SUBJECT- APPLIED CHEMISTRY			
Discipline : Mechanical/ Mechatronics Engg.		**Semester: 2nd Sem**	**Name of the Teaching Faculty :Prasant Behera**
Subject : TH.2b		**No. of Days / per week class allotted**	**Semester From date : 04.02.2025 To Date : 17.05.2025**
Month	**Week**	**Day**	**Topics**
FEBRUARY	**2nd**	**1st**	**Unit 1: Atomic Structure, Chemical Bonding and Solutions:** 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.
		4th	Heisenberg uncertainty principle, Quantum numbers – orbital concept. Shapes of s,p and d orbitals,
	3rd	**1st**	Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.
		4th	Concept of chemical bonding – cause of chemical bonding, types of bonds:
	4th	**1st**	ionic bonding (NaCl example), covalent bond (H2, F2, HF hybridization in BeCl2, BF3, CH4, NH3, H2O)
		4th	coordination bond in NH4 +, and anomalous properties of NH3, H2O due to hydrogen bonding, and metallic bonding.
	5th	**1st**	Solution – idea of solute, solvent and solution, methods to express the concentration of solution
		4th	molarity (M = mole per liter), ppm, mass percentage, volume percentage and mole frac tion.
MARCH	**2nd**	**1st**	Numericals
		4th	**Unit 5: Electro Chemistry:** Electronic concept of oxidation, reduction and redox reactions.
	3rd	**1st**	Definition of terms: electrolytes, non-electrolytes with suitable examples,
		4th	Faradays laws of electrolysis and simple numerical problems.
	4th	**1st**	Industrial Application of Electrolysis – • Electrometallurgy • Electroplating • Electrolytic refining
		4th	Application of redox reactions in electrochemical cells – • Primary cells – dry cell,
	5th	**1st**	Secondary cell - commercially used lead storage battery, fuel and
		4th	Solar cells. Introduction to Corrosion of metals – • definition, types of corrosion (chemical and electrochemical),
APRIL	**1st**	**1st**	H2 liberation and O2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.
	2nd	**1st**	Internal corrosion preventive measures – • Purification, alloying
		4th	d heat treatment and External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

	3rd	**4th**	Natural occurrence of metals – minerals, ores of iron, aluminium and copper
	4th	**1st**	, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy
		4th	Extraction of - iron from haematite ore using blast furnace
	5th	**4th**	aluminium from bauxite along with reactions. Alloys
MAY	**1st**	**4th**	definition, purposes of alloying, ferrous alloys and nonferrous with suitable examples, properties and applications
	2nd	**1st**	General chemical composition, compositionbasedapplications (elementary idea only details omitted):
		4th	Port land cement and hardening
	3rd	**4th**	Glasses Refractory and Composite materials.