

## **MT-103 Introduction to Mathematics**

### **Complex Numbers**

Properties of complex numbers, conjugates and modules. Geometrical representation of complex numbers.

### **Functions and their graph**

Functions, Graph of linear and non-linear functions, Roots of a quadratic equation (real, distinct, equal and imaginary roots). Formation of quadratic equation.

### **Matrices**

Properties of matrices, sum, difference and multiplication of matrices. Cramer's rule, solution of linear equations of three variables, determinant of a matrix, Eigen values and Eigen vectors of a matrix.

### **Sequence and Series**

Arithmetic progression, standard forms of an A. P.; arithmetic means. Geometric progression, standard forms of a G. P., sum of Infinite geometric series, geometric means. Harmonic progression, harmonic means. Relation between H.M., A.M. and G.M, Binomial Series.

### **Partial Fraction**

Rational function, proper fraction, improper fraction.

### **Trigonometric Functions and Identities**

Sine, Cosine, Tangent etc. relation between them. Trigonometric identities, sum and difference formulae, multiple angle formulae, Inverse functions. Unit circle and relation between Radian and degree.

### **Limits**

Basic concepts of limit, evaluation of limit of simple algebraic and rational function.

### **Differentiation**

Differentiation of product and quotient formula, trigonometric functions, exponents and logarithmic functions.

### **Integration**

Basic integrals, integrals of sum powers of trigonometric functions, exponent functions and logarithmic functions, Integration by parts and etc.

### **Coordinate Geometry**

Basic concept of coordinate system, length, mid-point, gradient of line segment, different forms of equation of a line. Angle between two lines, distance of a point from a line.

### **Conic Sections:**

Basic concept of intersection of cone by plan, Equation of Circle, Parabola, Ellipse and hyperbola.