

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. Chemical Engineering

Semester: I

Subject Name: **Advance Reactor Design**

Sr.No	Course content
1.	Introduction: Introduction to design for Heterogeneous Reacting Systems, Linear rate expressions, Non-linear rate expressions.
2.	Design of Reactors for Heterogeneous Systems: (a) Design of Catalytic Reactor – Design of fixed bed reactors, design of moving bed reactors, design of fluidized bed reactor, design of reactors for regeneration, design of combination of catalytic reactor and regenerator, (b) Design of Non-catalytic reactor – Gas-solid reactors, Liquid-solid reactors
3.	Design of Non-Isothermal Reactors: Energy Balance, Non-Isothermal Continuous flow reactors at steady state, Equilibrium conversion unsteady state operation, Non-adiabatic reactor operation, Multiple steady state
4.	Design of Reactors for Multiple Reactions: Conditions for maximizing the desired products in parallel reactions, maximizing the desired products in series reaction.
5.	Design of Non-Conventional Reactors: Kinetics of bio-reaction, Monod Equation, Design of bioreactors, Reactions in solids – Reactors for solid reactions, LPCVD & other CVD reactors, Monolithic reactors, Design of multiphase reactors like slurry reactors

Reference Books:

1. Chemical Reaction Engineering by Octave Levenspiel.
2. Elements of Chemical Reaction Engineering by H.Scott Fogler.
3. Introduction to Process Engineering and design by S.B.Thakore & B.I. Bhatt
4. Ulmann's Encyclopedia Vol-4.