

## Academic Lesson Plan for Engg. Chemistry (Winter-2023)

<b>Discipline: Civil &amp; Mechanical</b>	<b>Semester: 1st</b>	<b>Name of the teaching faculty: Sasmita Moharana &amp; Madhusmita Sahoo</b>
<b>Subject: Engg. Chemistry</b>	<b>No. of days/per week</b>	<b>Semester from: 16/08/2023-11/12/2023</b>
	<b>Class Allotted: 4</b>	<b>No. of weeks: 15</b>
<b>Week</b>	<b>Class day</b>	<b>Theory Topics</b>
1st	1st	<b>Chapter 1: Atomic structure</b> : Fundamental particles ( electron, proton & neutron Definition, mass and charge ). Rutherford's Atomic model ( postulates and failure),
	2nd	Atomic mass and mass number, Definition, examples and properties of Isotopes, isobars and isotones.
	3rd	Bohr's Atomic model ( Postulates only),
	4th	Bohr-Bury scheme, Aufbau's principle,
2nd	1st	Hund's rule, Electronic configuration (up to atomic no 30).
	2nd	<b>Chapter 2 : Chemical Bonding</b> : types ( Electrovalent, Covalent bonds ( formation of NaCl, MgCl <sub>2</sub> , H <sub>2</sub> , Cl <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> ).
	3rd	Covalent & Coordinate bond with examples ( formation of H <sub>2</sub> O, CH <sub>4</sub> , NH <sub>3</sub> , NH <sub>4</sub> <sup>+</sup> , SO <sub>2</sub> ).
	4th	<b>Chapter 3 : Acid base theory</b> : Concept of Arrhenius & Lowry Bronsted for acid and base with examples,
3rd	1st	Limitations of Lowry Bronsted theory , Lewis theory for acid and base with examples,
	2nd	Limitations of Lewis theory & Neutralization of acid & base.
	3rd	Definition of Salt, Types of salts ( Normal, acidic, basic, double, complex and mixed salts, definitions with 2 examples from each).
	4th	<b>Chapter 4: Solutions</b> : Definitions of atomic weight, molecular weight, Equivalent weight.
4th	1st	Determination of equivalent weight of Acid, Base and Salt
	2nd	Modes of expression of the concentrations ( Molarity & Normality) with Simple Problems.
	3rd	Modes of expression of the concentrations (Molality) with Simple Problems.
	4th	pH of solution ( definition with simple numericals ) Importance of pH in industry ( sugar, textile, paper industries only)
5th	1st	<b>Chapter 5 : Electrochemistry</b> : Definition and types ( Strong & weak) of Electrolytes with example. Electrolysis ( Principle & process) Electrolysis with example of NaCl (fused and aqueous solution)
	2nd	Faraday's 1st law of Electrolysis ( Statement & mathematical expression) with simple numericals

	3rd	Faraday's 2nd law of Electrolysis ( Statement & mathematical expression) with simple numericals.
	4th	Industrial application of Electrolysis- Electroplating ( Zinc plating)
6th	1st	<b>Chapter 6 : Corrosion:</b> Definition of Corrosion, Types of Corrosion- Atmospheric Corrosion, Waterline corrosion.
	2nd	Mechanism of rusting of Iron only. Protection from Corrosion by (i) Alloying and (ii) Galvanization.
	3rd	<b>Chapter 7 : Metallurgy:</b> Definition of Mineral, ores , gangue with example. Distinction between Ores And Minerals. General methods of extraction of metals,i) Ore Dressing
	4th	ii) Concentration ( Gravity separation, magnetic separation)
7th	1st	Froth floatation & leaching
	2nd	iii) Oxidation (Calcinations, Roasting )
	3rd	iv) Reduction (Smelting, Definition & examples of flux, slag)
	4th	v) Refining of the metal ( Electro refining, & Distillation )
8th	1st	<b>Chapter 8 :Alloys:</b> Definition of alloy. Types of alloys ( Ferro, Non Ferro & Amalgam) with example.
	2nd	Composition and uses of Brass, Bronze, Alnico, Duralumin
	3rd	<b>Chapter 9 : Hydrocarbons :</b> Saturated and Unsaturated Hydrocarbons ( Definition with example)
	4th	Aliphatic and Aromatic Hydrocarbons ( Huckle's rule).
9th	1st	Difference between Aliphatic and aromatic hydrocarbons
	2nd	IUPAC system of nomenclature of Alkanes
	3rd	IUPAC system of nomenclature of Alkenes
	4th	IUPAC system of nomenclature of Alkynes
10th	1st	IUPAC system of nomenclature of alkyl halides
	2nd	IUPAC system of nomenclature of alcohols
	3rd	Bond line notation.
	4th	Uses of some common aromatic compounds ( Benzene, Toluene, BHC, Phenol, Naphthalene,Anthracene and Benzoic acid) in daily life.
11th	1st	<b>Chapter 10 :Water Treatment :</b> Sources of water, Soft water, Hard water, hardness,
	2nd	types of Hardness (temporary or carbonate and permanent or non-carbonate)
	3rd	Removal of hardness by cold lime soda method (Principle, process & advantages )

	4th	Removal of hardness by hot lime soda method (principle, process & advantages )
12th	1st	Advantages of Hot lime over cold lime process & Organic Ion exchange method ( principle)
	2nd	Organic Ion exchange method (process and regeneration of exhausted resins)
	3rd	<b>Chapter 11 : Lubricants:</b> Definition of lubricant, Types ( solid, liquid and semisolid ).
	4th	specific uses of lubricants ( Graphite, Oils, Grease), Purpose of lubrication
13th	1st	<b>Chapter 12 :Fuel:</b> Definition and classification of fuel, Definition of calorific value of fuel, Choice of good fuel
	2nd	Liquid: Diesel, Petrol, and Kerosene --- Composition and uses.
	3rd	Gaseous: Producer gas and Water gas (Composition and uses).
	4th	Elementary idea about LPG,CNG and coal gas
14th	1st	<b>Chapter 13 :Polymer:</b> Definition of Monomer, Polymer, Homo-polymer, Co-polymer and Degree of polymerization.
	2nd	Difference between Thermosetting and Thermoplastic,
	3rd	Composition and uses of Polythene & Poly-Vinyl Chloride
	4th	Composition and uses of Bakelite.
15th	1st	Definition of Elastomer ( Rubber). Natural Rubber (it's drawbacks ).
	2nd	Vulcanisation of Rubber.Advantages of Vulcanised rubber over raw rubber.
	3rd	<b>Chapter 14 :Chemicals in Agriculture:</b> Pesticides: Insecticides, herbicides, fungicides-Examples and uses.
	4th	Bio Fertilizers: Definition, examples and uses.

*Sasmita Moharana Madhusmita Sahoo*

Signature of Faculty