

Syllabus for TS EAMCET-2020-E Stream (Engineering Stream)

The syllabus is in tune with the syllabus introduced by the Board of Intermediate Education, TS, for Intermediate course with effect from the academic year 2018-2019 (1st year) and 2019-2020 (2nd year) and is designed at the level of Intermediate Course and equivalent to (10+2) scheme of Examination conducted by Board of Intermediate Education, TS. The syllabus is designed to indicate the scope of subjects included for TS EAMCET-2020. The topics mentioned therein are not to be regarded as exhaustive. Questions may be asked in TS EAMCET-2020 to test the student's knowledge and intelligent understanding of the subject. The syllabus is applicable to students of both the current and previous batches of Intermediate Course, who desire to appear for TS EAMCET-2020.

MATHEMATICS

1) ALGEBRA:

- a) **Functions:** Types of functions – Definitions - Inverse functions and Theorems - Domain, Range, Inverse of real valued functions.
- b) **Mathematical Induction:** Principle of Mathematical Induction & Theorems - Applications of Mathematical Induction - Problems on divisibility.
- c) **Matrices:** Types of matrices - Scalar multiple of a matrix and multiplication of matrices - Transpose of a matrix - Determinants - Adjoint and Inverse of a matrix - Consistency and inconsistency of Equations- Rank of a matrix - Solution of simultaneous linear equations.
- d) **Complex Numbers:** Complex number as an ordered pair of real numbers - fundamental operations - Representation of complex numbers in the form $a + ib$ - Modulus and amplitude of complex numbers – Illustrations - Geometrical and Polar Representation of complex numbers in Argand plane- Argand diagram.
- e) **De Moivre's Theorem:** De Moivre's theorem- Integral and Rational indices - n^{th} roots of unity- Geometrical Interpretations – Illustrations.
- f) **Quadratic Expressions:** Quadratic expressions, equations in one variable - Sign of quadratic expressions – Change in signs – Maximum and minimum values - Quadratic inequations.
- g) **Theory of Equations:** The relation between the roots and coefficients in an equation - Solving the equations when two or more roots of it are connected by certain relation - Equation with real coefficients, occurrence of complex roots in conjugate pairs and its consequences - Transformation of equations - Reciprocal Equations.
- h) **Permutations and Combinations:** Fundamental Principle of counting - linear and circular permutations - Permutations of 'n' dissimilar things taken 'r' at a time - Permutations when repetitions allowed - Circular permutations - Permutations with constraint repetitions - Combinations-definitions, certain theorems.

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- i) **Binomial Theorem:** Binomial theorem for positive integral index - Binomial theorem for rational Index (without proof) - Approximations using Binomial theorem.
 - j) **Partial fractions:** Partial fractions of $f(x)/g(x)$ when $g(x)$ contains non - repeated linear factors - Partial fractions of $f(x)/g(x)$ when $g(x)$ contains repeated and/or non-repeated linear factors - Partial fractions of $f(x)/g(x)$ when $g(x)$ contains irreducible factors only.
- 2) TRIGONOMETRY:**
- a) **Trigonometric Ratios up to Transformations:** Graphs and Periodicity of Trigonometric functions - Trigonometric ratios and Compound angles - Trigonometric ratios of multiple and sub - multiple angles - Transformations - Sum and Product rules.
 - b) **Trigonometric Equations:** General Solution of Trigonometric Equations - Simple Trigonometric Equations – Solutions.
 - c) **Inverse Trigonometric Functions:** To reduce a Trigonometric Function into a bijection- Graphs of Inverse Trigonometric Functions - Properties of Inverse Trigonometric Functions.
 - d) **Hyperbolic Functions:** Definition of Hyperbolic Function – Graphs - Definition of Inverse Hyperbolic Functions – Graphs - Addition formulae of Hyperbolic Functions.
 - e) **Properties of Triangles:** Relation between sides and angles of a Triangle - Sine, Cosine, Tangent and Projection rules - Half angle formulae and areas of a triangle – Incircle and Excircle of a Triangle.
- 3) VECTOR ALGEBRA:**
- a) **Addition of Vectors:** Vectors as a triad of real numbers - Classification of vectors - Addition of vectors - Scalar multiplication - Angle between two non zero vectors - Linear combination of vectors - Component of a vector in three dimensions - Vector equations of line and plane including their Cartesian equivalent forms.
 - b) **Product of Vectors:** Scalar Product - Geometrical Interpretations - orthogonal projections - Properties of dot product - Expression of dot product in i, j, k system - Angle between two vectors - Geometrical Vector methods - Vector equations of plane in normal form - Angle between two planes - Vector product of two vectors and properties - Vector product in i, j, k system - Vector Areas - Scalar Triple Product - Vector equations of plane in different forms, skew lines, shortest distance and their Cartesian equivalents. Plane through the line of intersection of two planes, condition for coplanarity of two lines, perpendicular distance of a point from a plane, angle between line and a plane. Cartesian equivalents of all these results - Vector Triple Product – Results.
- 4) PROBABILITY:**
- a) **Measures of Dispersion:** Range - Mean deviation - Variance and standard deviation of ungrouped/grouped data - Coefficient of variation and analysis of frequency distribution with equal means but different variances.

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- b) **Probability:** Random experiments and events - Classical definition of probability, Axiomatic approach and addition theorem of probability - Independent and dependent events - conditional probability- multiplication theorem and Bayes's theorem.
- c) **Random Variables and Probability Distributions:** Random Variables - Theoretical discrete distributions – Binomial and Poisson Distributions.
- 5) **COORDINATE GEOMETRY:**
 - a) **Locus:** Definition of locus – Illustrations - To find equations of locus - Problems connected to it.
 - b) **Transformation of Axes:** Transformation of axes - Rules, Derivations and Illustrations - Rotation of axes - Derivations – Illustrations.
 - c) **The Straight Line:** Revision of fundamental results - Straight line - Normal form – Illustrations - Straight line - Symmetric form - Straight line - Reduction into various forms - Intersection of two Straight Lines - Family of straight lines - Concurrent lines - Condition for Concurrent lines - Angle between two lines - Length of perpendicular from a point to a Line - Distance between two parallel lines - Concurrent lines - properties related to a triangle.
 - d) **Pair of Straight lines:** Equations of pair of lines passing through origin - angle between a pair of lines - Condition for perpendicular and coincident lines, bisectors of angles - Pair of bisectors of angles - Pair of lines - second degree general equation - Conditions for parallel lines - distance between them, Point of intersection of pair of lines - Homogenizing a second degree equation with a first degree equation in x and y .
 - e) **Circle:** Equation of circle - standard form - centre and radius of a circle with a given line segment as diameter & equation of circle through three non collinear points - parametric equations of a circle - Position of a point in the plane of a circle – power of a point- definition of tangent - length of tangent - Position of a straight line in the plane of a circle - conditions for a line to be tangent – chord joining two points on a circle - equation of the tangent at a point on the circle- point of contact-equation of normal - Chord of contact - pole and polar-conjugate points and conjugate lines - equation of chord with given middle point - Relative position of two circles - circles touching each other externally, internally- common tangents – centers of similitude- equation of pair of tangents from an external point.
 - f) **System of circles:** Angle between two intersecting circles - Radical axis of two circles - properties - Common chord and common tangent of two circles - radical centre - Intersection of a line and a Circle.
 - g) **Parabola:** Conic sections - Parabola- equation of parabola in standard form - different forms of parabola - parametric equations - Equations of tangent and normal at a point on the parabola (Cartesian and parametric) - conditions for straight line to be a tangent.

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- h) **Ellipse:** Equation of ellipse in standard form - Parametric equations - Equation of tangent and normal at a point on the ellipse (Cartesian and parametric) - condition for a straight line to be a tangent.
- i) **Hyperbola:** Equation of hyperbola in standard form - Parametric equations - Equations of tangent and normal at a point on the hyperbola (Cartesian and parametric) - conditions for a straight line to be a tangent - Asymptotes.
- j) **Three Dimensional Coordinates:** Coordinates - Section formulae - Centroid of a triangle and tetrahedron.
- k) **Direction Cosines and Direction Ratios:** Direction Cosines - Direction Ratios.
- l) **Plane:** Cartesian equation of Plane - Simple Illustrations.
- 6) **CALCULUS:**
 - a) **Limits and Continuity:** Intervals and neighbourhoods - Limits - Standard Limits - Continuity.
 - b) **Differentiation:** Derivative of a function - Elementary Properties - Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic Function – Derivatives - Methods of Differentiation - Second Order Derivatives.
 - c) **Applications of Derivatives:** Errors and approximations - Geometrical Interpretation of a derivative - Equations of tangents and normals - Lengths of tangent, normal, sub tangent and sub normal - Angles between two curves and condition for orthogonality of curves - Derivative as Rate of change - Rolle's Theorem and Lagrange's Mean value theorem without proofs and their geometrical interpretation - Increasing and decreasing functions - Maxima and Minima.
 - d) **Integration:** Integration as the inverse process of differentiation- Standard forms - properties of integrals - Method of substitution - integration of Algebraic, exponential, logarithmic, trigonometric and inverse trigonometric functions - Integration by parts – Integration - Partial fractions method - Reduction formulae.
 - e) **Definite Integrals:** Definite Integral as the limit of sum - Interpretation of Definite Integral as an area - Fundamental theorem of Integral Calculus – Properties - Reduction formulae - Application of Definite integral to areas.
 - f) **Differential equations:** Formation of differential equation-Degree and order of an ordinary differential equation - Solving differential equation by i) Variables separable method, ii) Homogeneous differential equation, iii) Non - Homogeneous differential equation, iv) Linear differential equations.