

Engineering Mathematics-1

Credits:4

UNIT-1:

Power series solution of ODE: Frobenius series, Bessel functions and Legendre Polynomials

UNIT-2:

Fourier Series : Periodic functions, Fourier series representation of a function, half range series, sine and cosine series, Fourier integral formula, Parseval's identity.

UNIT-3:

Fourier Transform: Fourier Transform, Fourier sine and cosine transforms. Linearity, scaling, frequency shifting and time shifting properties, Self reciprocity of Fourier Transform, convolution theorem

UNIT-4:

PDE: Introduction to partial differential equations, linear and quasi-linear equations of first order. Classification of integrals. Lagrange's Method of solution and its geometrical interpretation, compatibility condition, Charpit's method, special types of first order equations.

UNIT-5:

Cauchy, Neumann and Dirichlet problems. Fourier series solution of wave equation, vibrations of a string. Riemann's method for hyperbolic equation.

UNIT-6:

Method of separation of variables to solve heat equation, Laplace equation, Diffusion equation.

Text Books:

- 1. E. Kreyszig Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons (1999)**
- 2. Ian N. Sneddon, Elements of Partial Differential Equations, Dover publication (2006)**
- 3. Jain R.K., Iyengar S.R.K., Advanced Engineering Mathematics, 3rd Edition, Narosa.**

Reference Books:

- 1. Lawrence C. Evans, partial differential equations, AMS publications (1949)**
- 2. Alan Jeffrey, Applied partial differential equations: An introduction, academic press**