

Unit I**Ordinary Differential Equation**

Reorientation of differential equation, Exact differential equation and Integrating factors, First order and higher degree odes, solvable for p , y and x , Modelling of Real-world problems particularly Engineering, Spread of epidemic, Spread of new technological innovations, RC and RL network, Formation of partial differential equations, Higher order linear partial differential equations, Classification of Second order pde.

Unit II**Fourier Series**

Definition, Fourier series with arbitrary period, in particular periodic function with period 2 . Fourier series of even and odd function, Half range Fourier series.

Unit III**Laplace Transform**

Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step functions, Dirac – delta functions, Laplace transform of periodic functions, Convolutions theorem, Application to solve simple linear and simultaneous differential equations.

Unit IV**Finite Differences and Interpolation**

Finite Differences, Forward, Backward and Central operators, Interpolation by polynomials, Newton's forward, Backward interpolation formulae, Gauss & Stirling's central difference formulae, Newton's divided and Lagrange's formulae for unequal intervals, Newton-Cotes formula, Trapezoidal and Simpson's formulae, error formulae, Gaussian quadrature formulae.

Suggested Readings

- Higher Engineering Mathematics by Grewal B S. 2004. Khanna Publishers Delhi.
- Engineering Mathematics by Ramana B V. 2008. Tata McGraw-Hill. New Delhi.
- E. Kreyszig : Advanced Engg. Mathematics. 8th Ed, John Wiley & Sons., New York.
- Jain and Iyenger , Advanced Engg. Mathematics, Narosa Publications, New Delhi.
- James Steward, Calculas, Thomson Asia, 5 edition, Singapore, 2003.
- J. N. Kapur , Mathematical Models in Biology and Medicine, East west press.
- F. B. Hilderbrand , Methods of Applied Mathematics, McGraw Hill, New York