Syllabus

1. Vector and Analytic Geometry: Vectors in two and in three dimensions. Scalar product. Vector product. General equation of second degree: Conic section. Coordinates in three dimensions: Direction cosines. Planes and straight lines in three dimensions. Applications of geometry.

2. Algebra: Complex numbers. DeMoivre’s theorem and applications. Polynomials and algebraic equations. Summation of algebraic and trigonometric series. Basic knowledge of groups, rings and fields. Elementary number theory. Vector spaces. Linear independence: Basis and Dimension. Linear transformations. Linear equations, Matrices and determinants. Applications of Linear Algebra.

3. Calculus of One Variable: Functions and their graphs, limits, continuity, differentiation and application, integration and applications, fundamental theorems and applications. Convergence of infinite sequences and series. Applications of Calculus.

4. Calculus of Several Variables: Differentiation and integration of vector functions. Line, surface and volume integrals. Cylindrical polar and spherical polar coordinates. Applications of Grad, Div and Curl. Theorems of Green, Gauss, Stokes and their applications.

5. Differential Equations: Applications of 1st and 2nd order differential equations. Special functions.