

## MATHEMATICAL METHODS

**Course Code: 13BS201**

**L – T – P: 3-0-0            Credits: 3**

**Pre-requisite: Nil**

### SYLLABUS

Numerical Methods: The Bisection Method, Regula-falsi method, Newton-Raphson Method, Newton's forward and backward interpolations, Lagrange's Interpolation, Newton's divided difference formula, Numerical Differentiation: first and second order derivatives by Newton's forward and backward interpolations. Numerical Integration: Trapezoidal rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule and applications. Fourier series and transforms: Determination of Fourier coefficients, Fourier series, even and odd functions, Fourier series in an arbitrary interval, half-range Fourier sine and cosine series, Parseval's identities, Fourier integral theorem (without proof)– Fourier sine and cosine integrals. Fourier transforms, Fourier sine and cosine transforms and its properties, inverse transforms, finite Fourier transforms, discrete Fourier transforms. Z-transforms: Introduction, definition, some standard Z-transforms, initial and final value theorems, Z-transforms properties, inverse Z-transforms, convolution theorem, solution of difference equations using Z-transforms Probability and distributions: Random variables, probability function, mathematical expectation, geometric, exponential and normal distributions. Correlation and regression: Bivariate data, simple correlation and regression coefficients and their relations, least square's method for linear, curve linear and polynomial curve fitting Statistical testing of hypothesis: Sampling distribution of mean and standard error, large tests (Test for an assumed mean and equality of two population means with known SD), small sample tests (t-test for an assumed mean and equality of means of two populations when observations are independent), Chi-square test - independence of attributes, goodness of fit.

### TEXT BOOKS

1. Advanced Engineering Mathematics (Second edition), Michael Greenberg.
2. Advanced Engineering Mathematics (Tenth Edition), Erwin Kreyszig.

### REFERENCE BOOKS

1. Higher Engineering Mathematics, By Dr. B.S. Grewal. Publisher: Khanna, New Delhi.
2. Applied numerical methods with MATLAB for engineers and scientists, Steven C Chapra, third edition, Tata McGraw-hill edition.
3. Advanced engineering mathematics, RK Jain, SRK Iyengar, Narosa publishers, second edition.