

## Lesson Plan 2025(S)

Subject: - Applied Chemistry

Course code: - TH-5(b).

Name of faculty: - LIPSHARANI BARIK

Class allotted: - 4p/week

Semester: - 2<sup>nd</sup>

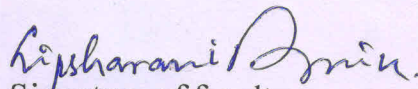
Branch: - Civil, Electrical & Metallurgy.

Weeks	Date/Period	From Date:- 04/02/2025 To 17/05/2025	Teaching Aid
		Theory/Practical-Topic/Lesson	
1	04/02/2025 To 08/02/2025	<b>Unit 1: Atomic Structure, Chemical Bonding and Solutions:</b> Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s, p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.	White Board Marker
2	10/02/2025 To 15/02/2025	Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H <sub>2</sub> , F <sub>2</sub> , HF hybridization in BeCl <sub>2</sub> , BF <sub>3</sub> , CH <sub>4</sub> , NH <sub>3</sub> , and H <sub>2</sub> O), and coordination bond in NH <sub>4</sub> <sup>+</sup> , and anomalous properties of NH <sub>3</sub> , H <sub>2</sub> O due to hydrogen bonding, and metallic bonding.	White Board Marker
3	17/02/2025 To 22/02/2025	Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity (M = mole per liter), ppm, mass percentage, volume percentage and mole fraction	White Board Marker
4	24/02/2025 To 01/03/2025	<b>Unit 2 Water</b> Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.	White Board Marker
5	03/03/2025 To 08/03/2025	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.), and quantitative measurement of water hardness by ETDA method, total dissolved solids	White Board Marker

		(TDS) alkalinity estimation. I) Water Softening techniques – soda lime process, zeolite process and ion exchange process.	
6	10/03/2025 To 13/03/2025	II) Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization. Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).	White Board Marker
7	17/03/2025 To 22/03/2025	<b>Unit 3: Engineering Materials</b> :Natural occurrence of metals – minerals, ores of iron, aluminum and copper, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy. Extraction of - iron from hematite ore using blast furnace, aluminum from bauxite along with reactions.	White Board Marker
8	24/03/2025 To 29/03/2025	Alloys – definition, purposes of alloying, ferrous alloys and nonferrous with suitable examples, properties and applications. General chemical composition, composition based applications (elementary idea only details omitted): Port land cement and hardening, Glasses Refractory and Composite materials	White Board Marker
9	02/04/2025 To 05/04/2025	Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.	White Board Marker
10	07/04/2025 To 12/04/2025	<b>Unit 4: Chemistry of Fuels and Lubricants</b> : Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula. Proximate analysis of coal solid fuel petrol and diesel	White Board Marker

11	15/04/2025 To 19/04/2025	fuel rating (octane and cetane numbers), Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas. Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism	White Board Marker
12	21/04/2025 To 26/04/2025	Hydrodynamic and boundary lubrication, physical proper- ties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants.	White Board Marker
13	28/04/2025 To 03/05/2025	<b>Unit 5: Electro Chemistry:</b> Electronic concept of oxidation, reduction and redox reactions. Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.	White Board Marker
14	05/05/2025 To 10/05/2025	Industrial Application of Electrolysis – • Electrometallurgy • Electroplating • Electrolytic refining. Application of redox reactions in electrochemical cells – • Primary cells – dry cell, • Secondary cell - commercially used lead storage battery, fuel and Solar cells.	White Board Marker
15	13/05/2025 To 17/05/2025	Introduction to Corrosion of metals – • definition, types of corrosion (chemical and electrochemical), H <sub>2</sub> liberation and O <sub>2</sub> absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion. Internal corrosion preventive measures – • Purification, alloying and heat treatment and External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.	White Board Marker

  
Signature of HOD

  
Signature of faculty