

Syllabus for JEE Advanced

Mathematics Syllabus for JEE Advanced:

Algebra:

- Algebra of complex numbers, addition, multiplication, conjugation, polar representation, properties of modulus and principal argument, triangle inequality, cube roots of unity, geometric interpretations.
- Quadratic equations with real coefficients, relations between roots and coefficients, formation of quadratic equations with given roots, symmetric functions of roots
- Arithmetic, geometric and harmonic progressions, arithmetic, geometric and harmonic means, sums of finite arithmetic and geometric progressions, infinite geometric series, sums of squares and cubes of the first n natural numbers.
- Logarithms and their properties
- Permutations and combinations, binomial theorem for a positive integral index, properties of binomial coefficients
- Matrices as a rectangular array of real numbers, equality of matrices, addition, multiplication by a scalar and product of matrices, transpose of a matrix, determinant of a square matrix of order up to three, inverse of a square matrix of order up to three, properties of these matrix operations, diagonal, symmetric and skew-symmetric matrices and their properties, solutions of simultaneous linear equations in two or three variables.
- Addition and multiplication rules of probability, conditional probability, Bayes Theorem, independence of events, computation of probability of events using permutations and combinations

Trigonometry:

- Trigonometric functions, their periodicity, and graphs, addition and subtraction formulae, formulae involving multiple and sub-multiple angles, the general solution of trigonometric equations.
- Relations between sides and angles of a triangle, sine rule, cosine rule, half-angle formula and the area of a triangle, inverse trigonometric functions (principal value only).

Analytical Geometry:

Two dimensions:

- Cartesian coordinates, the distance between two points, section formulae, the shift of origin.
- The equation of a straight line in various forms, angle between two lines, a distance of a point from a line; Lines through the point of intersection of two given lines, the equation of the bisector of the angle between two lines, concurrency of lines; Centroid, orthocentre, incentre and circumcentre of a triangle.

- Equation of a circle in various forms, equations of tangent, normal and chord
- Parametric equations of a circle, the intersection of a circle with a straight line or a circle, the equation of a circle through the points of intersection of two circles and those of a circle and a straight line.
- Equations of a parabola, ellipse and hyperbola in standard form, their foci, directrices and eccentricity, parametric equations, equations of tangent and normal.
- Locus problems

Three dimensions:

- Direction cosines and direction ratios, the Equation of a straight line in space, the equation of a plane, a distance of a point from a plane.

Differential Calculus:

- Real valued functions of a real variable, into, onto and one-to-one functions, sum, difference, product and quotient of two functions, composite functions, absolute value, polynomial, rational, trigonometric, exponential and logarithmic functions.
- Limit and continuity of a function, limit, and continuity of the sum, difference, product and quotient of two functions, L'Hospital rule of evaluation of limits of functions
- Even and odd functions, the inverse of a function, continuity of composite functions, intermediate value property of continuous functions.
- A derivative of a function, a derivative of the sum, difference, product and quotient of two functions, chain rule, derivatives of polynomial, rational, trigonometric, inverse trigonometric, exponential and logarithmic functions.
- Derivatives of implicit functions, derivatives up to order two, geometrical interpretation of the derivative, tangents, and normals, increasing and decreasing functions, maximum and minimum values of a function, Rolle's Theorem and Lagrange's mean value theorem.

Integral Calculus:

- Integration as the inverse process of differentiation, indefinite integrals of standard functions, definite integrals and their properties, fundamental theorem of integral calculus.
- Integration by parts, integration by the methods of substitution and partial fractions, application of definite integrals to the determination of areas involving simple curves.
- Formation of ordinary differential equations, solution of homogeneous differential equations, separation of variables method, linear first order differential equations

Vectors:

- The addition of vectors, scalar multiplication, dot and cross products, scalar triple products and their geometrical interpretations.
- AAT (Architecture Aptitude Test) Syllabus for JEE Advanced #year.

ARCHITECTURE APTITUDE TEST Syllabus for JEE Advanced:

Freehand Drawing:

- This would comprise of simple drawing depicting the total object in its right form and proportion, surface texture, relative location and details of its component parts in appropriate scale. Common domestic or day-to-day life usable objects like furniture, equipment, etc., from memory.

Geometrical Drawing:

- Exercises in geometrical drawing containing lines, angles, triangles, quadrilaterals, polygons, circles, etc. Study of plan (top view), elevation (front or side views) of simple solid objects like prisms, cones, cylinders, cubes, splayed surface holders, etc.

Three-Dimensional Perception:

- Understanding and appreciation of three-dimensional forms with building elements, color, volume, and orientation. Visualisation through structuring objects in memory.

Imagination and Aesthetic Sensitivity:

- Composition exercise with given elements. Context mapping. Creativity check through the innovative uncommon test with familiar objects. The sense of color grouping or application.

Architectural Awareness:

- General interest and awareness of famous architectural creations – both national and international, places and personalities (architects, designers, etc.) in the related domain.