Lesson Plan: Applied Chemistry (TH.5) 2nd Sem 2024-2025				
Discipline: Applied Chemistry (TH.5)		**Semester-2 Summer 2025**	**Faculty** **Rabinarayan Panda (GF),Payal Mishra(GF)**	
Sl. No	**Subject: Applied Chemistry (TH.5)**	**No. Of classes per week in a section:4**	**Semester From date: 04.02.2025 To date: 17.05.2025** **No of weeks: 15**	
	Week/Month	**Class Day**	**Topic**	Periods
1	**1st week /Feb 2025**	1st	Unit 1: **Atomic Structure, Chemical Bonding and Solutions**,(Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted)	1
		2nd	Hydrogen spectrum explanation based on Bohr's model of atom	1
		3rd	Heisenberg uncertainty principle, Quantum numbers – orbital concept.	1
		4th	Shapes of s,p and d orbitals, Pauli's exclusion principle.	1
2	**2nd Week /Feb 2025**	1st	Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.	1
		2nd	Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example)	1
		3rd	Covalent bond (H2, F2, HF hybridization in BeCl2, BF3, CH4, NH3, H2O),	1
		4th	Co-ordination bond in NH4+, and anomalous properties of NH3, H2O due to hydrogen bonding, and metallic bonding.	1
3	**3rd Week/ Feb 2025**	1st	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 frac tion.	1
		2nd	**Unit 2: Water**(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.	1
		3rd	Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge	1

		4th	Quantitative measurement of water hardness by ETDA method	1
4	**4th Week/ Feb 2025**	1st	Total dissolved solids (TDS) alkalinity estimation.	1
		2nd	Water softening techniques – soda lime process, zeolite process and ion exchange process.	1
		3rd	Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.	1
		4th	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).	1
5	**1st week of March/2025**	1st	**Unit 3: Engineering Materials**.Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (ma- trix), flux, slag,	1
		2nd	Metallurgy-Brief account of general principles of metallurgy.	1
		3rd	Extraction of - iron from haematite ore using blast furnace	1
		4th	Aluminium from bauxite along with reactions. Alloys – definition, purposes of alloying	1
6	**2nd Week/March 2025**	1st	ferrous alloys and non ferrous with suitable examples, properties and applications.	1
		2nd	General chemical composition, composition based applications (elementary idea only details omitted):	1
		3rd	Port land cement and hardening, Glasses Refractory and Composite materials.	1
		4th	Polymers-monomer, homo and co polymers, degree of polymerization	1
7	**3rd Week/ March 2025**	1st	Reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE)	1
		2nd	Preparation of nylon-6, nylon-6,6 and Bakelite),rubber and vulcanization of rubber	1
		3rd	**Unit 4: Chemistry of Fuels and Lubricants**,Definition of fuel and combustion of fuel, classification of fuels	1
		4th	calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.	1
8	**4th Week/ March 2025**	1st	Proximate analysis of coal solid fuel	1
		2nd	Petrol and diesel -fuel rating (octane and cetane numbers),	1
		3rd	Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.	1

		4th	Lubrication-function and characteristic properties of good lubricant.	1
9	**1st Week/April 2025**	1st	classification with examples, lubrication mechanism – hydrodynamic and boundary lubrication	1
		2nd	Physical properties (viscosity and viscosity index, oiliness)	1
		3rd	flash and fire point, could and pour point only)	1
		4th	chemical properties (coke number, total acid number saponification value) of lubricants.	1
10	**2nd Week/ April 2025**	1st	**Unit 5: Electro Chemistry**,(Electronic concept of oxidation, reduction and redox reactions. Definition of terms: electrolytes, non-electrolytes with suitable examples)	1
		2nd	Faradays laws of electrolysis and simple numerical problems	1
		3rd	Industrial Application of Electrolysis-Electrometallurgy	1
		4th	Electroplating,Electrolytic refining.	1
11	**3rd Week / April 2025**	1st	Application of redox reactions in electrochemical cells-Primary cells-dry cell.	1
		2nd	Secondary cell-commercially used lead storage battery.	1
		3rd	fuel and Solar cells. Introduction to Corrosion of metals.	1
		4th	definition, types of corrosion (chemical and electrochemical)	1
12	**4th week /April 2025**	1st	H2 liberation and O2 absorption mechanism of electrochemical corrosion	1
		2nd	factors affecting rate of corrosion	1
		3rd	Internal corrosion preventive measures-Purification, alloying and heat treatment	1
		4th	External corrosion preventive measures: a) metal (anodic, cathodic) coatings,organic inhibitors.	1
13	**1st week/May 2025**	1st	Revesion	1
		2nd	Revesion	1
		3rd	Revesion	1
		4th	Revesion	1
14	**2nd week/May 2025**	1st	Revesion	1
		2nd	Revesion	1
		3rd	Revesion	1
		4th	Revesion	1