.1 Definition of pollution and pollutant, classification of pollutant (primary and secondary),
2		2 nd		Natural and man-made sources of air pollution.
3		3 rd		1.2 Air Pollutants: Types, Particulate Pollutants:
4		4 th		Effects of air pollution.
5	2 nd	1 st		Control of air pollution (Bag filter, Cyclone separator, Electrostatic Precipitator)
6		2 nd		1.3 Gaseous Pollution Control: Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler
7		3 rd		1.4 Noise pollution: Definition, sources of pollution,
8		4 th		Effects of noise pollution.
9	3 rd	1 st		Control of Noise Pollution.
10		2 nd		DOUBT CLEARANCE CLASS
11		3 rd	2. Water and Soil Pollution	2.1 Sources of water pollution, Types of water pollutants,
12		4 th		2.2 Characteristics of water pollutants Turbidity, pH,
13	4 th	1 st		Total suspended solids, total solids BOD and COD,
14		2 nd		2.3 Waste Water Treatment: Primary methods: sedimentation, froth floatation,
15		3 rd		Secondary methods, Activated sludge treatment, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis).
16		4 th		2.4 Soil Pollution: Definition, Causes, Effects
17	5 th	1 st		Preventive measures of Soil Pollution
18		2 nd		2.5 Effects of Excessive use of Fertilizers, Pesticides and Insecticides,
19		3 rd		Irrigation, E-Waste on soil pollution.

20		4 th		DOUBT CLEARANCE CLASS
21	6 th	1 st	UNIT-3: Solid Waste Management	3.0 Solid waste generation- Sources and characteristics of: Municipal solid waste,
22		2 nd		E- waste, biomedical waste. Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.
23		3 rd		3.1 Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill),
24		4 th		Hazardous waste.
25	7 th	1 st		3.2 Concept of Carbon Credit, Carbon Footprint.
26		2 nd		3.3 Environmental management in fabrication industry.
27		3 rd		DOUBT CLEARANCE CLASS
28		4 th		4.1 Electronic concept of oxidation, reduction and redox reactions.
29	8 th	1 st	UNIT-4: Electrochemistry & Corrosion.	4.2 Definition of terms: electrolytes, non-electrolytes with suitable examples,
30		2 nd		4.3 Faradays laws of electrolysis and simple numerical problems.
31		3 rd		4.4 Industrial Application of Electrolysis – Electrometallurgy, Electroplating,
32		4 th		Electrolytic refining.
33	9 th	1 st		4.5 Application of redox reactions in electrochemical cells – Primary cells – dry cell,
34		2 nd		Secondary cell - commercially used lead storage battery and fuel cells.
35		3 rd		4.6 Introduction to Corrosion of metals - definition, types of corrosion (chemical and electrochemical),
36		4 th		H ₂ liberation and O ₂ absorption mechanism of electrochemical corrosion,
37	10 th	1 st		Factors affecting rate of corrosion.
38		2 nd		4.7 Internal corrosion preventive measures –Purification, alloying and heat treatment
39		3 rd		External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.
40		4 th		DOUBT CLEARANCE CLASS
41	11 th	1 st	UNIT-5: Chemistry of Fuels and Lubricants	5.1 Definition of fuel, classification of fuels, calorific values (HCV and LCV),
42		2 nd		5.2 Liquid fuels petrol and diesel - fuel rating (octane and cetane numbers),
43		3 rd		5.3 Chemical composition, calorific values and applications of LPG, CNG,
44		4 th		water gas, producer gas,

45	12 th	1 st		Coal gas, and biogas.
46		2 nd		5.4 Lubricant – Definition, function, classification with examples,
47		3 rd		5.5 Lubrication definition and mechanism (hydrodynamic and boundary lubrication)
48		4 th		5.6 Physical properties (viscosity and viscosity index, oiliness,
49	13 th	1 st		flash and fire point, cloud and pour point only)
50		2 nd		Chemical properties (coke number, total acid number saponification value) of lubricants, characteristic properties of good lubricant.
51		3 rd		DOUBT CLEARANCE CLASS
52		4 th		
53	14 th	1 st		6.1 Rutherford model of atom and its failures.
54		2 nd		6.2 Bohr's theory (expression of energy and radius to be omitted),
55		3 rd		hydrogen spectrum explanation based on Bohr's model of atom,
56		4 th		6.3 Quantum numbers.
57	15 th	1 st		Orbital concept. Shapes of s, p and d orbitals, 6.4 Pauli's exclusion principle, Heisenberg uncertainty principle, Aufbau principle,)
58		2 nd		Electronic configurations (up to atomic number 30). Hund's rule of maximum multiplicity.
59		3 rd		6.5 Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example),
60		4 th		Covalent bond (H ₂ , F ₂ , HF), 6.6 Basic concept of orbital overlapping sigma and pi bonds,
61	16 th	1 st		Concept of hybridization, hybridization in BeCl ₂ , BF ₃ , CH ₄ , NH ₃ , H ₂ O),
62		2 nd		6.7 Coordination bond in NH ₄ ⁺ ion, metallic bonding.
63		3 rd		6.8 Hydrogen bond and anomalous properties of NH ₃ , H ₂ O due to hydrogen bonding,
64		4 th		6.9 Solution – idea of solute, solvent and solution, methods to express the concentration of solution, molarity, normality,
65	17 th	1 st		molality, ppm, mass percentage, volume percentage and mole fraction.(with Simple numerical)
66		2 nd		DOUBT CLEARANCE CLASS

UNIT-6: Atomic Structure, Chemical Bonding and Solutions.

67		3 rd		DOUBT CLEARANCE CLASS
68		4 th		7.1 Graphical presentation of water distribution on Earth (pie or bar diagram). Classification as soft and hard water,
69		1 st		7.2 Causes of hardness, unit of hardness and simple numerical on water hardness and conversion.
70	18 th	2 nd		7.3 Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc.),
71		3 rd	UNIT-7: Water and Water Treatment.	7.4 Quantitative measurement of water hardness by ETDA method,
72		4 th		Total dissolved solids (TDS) alkalinity estimation.
73		1 st		7.5 Water softening techniques – soda lime process,
74		2 nd		Zeolite process and ion exchange process.
75	19 th	3 rd		7.6 Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.
76		4 th		DOUBT CLEARANCE CLASS
77		1 st		DOUBT CLEARANCE CLASS
78		2 nd		8.1 Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix) flux, slag,
79	20 th	3 rd		8.2 Metallurgy – brief account of general principles of metallurgy.
80		4 th		8.3 Alloys – definition, purposes of alloying, ferrous alloys and nonferrous with suitable examples
81		1 st		Properties and applications of Brass, Bronze, Stainless Steel, Alnico, Duralumin.
82	21 st	2 nd	UNIT-8: Engineering Materials.	8.4 Polymers – monomer, homo and co polymers, degree of polymerization, addition polymerization and condensation polymerization,
83		3 rd		8.5 Simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, Nylon – 6, nylon-6, 6 and Bakelite),
84		4 th		8.6 Rubber and vulcanization of rubber. Advantages of vulcanized rubber over natural rubber.
85		1 st		DOUBT CLEARANCE CLASS
86	22 nd	2 nd		DOUBT CLEARANCE CLASS
87		3 rd		
88		4 th	UNIT-9: Ecosystem.	9.1 Structure of ecosystem, Biotic & Abiotic components Food chain and food web,

89	23 rd	1 st		9.2 Aquatic (Lentic and Lotic)
90		2 nd		Terrestrial ecosystem: grassland, forest, desert),
91		3 rd		9.3 Carbon, Nitrogen,
92		4 th		Sulphur, Phosphorus cycle.
93	24 th	1 st		9.4 Global warming -Causes, effects, process, Green House Effect, Ozone depletion.
94		2 nd		DOUBT CLEARANCE CLASS
95		3 rd		DOUBT CLEARANCE CLASS
96		4 th		10.1 Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector.
97	25 th	1 st		Importance of coating. Advanced collector. Solar pond.
98		2 nd		Solar water heater, solar dryer. Solar stills.
99		3 rd		10.2 Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel.
100		4 th		10.3 Anaerobic digestion. Biogas production mechanism and Utilization.
101	26 th	1 st	UNIT-10: Renewable sources of Energy	10.4 Wind energy: Future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy.
102		2 nd		10.5 New Energy Sources: Need of new sources. Different types new energy sources.
103		3 rd		Applications of (Hydrogen energy, Tidal energy conversion.)
104		4 th		Concept, origin and power plants of geothermal energy.
105	27 th	1 st		DOUBT CLEARANCE CLASS
106		2 nd		DOUBT CLEARANCE CLASS
107		3 rd		UNIT – 6 REVISION
108		4 th		UNIT – 6 REVISION
109	28 th	1 st		UNIT – 6 REVISION
110		2 nd		UNIT – 7 REVISION
111		3 rd		UNIT – 7 REVISION
112		4 th		UNIT – 7 REVISION
113	29 th	1 st		UNIT – 8 REVISION
114		2 nd		UNIT – 8 REVISION
115		3 rd		UNIT – 8 REVISION
116		4 th		UNIT – 9 REVISION

117	30 th	1 st		UNIT – 9 REVISION
118		2 nd		UNIT – 9 REVISION
119		3 rd		UNIT – 10 REVISION
120		4 th		UNIT – 10 REVISION
121	31 st	1 st		UNIT – 10 REVISION
122		2 nd		PROBABLE QUESTIONS-ANSWERS DISCUSSION
123		3 rd		PROBABLE QUESTIONS-ANSWERS DISCUSSION
124		4 th		PROBABLE QUESTIONS-ANSWERS DISCUSSION
125	32 nd	1 st		PROBABLE QUESTIONS-ANSWERS DISCUSSION
126		2 nd		PROBABLE QUESTIONS-ANSWERS DISCUSSION
127		3 rd		PROBABLE QUESTIONS-ANSWERS DISCUSSION
128		4 th	PROBABLE QUESTIONS-ANSWERS DISCUSSION	



Signature of Faculty



Signature of HOD