

## CH357: CHEMICAL REACTION ENGINEERING – I

CREDITS = 6 (L = 4, T=0, P = 2)

1. **CLASSIFICATION OF CHEMICAL REACTIONS:** Rates of reactions, Order and rate constant, mechanism of reactions, Collection & interpretation of kinetic data. Rates of complex reactions. Temp. & Pressure effects. 12 Hours
2. **CLASSIFICATION OF CHEMICAL REACTORS, MASS & ENERGY BALANCES FOR HOMOGENEOUS, BATCH,;** Adiabatic and non-iso thermal operations. Design for single and multiple reactions. Recycle and Semi batch reactor. 8 Hours
3. **DESIGN FOR MULTIPLE REACTION AND REACTOR SYSTEM:** Series and parallel network of plug flow and CSTR for single and multiple reactions. 6 Hours
4. **NON-IDEAL REACTORS:** Flow patterns in non-ideal reactors. Residence time distribution F, E, and C curves. Conversion from non-ideal reactors. Network of non-ideal reactors. 8 Hours
5. Non iso-thermal reactors and optimum temperature progressions 6 Hours

### REFERENCE BOOKS

Title: Chemical Reaction Engineering  
Author: Octave Levenspiel  
Publisher: Wiley Eastern

Title: Chemical Engineering Kinetics - 2nd ed  
Author: J M Smith  
Publisher: Tata McGraw Hill

Title: Chemical Engineering kinetics & Reactor Design  
Author: C G Hill  
Publisher: J Wiley Publication

### ***LIST OF EXPERIMENTS***

- 1 To Determine the Residence Time Distribution in Continuous Flow Stirred Tank Reactor.
- 2 To Determine the Residence Time Distribution in Packed Bed Reactor.
- 3 To Determine the Residence Time Distribution in Tubular Flow

Reactor.

4. To Determine the Residence Time Distribution in Spiral Tube Coil Reactor.
5. To Determine the Residence Time Distribution in Multiple Continuous Stirred Tank Reactors.
6. To Determine the Kinetics by Half-Life Method in Stirred Cell.
7. To Study the Differential Method of Analysis.
8. To Study the Pseudo-First Order Kinetics.
9. Determination of Activation Energy of Saponification Reaction.