GOVERNMENT POLYTECHNIC JAGATSINGHPUR

CHEMICAL ENGINEERING DEPARTMENT
LESSON PLAN

Discipline :- **CHEMICAL**	Semester:-**6th**	Name of the Teaching Faculty **Dr. SUSHANTA KUMAR BEHERA**
Subject:- **Chemical Reaction Engineering and Catalysis** Course Code: **TH 2**	No of Days/per Week Class **Allotted :-04**	Semester From:- **January** To:- **May**
Week	**Class Day**	**Theory/ Practical Topics**
1st	1st	**CHAPTER-1: CHEMICAL KINETICS** Introduction
	2nd	Classification of chemical reaction.
	3rd	Rate of reaction, rate constant.
	4th	Elementary and non-elementary reaction.
2nd	1st	Molecularity and order of reaction.
	2nd	Arrhenius equation.
	3rd	Concept of activation energy.
	4th	Half-life reaction.
3rd	1st	Solve problems to determination of order of reaction and activation energy.
	2nd	**CHAPTER-2: INTERPETATION OF BATCH REACTOR DATA** Introduction to reactor.
	3rd	Derivation of integrated rate equation for zero order reactions with Conversion vs time
	4th	Derivation of integrated rate equation for zero order reactions concentration vs time and half-life of reaction.
4th	1st	Derivation of integrated rate equation for irreversible unimolecular first order reaction with Conversion vs time and concentration vs time
	2nd	Derivation for first order reaction for half-life reaction.
	3rd	Solve numerical based on first order reaction
	4th	Derivation of integrated rate equation for irreversible bimolecular second order reaction with Conversion vs time and concentration vs time
5th	1st	Derivation for second order reaction for half-life reaction.
	2nd	Solve numerical based on second order reaction
	3rd	Methods of interpretation of Batch reactor data.
	4th	Derivation of equation for constant volume batch reactor.
6th	1st	Elementary idea about auto-catalytic reaction, reversible reaction
	2nd	Concepts of variable volume batch reactor.(no derivation)
	3rd	Solve numerical based on topics
	4th	**CHAPTER-3: CATALYSIS** Introduction
7th	1st	Define and classify catalysis with example
	2nd	Characteristics of catalytic reaction.

	3rd	Concepts of catalyst Promoter, Inhibitors, Accelerators, carriers and their actions
	4th	Catalytic poisoning.
8th	1st	Concepts of Autocatalysis, negative catalysis, enzyme catalysis.
	2nd	Concepts of Deactivation of catalysis,
	3rd	Role of activation energy and catalysis
	4th	Discuss theories of catalysis
9th	1st	Preparation of catalyst
	2nd	**CHAPTER-4: REACTORS** Introduction
	3rd	General idea about batch reactor, semi batch reactor
	4th	Construction and operation of Batch reactors
10th	1st	Derivation for Performance equation of Batch reactors
	2nd	Solve numerical based on Batch reactors
	3rd	Construction and operation of semi batch reactor
	4th	Construction and operation continuous reactor or CSTR
11th	1st	Derivation for Performance equation of CSTR or MFR
	2nd	Solve numerical based on CSTR
	3rd	Construction and operation of Tubular Reactor or PFR
	4th	Construction and operation of Fixed Bed Reactor
12th	1st	Derivation for Performance equation of PFR
	2nd	Solve numerical based on PFR
	3rd	Construction and operation of Fluidized bed Reactor
	4th	Construction and operation of Spray column reactor
13th	1st	Construction and operation of Packed column Reactor
	2nd	Construction and operation of Packed column Reactor
	3rd	Space velocity, space-time, and residence time.
	4th	Choice of a reactor and material of construction of reactor.
14th	1st	Optimum Reactor Design
	2nd	**CHAPTER-5: CHEMICAL EQUILIBRIUM** Introduction of chemical kinetics
	3rd	Reversible reaction and Irreversible reaction with example.
	4th	Concepts of Chemical equilibrium, characteristic of chemical equilibrium.
15th	1st	Law of Mass action
	2nd	Derivation of finding equilibrium constant
	3rd	Le Chatelier's Principle.
	4th	Application of laws of chemical equilibrium and Condition for maximum yield in industrial processes