

# G.I.E.T. (POLYTECHNIC), JAGATPUR, CUTTACK

## LESSON PLAN

<b>Discipline:</b> Civil, CSE Electrical, ETC & Mechanical Engg.	<b>Semester:</b>  2 <sup>nd</sup>	<b>Name of the Teaching Faculty:</b>  Amrutendu Pati (Lect. In Chemistry)
<b>Subject:</b>  Applied Chemistry	<b>No of Days/per week class allotted: 5P (4 Lectures +1 Tutorial)</b>	<b>Semester From Date: 04.02.2025 to Date: 17.05.2025</b>  <b>No. of Weeks: 15</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory Topics</b>
1ST	1 <sup>st</sup>	<u>UNIT-I: ATOMIC STRUCTURE, CHEMICAL BONDING AND SOLUTION.</u> Rutherford model of Atom.
	2 <sup>nd</sup>	Bohr's Theory (expression of energy and radius to be omitted).
	3 <sup>rd</sup>	Hydrogen Spectrum explanation based on Bohr's model of atom.
	4 <sup>th</sup>	Heisenberg Uncertainty principle.
2ND	1 <sup>st</sup>	Quantum number - Orbital Concept.
	2 <sup>nd</sup>	Shapes of S, P and D orbitals.
	3 <sup>rd</sup>	Pauli's exclusion Principle, Hund's rule of maximum multiplicity Aufbau rule.
	4 <sup>th</sup>	Electronic Configuration
3RD	1 <sup>st</sup>	Concepts of chemical bonding - cause of chemical bonding, types of bonds.
	2 <sup>nd</sup>	Ionic bonding (NaCl example).
	3 <sup>rd</sup>	Covalent bond ( $H_2, F_2$ , HF hybridization in $BeCl_2$ ).
	4 <sup>th</sup>	$BF_3, CH_4, NH_3, H_2O$ .
4TH	1 <sup>st</sup>	Coordination bond in $NH_4^+$ and anomalous properties of $NH_3$ .
	2 <sup>nd</sup>	Solution - idea of solute, solvent and solution.
	3 <sup>rd</sup>	Method to express concentration of solution molarity ( $m = \text{moles per liter}$ ), PPM.
	4 <sup>th</sup>	Mass percentage, Volume percentage and mole fraction.
5TH	1 <sup>st</sup>	<u>UNIT-2: WATER.</u> Graphical Presentation of water distribution on Earth (pie or bar diagram).
	2 <sup>nd</sup>	Classification of soft and hard water based on soap test.





	3 <sup>rd</sup>	Salts causing water hardness ,unit of hardness and simple numerical on water hardness.
	4 <sup>th</sup>	Cause of poor lathering of soap in hard water ,problems caused by use of hard water in boiler.
6TH	1 <sup>st</sup>	Quantitative measurement of water hardness by EDTA method.
	2 <sup>nd</sup>	Water softening techniques -soda lime technique.
	3 <sup>rd</sup>	Zeolite process and Ion exchange process.
	4 <sup>th</sup>	Municipal water Treatment-sedimentation, coagulation, filtration, sterilization.
7TH	1 <sup>st</sup>	Water for human consumption for drinking and cooking purpose.
	2 <sup>nd</sup>	Indian standard Specification of drinking Water.
	3 <sup>rd</sup>	Revision
	4 <sup>th</sup>	Class Test
8TH	1 <sup>st</sup>	<b><u>UNIT-3:ENGINEERING MATERIAL.</u></b> Natural occurrence of metals-minerals, ores of iron.
	2 <sup>nd</sup>	Aluminum and copper, gangue(matrix), flux, slag.
	3 <sup>rd</sup>	Metallurgy -brief account of general principles of metallurgy.
	4 <sup>th</sup>	Extraction of iron from hematite are using blast furnace.
9TH	1 <sup>st</sup>	Aluminum from bauxite along with reaction.
	2 <sup>nd</sup>	Alloys-Definition, purposes of alloying, ferroalloys and non-ferrous with examples.
	3 <sup>rd</sup>	General chemical composition.
	4 <sup>th</sup>	Composition based application (elementary idea only details omitted).
10TH	1 <sup>st</sup>	Portland cement and Hardening.
	2 <sup>nd</sup>	Glass refractory and Composite materials.
	3 <sup>rd</sup>	Polymers-monomers, Omo and co polymers, degree of polymerization.
	4 <sup>th</sup>	Simple reaction involved in preparation and their application of thermoplastics and thermosetting plastics.
11TH	1 <sup>st</sup>	<b><u>UNIT-4:CHEMISTRY OF FUELS AND LUBRICANTS.</u></b> Definition of fuel and combustion of fuel.
	2 <sup>nd</sup>	Classification of fuels, calorific values(HCV&LCV).
	3 <sup>rd</sup>	Calculation of LCV &HCV using Dulong's formula.
	4 <sup>th</sup>	Proximate analysis of coal solid fuel.
12TH	1 <sup>st</sup>	Petrol and Diesel -fuel rating (octane and cetane numbers).
	2 <sup>nd</sup>	Chemical composition, calorific values and application of LPG, CNG,water gas, coal gas, Biogas.
	3 <sup>rd</sup>	Lubrication-Function and Characteristics properties of good lubricant, classification with examples.
	4 <sup>th</sup>	Lubrication mechanism -hydrodynamic & boundary



		lubrication.
13TH	1 <sup>st</sup>	Physical properties (viscosity & viscosity index , oiliness , flash and fire point).
	2 <sup>nd</sup>	Chemical properties (coke number, Total acid numbers, saponification value of lubricants.)
	3 <sup>rd</sup>	<u>UNIT-5: ELECTRO CHEMISTRY.</u> Electronic concept of oxidation, reduction & redox reaction.
	4 <sup>th</sup>	Definition of terms: electrolytes, non-electrolytes with example.
14TH	1 <sup>st</sup>	Faradays law of electrolysis and numerical problems.
	2 <sup>nd</sup>	Industrial application of electrolysis- Electrometallurgy Electroplating Electrolytic refining.
	3 <sup>rd</sup>	Application of redox reaction in electrochemical cells- Primary cells-dry cell. Secondary cell.
	4 <sup>th</sup>	Solar cell's introduction to corrosion of metals. Definition, types of corrosion.
15TH	1 <sup>st</sup>	H <sub>2</sub> liberation & O <sub>2</sub> absorption mechanism.
	2 <sup>nd</sup>	Factors affecting rate of corrosion.
	3 <sup>rd</sup>	Internal corrosion preventive measures of purification, alloying and heat treatment.
	4 <sup>th</sup>	External corrosion preventive measures. a) Metals (anodic, cathodic, -coating), Organic inhabitation.

Amrutendu Pati  
Sign. of Teaching Faculty

  
31/11/25  
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Sr. Lecture  
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31.05.25  
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