

IMA-301: MATHEMATICS – III
(CE/EE/ME/CHE/BE/FT/OT/PT/PL/LT- III Semester)

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Unit – I: Transform Methods:

Fourier integral, conditions of convergence, Fourier sine and cosine integrals, complex form, applications, Fourier transform pairs, existence conditions, operational properties. Applications of Laplace transform and Fourier transform to solve boundary value problems, Discrete and Fast Fourier transforms and its applications.

Development of difference equations as models, operator method, method of undetermined coefficients, Z-transform pairs, ROC. Operational properties, limiting- value theorems, its applications to solve difference equations and BVP, systems of difference equations.

Unit – II: Functions of a Complex Variable and Conformal Mapping:

Limit, continuity, differentiability and analyticity, Cauchy-Riemann equations, harmonic functions, complex functions as mappings, linear transformation, inverse transformation, bilinear transformation, conformal mapping, applications.

Unit – III: Integration of Complex Functions:

Contour integrals and evaluations, Cauchy- integral theorem, Cauchy's integral formulae, Liouville's theorem, convergence of power series, Taylor series, Laurent series, zeros and singularities of a complex function, residues and residue theorem, evaluation of definite and improper integrals.

Unit – IV: Curve – Fitting, Correlation, Regression and Probability:

Curve-fitting, method of least- squares , fitting of straight lines, polynomials, non-linear and exponential curves etc., correlation analysis, linear, non-linear and multi-regression analysis, probability, random variables and probability distributions, expectation, moments and transform methods, Binomial, Poisson and Normal distributions, overview of t-distribution, F-distribution and χ^2 -distribution.

Unit – V: Statistical Methods:

Sampling theory, parameter estimation, confidence intervals, tests of hypotheses and significance; z-, t-, F-, and χ^2 tests, goodness of fit test - χ^2 test, analysis of variance, non-parametric tests (Simple application), time series analysis, index numbers, quality control charts and acceptance sampling, Introduction to design of experiments, Forecasting models.

Books Recommended:

1. Dennis G, Zill & Michael R. Cullen; Advanced Engineering Mathematics, Jones & Bartlett Publishers. 2nd Edition.
2. R. K. Jain & S. R. K. Iyengar; Advanced Engineering Mathematics, Narosa Publishing House, 2002.
3. Erwin Kreyszig; Advanced Engineering Mathematics, John Wiley & Sons 8th Edition.