

## 2.14 30514 REACTION ENGINEERING & CHEMICAL TECHNOLOGY

### UNIT-1

- 1.1 Classification of reactions, variables affecting rate of reaction, definition of reaction rate.
- 1.2 Kinetics of homogeneous reactions, concentration dependent term of a rate equation,
- 1.3 Temperature dependent term of a rate equation, theories of reaction, collision theory, transition theory,
- 1.4 Arrhenius equation. Analysis of experimental reactor data, evaluation of rate equation,
- 1.5 Integral and differential analysis for constant variable volume system, fitting of data complex reaction mechanism.

### UNIT-2

- 2.1 Ideal reactors, Design for homogeneous systems, batch, stirred tank and tubular flow reactor, design of reactors for multiple reactions, combination reactor system, and size comparison of reactors.
- 2.2 Elementary ideas of none, ideal reactor performance, residence time distribution.
- 2.3 Types of fermenters and bioreactors.
- 2.4 Enzymes, mechanism of enzyme action, introduction to enzyme kinetics, Michaelis, Menten kinetics, methods of enzyme immobilization.

### UNIT-3

- 3.1 Inorganic chemical technology: Chlor-alkali industries, soda ash-caustic soda-chlorine hydrochloric acid. Manufacture of sulphuric acid.
- 3.2 Phosphorous industries, phosphoric acid wet process phosphoric acid, electric furnace phosphoric acid, single super phosphate and triple super phosphate.
- 3.3 Nitrogenous industries- ammonia, nitric acid, urea, ammonium sulphate, ammonium phosphate. (Only the processes currently in use in industries need be covered)

### UNIT-4

- 4.1 Organic chemical technology: Manufacturing processes for pulp and paper, sugar, industrial alcohol by fermentation
- 4.2 Absolute alcohol, beers, wines, oils and fats, soaps and detergents, agrochemicals,
- 4.3 Introduction to polymers, synthetic rubbers, SBR, neoprene, urethane rubbers. (Only the processes currently in use in industries need be covered)

### Reference Books:

1. O. Leve spiel, Chemical Reaction Engineering, John Wiley & Sons,
2. M.GopalRao & M.Sittig (Eds), Dryden's Outlines of Chemical Technology, Affiliated East West Press
3. Michael L. Shuler and Fikret Kargi, Bioprocess Engineering: Basic Concepts, Prentice Hall of India, 2002.