

Chemical Reaction Engineering - Video course

COURSE OUTLINE

The objective of this course is to help the student master several advanced ideas in chemical reaction engineering, notably:

1. Complex chemical reaction mechanisms and kinetics.
2. Transport effects in multiphase reactive systems.
3. Advanced reactor design and stability, including consideration of the energy balance.

On completion of the course, the student should be able to design/analyze a variety of complex reacting systems in both traditional and nontraditional areas of chemical engineering.

COURSE DETAIL

Module	Topics	No. of Hours
1	Review of Undergraduate Reaction Engineering: Stoichiometry, thermodynamics of reacting systems, kinetics of elementary reactions, ideal reactors: CSTR/PFR.	4
2	Kinetics of complex reactions: Reaction mechanism and kinetics, Chain, catalytic, polymerization, biochemical reactions, Analysis of reaction network, lumping analysis, Parameter estimation.	8
3	Conservation equations for chemically reacting mixtures.	2
4	Heterogeneous reactions: Mass transport with reaction, Catalytic and Non-catalytic, gas-solid reactions, Gas-liquid reactions.	8
5	Chemical Reactor Design: Transient and steady state analysis, Optimal design of reactors, Multiphase reactors: fixed, fluidized, trickle bed, slurry etc, Non-ideal continuous flow reactors.	18
Total		40



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

Chemical Engineering

Pre-requisites:

Chemical reactions engineering.

Coordinators:

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References:

1. Foggler, H. S., Elements of Chemical Reaction Engineering, Prentice Hall of India, 2008.
2. Fromment G.F. and Bischoff K.B., Chemical Reactor Analysis and Design, John Wiley 1994.