

MT-333 Advanced Calculus & Fourier Analysis

Partial Differential Equation:

Basic concepts and formation of partial differential equations; Linear homogeneous partial differential equations and relations to ordinary differential equations; Solution of first order linear and special types of second and higher order differential equations; D' Alembert's solution of the wave equation and two dimensional wave equations; Lagrange's solution; Various standard forms.

Fourier series:

Periodic functions and expansion of periodic functions in Fourier series and Fourier coefficients; Expansion of function with arbitrary periods. Odd and even functions and their Fourier series; Half range expansions of Fourier series, “OFT and FFT, Fourier Spectrum”.

Advance calculus:

Define a stationary point of a function of several variables, define local maximum, and saddle point for a function of two variables the stationary points of a several variables, obtain higher partial derivatives of simple functions of two or more variables, iterated integrals, double and triple integrations with applications (area, center of mass, moment of inertia, surface area, and volume, use multiple integrals in solutions of engineering problems.

Vector Calculus:

Vector differential operator, directional derivative, gradient, divergence, curl of a vector field, and Laplacian operators with applications, (Solenoid, conservative, etc).

Vector Integrations; Evaluate line integrals along simple paths, apply line integrals to calculate work done, apply Green's theorem in the plane to simple examples, evaluate surface integrals over simple surface, use the Jacobian to transform a problem to a new coordinate system, apply Gauss' divergence theorem to simple problems, apply Stokes' theorem to simple examples.

Recommended Books

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| 1. Advance Engineering Mathematics | Erwin Kreyszig | Seven Edition |
| 2. Calculus & Analytical Geometry | Howard Anton | Fifth |
| 3. Introduction to Differential Equation | J. Farlaw | 1994 |
| 4. Differential Equation | G. Zill | |