

# LESSON PLAN

SUBJECT: APPLIED CHEMISTRY

BRANCH: COMMON

SEMESTER: 2<sup>ND</sup> (2025-26)

NAME OF THE FACULTY: BISWANATH PADHI



**GOVERNMENT POLYTECHNIC, BHADRAK**

*Tahata*  
*07/01/2026*  
HOD, Humanities & Sciences  
**H.O.D.**  
**Humanities & Sciences**  
**Govt. Polytechnic, Bhadrak**

*[Signature]*  
Academic Coordinator  
**Academic Co-ordinator**

*[Signature]*  
**Principal**  
**Govt. Polytechnic, Bhadrak**

## LESSON PLAN

Session: 2025 – 26 (Summer)

Course Name : Applied Chemistry	Name of the Faculty: BISWANATH PADHI, Guest Faculty (Chemistry)
Course Code : Th 5	Session : Summer 2025-26
Semester : 2 <sup>nd</sup> Semester	Date : 09-01-2026 to 08-05-2026
Periods/Week : 04	No. of Credits : 4
Total Periods : 60	

Week	Class/Day	Topics to be Covered
1	1	Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted)
	2	Hydrogen spectrum explanation based on Bohr's model of atom
	3	Heisenberg uncertainty principle, Quantum numbers (Principal and Azimuthal)
	4	Quantum numbers (Magnetic and Spin)– orbital concept.
2	1	Shapes of s, p and d- orbitals, Aufbau rule, Electronic configurations.
	2	Hund's rule of maximum multiplicity, Pauli's exclusion principle,
	3	Cause of chemical bonding, types of bonds: ionic bonding (NaCl example),
	4	Covalent bond (H <sub>2</sub> , F <sub>2</sub> , HF)
3	1	Concept of Hybridization, Hybridization in BeCl <sub>2</sub> , BF <sub>3</sub> ,
	2	Hybridization in CH <sub>4</sub> , NH <sub>3</sub> , H <sub>2</sub> O, coordination bond in NH <sub>4</sub> <sup>+</sup> .
	3	Concept of Hydrogen Bonding, Anomalous properties of NH <sub>3</sub> , H <sub>2</sub> O due to hydrogen bonding.
	4	Metallic Bonding.
4	1	Idea of solute, solvent and solution, methods to express the concentration of solution- molarity (M = mole per liter)
	2	PPM, Mass percentage, Volume percentage and Mole fraction.
	3	<b>UNIT DISCUSSION</b>
	4	Graphical presentation of water distribution on Earth (pie or bar diagram).
5	1	Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness
	2	Simple numerical on water hardness.
	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.)
	4	Quantitative measurement of water hardness by ETDA method,
6	1	Total dissolved solids (TDS) alkalinity estimation.
	2	Water softening techniques – soda lime process
	3	Zeolite process and ion exchange process.
	4	Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.

7	1	Water for human consumption for drinking and cooking purposes from any water sources).
	2	Enlist Indian standard specification of drinking water (collect data and understand standards
	3	<b>UNIT DISCUSSION</b>
	4	Natural occurrence of metals – minerals, ores of iron, aluminium,
8	1	copper, gangue (matrix), flux, slag,
	2	Metallurgy – brief account of general principles of metallurgy.
	3	Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite along with reactions.
	4	Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.
9	1	General chemical composition, composition-based applications (elementary idea only details omitted): Port land cement and hardening,
	2	Glasses Refractory and Composite materials.
	3	Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of PVC, PS,
	4	Simple reactions involved in preparation and their application of PTFE, nylon – 6, nylon-6,6 and Bakelite)
10	1	Rubber and vulcanization of rubber.
	2	<b>UNIT DISCUSSION</b>
	3	Definition of fuel and combustion of fuel, classification of fuels,
	4	Calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula.
11	1	Proximate analysis of coal, liquid fuel petrol and diesel - fuel rating (octane and cetane numbers),
	2	Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.
	3	Lubrication – function and characteristic properties of good lubricant, classification with examples.
	4	Lubrication mechanism – hydrodynamic and boundary lubrication
12	1	Physical properties of lubricants (viscosity and viscosity index, oiliness, flash and fire point, cloud and pour point only)
	2	Chemical properties (coke number, total acid number saponification value) of lubricants.
	3	<b>UNIT DISCUSSION</b>
	4	Electronic concept of oxidation, reduction and redox reactions.
13	1	Definition of terms: electrolytes, non-electrolytes with suitable examples
	2	Faradays laws of electrolysis and simple numerical problems.
	3	Industrial Application of Electrolysis – Electrometallurgy, Electroplating and Electrolytic refining.
	4	Application of redox reactions in electrochemical cells – Primary cells (dry cell),

14	1	Secondary cell (commercially used lead storage battery), fuel and Solar cells.
	2	Introduction to Corrosion of metals – Definition, types of corrosion (chemical and electrochemical)
	3	H <sub>2</sub> liberation and O <sub>2</sub> absorption mechanism of electrochemical corrosion,
	4	Factors affecting rate of corrosion.
15	1	Internal corrosion preventive measures – Purification, alloying and heat treatment
	2	External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.
	3	PYQ DISCUSSION
	4	PYQ DISCUSSION
16	1	PYQ DISCUSSION
	2	PYQ DISCUSSION
	3	PYQ DISCUSSION
	4	PYQ DISCUSSION
17	1	DOUBT CLEARANCE
	2	DOUBT CLEARANCE
	3	DOUBT CLEARANCE
	4	DOUBT CLEARANCE

*B. S. Narayana Reddy*  
Signature of the Faculty