

CH305 MATHEMATICAL METHODS IN CHEMICAL ENGINEERING

Credits: 4 (L = 4, P = 1)

(Pre-requisite: None)

Course Details:

Treatment of engineering data:

Empirical equations, Interpolation-Newton's forward & backward difference method, Lagrange's method, Graphical integration, Numerical integration- Simpson's 1/3rd & 3/8th Rule, Trapezoidal rule, Errors and their analysis, Regression & Correlation - Least square method, Multiple Regression.

Numerical solution of ordinary & partial differential equations:

Numerical solution of ODE - Euler's method, Modified Euler's method, Method of Runge - Kutta (Fourth order), Numerical solution of PDE-Finite difference technique.

The laplace transform:

Transformation method, Properties of transformation, the inverse transformation, Convolution, Application to chemical engineering problems.

Basic ideas on probability and statistics:

Probability, Probability distribution & Probability densities - Sample Spaces, Events, Counting, Probability & axiom of probability, Bayes' theorem, Random variable, Binomial distribution, Hypergeometric distribution, Geometric distribution, Mean & Variance of a probability distribution, Normal distribution. Sampling distribution - population & samples. Variance - properties & analysis.

Statistical quality control:

Introduction, Control charts for measurement & attributes, Causes of deviation from standards, Basis & method of control, Single sampling plan, and Advantages & limitations of SQC.

Reference Books:

Mathematical Methods in Chemical Engineering:

Academic Press, New York.

Jenson & Jeffreys

Applied Mathematics in Chemical Engineering:

Tata - McGraw Hill

Mickley Sherwood, Reed,

Probability & Statistics for Engg. :

PHI Pvt. Ltd.

Richard Johnson

Higher Engineering, Mathematics:

Khanna Publisher

Dr. B. S. Grewal

Quality Control & Applications:

PHI Pvt. Ltd.

Hansen & Ghare