GOVERNMENT POLYTECHNIC JAGATSINGHPUR

LESSON PLAN OF 3rd SEMESTER(2022-23) CHEMICAL ENGINEERING

Discipline :- **CHEMICAL**	Semester:-**3RD**	Name of the Teaching Faculty **Dr. SUSHANTA KUMAR BEHERA**
Subject:- **Industrial Stoichiometry** Course Code: **TH 4**	No of Days/per Week Class Allotted :-04	Semester From:- **September** To:- **December**

Week	Class Day	Theory/ Practical Topics
1st	1st	**CHAPTER-1: UNITS AND DIMENSIONS** Introduction
	2nd	Basic and derived units used in process industry.
	3rd	Units of physical and chemical properties
	4th	Relation between units and dimension
2nd	1st	Unit conversion and solve numerical
	2nd	Concepts of unit operation and unit process
	3rd	Application of various graphs in process calculation
	4th	Solve numerical
3rd	1st	**CHAPTER-2: MOLE CONCEPT** Atomic number, atomic weight of elements
	2nd	Mol. Wt., mole unit, mole fraction (or percent) and mass fraction (or percent),
	3rd	Relation between mole and mass fraction
	4th	Mole concept with respect to chemical equation.
4th	1st	Principle of atom conservation.
	2nd	Mole calculation from reaction
	3rd	Methods of expressing composition of mixtures and solutions
	4th	**Solve related numericals**
5th	1st	**CHAPTER-3: STOICHIOMETRY** Introduction
	2nd	Concept of limiting reactant, Atomic weight,
	3rd	Concept of Molecular weight and empirical formula
	4th	Solved numerical based on limiting reactant, mass-mass and mass volume basis
6th	1st	Concepts of Eq. weight, valence of molecule
	2nd	Solve related numerical
	3rd	Concepts of preparation of solution
	4th	Weight and volume percent of solutions
7th	1st	Basics of Normality, molarity and molality
	2nd	Numerical on solution preparation
	3rd	Solve related numerical
	4th	**CHAPTER-4: GASES AND GASEOUS MIXTURES**

		Introduction
8th	1st	Define gases, different gaseous mixture
	2nd	Derivation of Ideal gas equation
	3rd	Derive average molecular weight and Values of R
	4th	Derivation of density of gas mixture
9th	1st	Solve related numerical
	2nd	Composition by vol% and by weight % related to average molecular weight of gas mixture
	3rd	Solve the examples and exercises related to Avg. mol wt. and Ideal gas equation.
	4th	Concepts of Pressure, partial pressure and various laws related to PVT behavior.
10th	1st	Concepts of State Raoult's law and Henry's law
	2nd	**CHAPTER-5: MATERIAL BALANCE WITHOUT CHEMICAL REACTION** Introduction
	3rd	Basics of chemical equation and stoichiometry
	4th	Concepts of law of conservation of mass and material balance over the reaction.
11th	1st	Material balance problems without chemical reactions of unit operations
	2nd	Material balance of Evaporation and solve numerical
	3rd	Material balance of mixing and solve numerical
	4th	Material balance of crystalization
12th	1st	Material balance over distillation and solve numerical
	2nd	Material balance over drying and solve related numerical
	3rd	Material balance humidification and solve related numerical
	4th	Material balance over filtration
13th	1st	Material balance over absorption, extraction
	2nd	Solve numerical
	3rd	**CHAPTER-6: MATERIAL BALANCE WITH CHEMICAL REACTION** Introduction
	4th	Concepts of Limiting reactant, Excess reactant
14th	1st	Concepts of Conversion, Selectivity, Yield.
	2nd	Basic concepts involved in material balance calculations.
	3rd	Material balance over combustion
	4th	Material balance over chemical reaction calculation
15th	1st	Concepts of heat of combustion and heat of formation.
	2nd	Concept of recycle and by pass, purge
	3rd	Excess air and theoretical air
	4th	Numerical based on combustion, Excess air and theoretical air