5th Semester	RPL5D005	Polymer Reaction Engineering	L-T-P 3-0-0	3 Credits

Module I: **(8 Hours)**

Elements of Chemical Reaction Engineering: Introduction to chemical kinetics. Representation of expression for reaction rate, Temperature dependent and concentration dependent. Interpretation of Batch Reactor data for various types of reactions taking place in constant volume and variable volume batch reactors.

Module II: **Introduction to Reactor design** **(7 Hours)**

Ideal Reactor for a single reaction-Ideal Batch Reactor, Steady state mix flow reactor, steady state plug flow reactor, Graphical representation of performance equation, space time, space velocity, holding time for flow reactor

Module III: **Design for single reaction** **(9 Hours)**

Size comparison of single reactor, comparison of CSTR with plug flow reactor for first order reaction, reactors in series, cstrs in series, unequal size CSTRs in series, equal size CSTRs in series, Plug flow reactors in series, Plug flow reactors in Parallel, Recycle Reactor

Module IV: **Heterogeneous reacting systems** **(8 Hours)**

Heterogeneous reacting systems – models for reaction controlled – diffusion controlled mechanisms – application to design – solid catalysed reactions – experimental methods for rates – application to design

Module V: **Polymerization reactors** **(8 Hours)**

Polymerization reactors – by free radical mechanism – characterization of mixtures of polymers – mechanism – rate equations – design of reactors for free radical polymerization – stepwise addition and condensation polymerization and copolymerization – analysis of rate equation – polymerization in batch reactors – flow reactors.

Books:

[1] K A Gavane Chemicak Reaction Engg 1& 2

[2] J. M. Smith, Chemical Engineering Kinetcs, McGraw-Hill, 1975

[3] Octave Levenspiel, Chemical Reaction Engineering, Wiley Eastern Ltd.

[4] Asua; Jose M, (Ed), Polymer Reaction Engineering, Blackwell Publishing, Ltd, Oxford