

Stat-123: Algebra and Analytical Geometry
100 Marks: 03 Credits
Number of Class: 35-40

Algebra

Basic Concepts of Algebra: Concepts of Equation, Relations and Functions. Binary relation, Operation on Algebraic Expressions, Equivalence Relation, Properties of Real Number and Complex Number, and Definition of Group and Field.

Inequality: Order properties of real number, Arithmetic mean, Geometric mean, Weierstras's Inequality, Cauchy-Schwarz Inequality.

Theory of Equations: Binomial and Polynomial Equations, the Remainder Theorem in Algebra, Multiple Roots, Relation between Roots and Coefficients, Descarte's Rule of Signs, Symmetric Function of the Roots, Sum of the Powers of the Roots, Transformation of Equations, Limit of the Roots, Removal of any Terms of the Equations, Reciprocal Equation, Solutions of Cubic and Bi-Quadratic Equations.

Series: Basic concepts of series, Techniques of summing up series, Test of Convergence and Divergence of series.

Analytical Geometry

Basic Concepts about the Formation and History of Geometry, Cartesian and Polar Co-ordinates, Parameters, Changes of Axes Standard Equation in Different Co-ordinate Systems and their Parametric Representation.

Straight-line: Slope, Derivation of the Equation of Straight-line, Angle between Two Straight-line, Condition for Perpendicularity Parallelism Related Problems.

Pair of straight-lines: Concepts of Pair of Straight-line with Homogeneous form, General Equation of Second Degree, Reduction of Pair of Straight-line.

Coins: Ellipse, Parabola, Hyperbola, Circle & System of circle.

Text:

1. Anton, H (2006): *Calculus with Analytic Geometry*, Wiley, New York.
2. Littlewood, D. E. (1977): *University Algebra*, Oxford University Press, Oxford.

References

1. Ayres, F. (1965): *Theory and Problems of Modern Algebra, Schaum's Outline Series*, McGraw-Hill Book Company.
2. Shahidullah, M. and Bhattacharjee, P. K.: *Text Book on Algebra and Trigonometry*, Latest edition.
3. Van Der Waerden, BL (1966): *Modern Algebra*, Frederick Ungar publishing Co., New York.

