NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY
SERGARH-756060,BALASORE (ODISHA)
(Approved by AICTE &affiliated to SCTE&VT , Odisha)

LESSON PLAN

SUBJECT:Th5( ):APPLIED CHEMISTRY

NAME OF THE FACULTY : MISS. ALIVAJYOTI BARIK & MR. ADITYA PRAKASH DAS

SEMESTER : 2nd **BRANCH : EE/EEE/CE/ME/AE**

SESSION: 2024-25. **EXAMINATION : 2025(S)**

CHAPTER WISE DISTRIBUTION OF PERIODS

SL.NO.	NAME OF CHAPTER AS PER THE SYLLABUS	NO. OF PERIOD ACTUALLY NEEDED
1	ATOMIC STRUCTURE , CHEMICAL BONDING AND SOLUTIONS	12
2	WATER	12
3	ENGINEERING MATERIALS	13
4	CHEMISTRY OF FUELS AND LUBRICANTS	12
5	ELECTRO-CHEMISTRY	13
TOTAL		62

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Discipline: All branches	Semester: 2nd	NAME OF THE TEACHING FACULTY : MISS. ALIVAJYOTI BARIK & MR. ADITYA PRAKASH DAS SESSION -2024-25 EXAMINATION -2025(S)
WEEK	CLASS DAY	TOPICS TO BE COVERED
1ST	1st	**UNIT-1: ATOMIC STRUCTURE , CHEMICAL BONDING AND SOLUTIONS**:- Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted),
	2nd	Hydrogen spectrum explanation based on Bohr's model of atom.
	3rd	Heisenberg uncertainty principle, Quantum numbers – orbital concept
	4th	Shapes of s,p and d orbitals, Pauli's exclusion principle
2ND	1st	Hund's rule of maximum multiplicity Aufbau rule, electronic configuration.
	2nd	Concept of chemical bonding – cause of chemical bonding
	3rd	Types of bonds: ionic bonding, covalent bond
	4th	Ionic bonding (NaCl example)
3RD	1st	Covalent bond (H2, F2,HF hybridization in BeCl2,
	2nd	BF3, CH4, NH3, H2 coordination bond in NH4 +, and anomalous O),
	3rd	Properties of NH3, H2O due to hydrogen bonding, and metallic bonding
	4th	Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity,ppm,mass,percentage,volume,percentage and mole fraction
4TH	1st	**UNIT:II:-WATER**:-Graphical presentation of water distribution on Earth (pie or bar diagram).
	2nd	Classification of soft and hard water based on soap test
	3rd	Salts causing water hardness
	4th	Unit of hardness and simple numerical on water hardness
5TH	1st	Cause of poor lathering of soap in hard water
	2nd	Problems caused by the use of hard water in boiler (scale and sludge)
	3rd	Problems caused by the use of hard water in boiler (foaming and priming, corrosion etc),
	4th	Quantitative measurement of water hardness by ETDA method

WEEK	CLASS DAY	TOPICS TO BE COVERED
6TH	1st	Total dissolved solids (TDS) alkalinity estimation.
	2nd	I) Water softening techniques – soda lime process, zeolite process and ion exchange process
	3rd	II) Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization
	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).
7TH	1st	**1ST INTERNAL ASSESMENT**
	2nd	**UNIT:III ENGINEERING MATERIALS**: Natural occurrence of metals – minerals, ores of iron, aluminium and copper
	3rd	Gangue (matrix), flux, slag
	4th	Metallurgy – brief account of general principles of metallurgy
8TH	1st	Extraction of - iron from haematite ore using blast furnace
	2nd	Extraction of aluminium from bauxite along with reactions.
	3rd	Alloys – definition, purposes of alloying, ferrous alloys and nonferrous with suitable examples, properties and applications
	4th	General chemical composition, composition based applications (elementary idea only details omitted)
9TH	1st	Port land cement and hardening, Glasses Refractory and Composite materials.
	2nd	Polymers–monomer, homo and co polymers, degree of polymerization
	3rd	Simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics
	4th	PVC, PS, PTFE, nylon – 6
10TH	1st	(nylon-6,6 and Bakelite)
	2nd	rubber and vulcanization of rubber
	3rd	**UNIT:IV:-CHEMISTRY OF FUELS AND LUBRICANTS** : Definition of fuel and combustion of fuel
	4th	Classification of fuels

WEEK	CLASS DAY	TOPICS TO BE COVERED
11TH	1st	Calorific values (HCV and LCV)
	2nd	Calculation of HCV and LCV using Dulong's formula
	3rd	Aroximate analysis of coal solid fuel
	4th	Petrol and diesel - fuel rating (octane and cetane numbers)
12TH	1st	Chemical composition, calorific values
	2nd	Applications of LPG, CNG, water gas, coal gas, producer gas and biogas.
	3rd	Lubrication – function and characteristic properties of good lubricant, classification with examples,
	4th	Lubrication mechanism – hydrodynamic and boundary lubrication,
13TH	1st	**2ND INTERNAL ASSESMENT**
	2nd	Physical proper- ties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only)
	3rd	Chemical properties (coke number,total acid number,saponification value) of lubricants.
	4th	**UNIT:V: ELECTRO CHEMISTRY:** Electronic concept of oxidation, reduction and redox reactions
14TH	1st	Definition of terms: electrolytes, non-electrolytes with suitable examples,
	2nd	Faradays laws of electrolysis and simple numerical problems.
	3rd	Industrial Application of Electrolysis – • Electrometallurgy • Electroplating • Electrolytic refining.
	4th	Application of redox reactions in electrochemical cells – • Primary cells – dry cell,
15TH	1st	• Secondary cell - commercially used lead storage battery, fuel and Solar cells
	2nd	Introduction to Corrosion of metals – • definition, types of corrosion (chemical and electrochemical),
	3rd	H2 liberation mechanism of electrochemical corrosion,
	4th	O2 absorption mechanism of electrochemical corrosion

WEEK	CLASS DAY	TOPICS TO BE COVERED
16TH	1st	Ffactors affecting rate of corrosion.
	2nd	Internal corrosion preventive measures – • Purification, alloying , heat treatment
	3rd	External corrosion preventive measures: a) metal (anodic, cathodic) coatings,
	4th	External corrosion preventive measures b) Organic inhibitors.

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