

UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA



LESSON PLAN

SUBJECT-CHEMICAL REACTION ENGINEERING

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DEPARTMENT OF CHEMICAL
ENGINEERING**

	Topics covered
WEEK 1	Introduction to Chemical Reaction engineering
	Classification of chemical reaction
	Rate of reaction, rate constant
	Elementary and non-elementary reaction.
WEEK 2	Molecularity and order of reaction
	Concept of activation energy
	Arrhenius equation.
WEEK 3	Numericals on Arrhenius equation.
	Numericals on Arrhenius equation
	Numericals on rate of reaction
WEEK 4	Half-life reaction
	Numericals on half-life period
	Numericals to determine the order of reaction
	Doubt clear class
WEEK 5	Quiz test
	Methods of interpretation of batch reactor data
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	Methods of interpretation of batch reactor data
WEEK 6	Derivation of irreversible unimolecular first order reaction equation
	Derivation of irreversible unimolecular first order reaction equation
	Numericals based on first order equation
	Numericals based on first order equation
WEEK 7	Numericals based on first order equation
	Numericals based on first order equation

	Derivation of irreversible bimolecular type second order reaction.
WEEK 8	Derivation of irreversible bimolecular type second order reaction
	Derivation of irreversible bimolecular type second order reaction
	Numericals based on second order reaction
WEEK 9	Numericals based on second order reaction
	Numericals based on second order reaction
	Derivation of equation for constant volume batch reactor
WEEK 10	Autocatalytic reaction, Variable volume batch reactor, Reversible reaction
	Doubt clear class
	Doubt clear class
WEEK 11	Quiz test
	Define and classify catalysis with example
	Characteristics of catalytic reaction
WEEK 12	Promoter, Inhibitors, Accelerators, carriers and their actions.
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	Catalytic poisoning.
	Autocatalysis, negative catalysis
WEEK 13	enzyme catalysis.
	Deactivation of catalysis, Activation energy and catalysis.
	Discuss theories of catalysis
WEEK 14	Discuss theories of catalysis
	Construction and operation of Batch reactors
	semi batch reactor, continuous reactor,
	Tank Reactors, Tubular Reactor, Fixed Bed Reactor
WEEK 15	Fluidized bed Reactor, Spray column reactor
	Packed column Reactor, Reactor with catalyst
	Basic design equations for batch, CSTR, TFR.
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WEEK 16	Numericals on Batch, CSTR, PFR
	Space velocity, space-time, and residence time
	Choice of a reactor and material of construction reactor.
	Reversible reaction with example
WEEK 17	Chemical equilibrium, characteristic of chemical equilibrium.
	Law of Mass action, equilibrium constant
	Le Chatelier's Principle.
	Condition for maximum yield in industrial processes

BOOKS FOR REFERENCE:

- Chemical Reaction Engineering by Octave Levenspiel, Wiley Publication
- Chemical Reaction Engineering Volume-1 by K A Gavane Nirali Publication

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Signature		
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