



U.P. EDUCATION SERVICE SELECTION COMMISSION, PRAYAGRAJ
TGT MATHEMATICS SYLLABUS 2026

Subject Code - 03 (English Medium)

Unit 1: Algebra & Set Theory

Sets, Relations and Functions, Types of Relations, Equivalence Relations, Composition of Functions, Inverse Functions. Theory of Equations: Quadratic equations and expressions, Roots and coefficients, Symmetric functions of roots, Transformation of equations. Progressions: Arithmetic, Geometric and Harmonic Progressions (AP, GP, HP), Sum of n terms, Means. Permutations and Combinations: Fundamental principles of counting, Formulas for nPr and nCr , Applications. Binomial Theorem: Positive, negative, and fractional indices, General and middle terms, Exponential and Logarithmic Series.

Unit 2: Matrices and Determinants

Matrices: Types of matrices, Addition, Subtraction, and Multiplication of matrices, Transpose of a matrix, Symmetric and Skew-symmetric matrices, Adjoint and Inverse of a matrix. Determinants: Properties of determinants, Expansion, Minors and Cofactors, System of linear equations and solution using Cramer's Rule and Matrix Inversion Method, Rank of a Matrix.

Unit 3: Trigonometry

Trigonometric ratios and identities, Compound angles, Multiple and Sub-multiple angles, Transformation formulas. Trigonometric Equations and General Solutions. Properties of Triangles: Sine rule, Cosine rule, Projection formulas, In-radius, Ex-radii, Circum-radius, and Solution of Triangles. Inverse Trigonometric Functions: Properties and solutions. Heights and Distances. Complex Numbers: De Moivre's Theorem and its simple applications, Hyperbolic Functions.

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Unit 4: Coordinate Geometry (2D & 3D)

2D Geometry: Cartesian coordinates, Distance formula, Section formula, Area of a triangle. Straight Lines: Angle between two lines, Pair of straight lines, Distance of a point from a line. Circles: Standard and general equation, Tangent and Normal, Condition of tangency, Family of circles. Conic Sections: Standard equations, properties, tangents and normals of Parabola, Ellipse, and Hyperbola. 3D Geometry: Direction Cosines and Direction Ratios, Planes and Straight Lines in 3D, Shortest distance between two skew lines, Sphere.

Unit 5: Calculus (Differential & Integral)

Differential Calculus: Limits, Continuity, and Differentiability. Derivatives of standard functions, Chain rule, Implicit and Parametric differentiation. Tangents and Normals, Monotonicity, Rolle's Theorem and Lagrange's Mean Value Theorem, Maxima and Minima of functions of one variable, Successive differentiation, Expansion of functions. Integral Calculus: Indefinite and Definite integrals, Integration by substitution, parts, and partial fractions. Properties of definite integrals, Area bounded by plane curves. Differential Equations: Order and degree, First order and first degree differential equations (Variable separable, Homogeneous, Linear differential equations).

Unit 6: Vector Algebra & Dynamic Statics

Vector Algebra: Vectors and Scalars, Addition of vectors, Position vector, Scalar and Vector products of two and three vectors (Dot, Cross, Scalar Triple Product, Vector Triple Product) and their geometric applications. Statics: Coplanar forces, Equilibrium conditions, Moments, Couples, Resultant of concurrent and parallel forces, Center of Gravity. Dynamics: Motion in a straight line, Rectilinear motion with uniform acceleration, Projectiles, Motion under gravity, Work, Power, and Energy, Laws of Motion.

Unit 7: Statistics & Probability

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Statistics: Measures of Central Tendency (Mean, Median, Mode), Measures of Dispersion (Range, Mean Deviation, Variance, Standard Deviation), Frequency distribution. Correlation and Regression coefficients, Lines of regression. Probability: Random experiments, Sample space, Events, Axiomatic definition of probability, Addition and Multiplication theorems, Conditional probability, Bayes' Theorem, Binomial and Poisson distributions.

