MA 202 COMPLEX ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS **4 credits [3-1-0]**

(a) *Complex Analysis***:** Derivative. Analytic function, Cauchy Riemann equations, Laplace's equation, Geometry of analytic functions, Exponential function, Trigonometric functions, Hyperbolic functions, Logarithm, General power, Conformal mapping, Linear fractional transformations. Complex integration, Line integral in the complex plane, Cauchy's Integral Theorem, Cauchy's Integral Formula, Derivative of Analytic functions, Power series, Taylor series, Sequences, Series, Convergence tests, Functions Given by power series, Taylor series and Maclaurin series, Uniform convergence. Laurent series, Residue integration, Laurent series, Singularities and zeros infinity, Residue integration methods, Evaluation of real integrals. **(b)***Partial Differential Equations***:** Basic concepts, Modeling of vibrating string, Wave equation, Separation of variable, Use of Fourier series, D'Alembert's solution of the wave equation, Heat equation, Solution by Fourier Series, Solution by Fourier integral and transforms, Modeling: Membrane, Two-dimensional wave equation, Rectangular membrane. Use of double Fourier series, Laplacian in polar coordinates, Circular membrane, Use of Fourier–Bessel series, Laplace's equation in cylindrical and spherical coordinates, Potential, Solution by Laplace transforms.

Essential Reading :

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, Wiley India Pvt. Ltd. 2007
   Chapters: 11, 12 (12.3 – 12.9), 13,14, 15.