

UG
Course Code: **CH416**
Credit: **3**
Version: **1**
Prerequisite Course: **Nil**

Department: **Chemical Engineering**
Course Name: **Catalytic Processes**
L-T-P: **3-0-0**
Approved on:

Review of Heterogeneous Catalysis.

Transport Processes: Analysis of external transport processes in heterogeneous reactions in fixed bed, fluidized bed and slurry reactors. Intrapellet mass transfer, heat transfer, mass transfer with chemical reaction and simultaneous mass and heat transfer with chemical reaction.

Catalyst Selectivity: Effect of intrapellet diffusion on selectivities in complex reactions, effect of external mass transfer on selectivities.

Catalyst Deactivation: Modes of deactivation – poisoning, fouling and sintering. Determination of deactivation routes, combined effect of deactivation and diffusion on reaction rates, effect of deactivation on selectivity.

Reactor Design: Design calculation for ideal catalytic reactor operating at isothermal, adiabatic and non-adiabatic conditions. Deviations from ideal reactor performance. Design of industrial fixed-bed, fluidized bed and slurry reactors. Thermal stability of packed bed and fluidized bed reactors.

Books

1. Smith, J. M., "*Chemical Engineering Kinetics*," 3rd ed., McGraw-Hill, 1981.
2. Carberry, J. J., "*Catalytic Reaction Engineering*," McGraw-Hill, 1977.
3. Lee, H. H., "*Heterogeneous Catalytic Reactors*," Butterworth.
4. Tarhan, M. O., "*Catalytic Reactor Design*," McGraw-Hill, NY, 1983.
5. Anderson, J. R. and Boudart, M., "*Catalysis, Science and Technology*," Vol. SpringerVerlag, NY.
6. Thomas, J. M. and Thomas, W. J., "*Introduction to the Principles of Heterogeneous Catalysis*," Academic Press, 1967.
7. Gates, B.C., "*Catalytic Chemistry*," Wiley, New York, 1992.