

## Recommended Syllabus For CET (Engineering)-2018

## MATHEMATICS

1.	Trigonometry	Angle and its measurements, Standard angles, Angles in quadrant and quadrantal angles, Relation between degree measure and radian measure, Length of arc of a circle, Area of sector, Trigonometric ratios : Trigonometric ratios of any angle, Signs of Trigonometric ratios in different quadrants, Fundamental identities , Trigonometric ratios of compound angles, Trigonometric ratios of allied angles, Trigonometric ratios of multiple angles, Trigonometric ratios of half angles, Factorization and Defactorization formulae , Sum and difference of two angles , Properties of Triangle : Trigonometric ratios of angles of a triangle, Cosine rule, Sine rule, Projection rule, Inverse Circular functions : Properties of inverse circular functions. General solution of Trigonometric equations. Area of triangle.
2.	Determinant	Determinant of order 3, (Expansion and Properties), Cramer's rule, Condition of consistency, Area of a triangle.
3.	Sets, Relations and Functions	Review of set theory, Power set, Cartesian product, Relations, Functions, Types of functions, Graphs of functions, Composite function, Inverse function, Constant function.
4.	Logarithm	Introduction and definition, Laws of logarithm with proof, Change of base, Numerical Problems.
5.	Complex Numbers	Complex Number in the form $a+ib$ , Modulus, Complex Conjugate, Argument of Complex Number, Algebra of Complex numbers, Square roots of Complex numbers, Argand diagram.
6.	Quadratic Equations	Roots of equation, Nature of roots, Sum and product of roots, Formation of quadratic equation, Symmetric functions of roots, Complex cube roots of unity.
7.	Sequences and Series	Arithmetic Progression, Geometric progression, Harmonic progression, Arithmetic mean, Geometric mean, Harmonic mean , Special series : $\sum n$ , $\sum n^2$ , $\sum n^3$ and their uses.
8.	Permutations and Combinations	Factorial Notation, Properties of $n!$ , Fundamental Principle of Counting, Permutations, Permutations of repeated objects, Circular permutation, Combinations, Relation between permutations and combinations, Properties of combination.

9.	Mathematical Induction and Binomial Theorem	Principle of Mathematical Induction and its applications, Binomial Theorem for, $n \in \mathbb{N}$ (statement only), Obtaining general term in the expansion. Binomial theorem for any index. Binomial coefficients.
10.	Limits & Continuity	Standard Limits, Definitions, Algebra of limits (without proof), Limit at infinity, Continuity of a function at a point, Continuity at a function in the interval, Algebra of continuous functions, Types of discontinuity, Continuity of some standard functions.
11.	Differentiation	Definition of Derivative, Derivatives of (a) Constant functions, (b) Power functions, (c) Trigonometric functions, Derivatives of $\log x$ , $a^x$ , $e^x$ (without proof), Rules of Differentiations : (a) Derivative of sum (b) Derivative of Difference (c) Derivative of product (d) Derivative of Quotient, Derivative from first principle, Relation between continuity and differentiability, Derivative of composite function, Derivative of inverse functions, Derivative of implicit functions, Derivative of parametric functions, Second order derivative.
12.	Applications of Derivatives	Increasing and decreasing functions, Tangent and normal at a point to, a curve, Rate measurer, related rates, Approximations and small errors, Maxima and minima. Problems based on Cauchy's Mean value theorem and Rolle's mean value theorem.
13.	Integration	<p>Definition of an Integral, Integral as a limit of sum, Integrals of some standard functions. Rules of integration. Definite Integrals, Methods of integration., a) Substitution Method., b) Integration by parts., c) Integration by partial fractions., Definite integrals, (a) Fundamental Theorem of integral calculus (without proof)., (b) Properties of definite integrals.</p> <p>Simple integral of the following type:</p> $\int \frac{dx}{x^2 - a^2}, \int \frac{dx}{\sqrt{x^2 - a^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$ $\int \frac{px + q}{ax^2 + bx + c} dx, \int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 - x^2} dx,$ $\int \sqrt{ax^2 + bx + c} dx, \int (px + q)\sqrt{ax^2 + bx + c} dx$
14.	Application of integral	Area under the curve, Volume of solid by revaluation,

15. Differential equations	Definitions of Differential equation, order, degree, General solution and Particular solution., Formation of Differential equation., Solutions of First order and first degree differential equations. a) Variables separable method (b) Homogeneous and non homogeneous differential equations, Applications of Differential equations, Growth and decay. Newton's law of cooling, Half life period, Surface area.
16. Boolean Algebra	Boolean Algebra as an algebraic structure, Principle of duality, Boolean function and switching circuits, Application of Boolean Algebra to switching circuits.
17. Mathematical Logic	Statements, Truth values of statement, Compound statement, Logical connectives and truth table, Statement pattern and logical equivalence, Tautology, Contradiction, Contingency, Applications of logic to switching circuits, Quantifiers and quantified statements, Negation of compound statement, Negation of quantified statement.
18. Matrices	Definition and types of matrices, Algebra of matrices, Elementary transformation and Inverse of Matrix by elementary transformation, Minors and cofactor of elements, Adjoint of matrix, Inverse by adjoint method, Solution of Linear Equations by reduction method and inversion method.
19. Plane Co ordinate Geometry	<p>Locus : definition of locus, Equation of locus, Point of locus, Shift of origin.</p> <p>Line : Definition of line, slope of line, equation of lines in standard forms, general equation, angle between two lines, point of intersection of lines, conditions of concurrent lines, distance of a point from a line, family of lines Pair of straight lines : Pair of lines passing through origin, Pair of lines not passing through origin. Condition that general second degree equation in x and y represents a pair of lines, conditions of parallel lines and perpendicular lines, angle between the lines represented by</p> $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ <p>Circle : Different forms of Equations of a circle, Standard equation, General equation, Centre radius form, Parametric equation of a circle, Tangent and normal, Equations of tangent and normal, condition of tangency to the standard circle, Director circle, Length of tangent segment, tangent in terms of slope,</p> <p>Conics : Definition of conic, Equations of conics, Focus, Directrix, Eccentricity, Classification of conics, Standard equations of parabola, Ellipse, Hyperbola, Tangents and Normals, Equation of tangent and normal at a point, condition of tangency, tangent in terms of slope. Number of tangents from a point to conic (parabola, Ellipse, Hyperbola). Director circle.</p>

20. Vectors	Scalar and vector, Different types of vectors, Collinear vectors, Co-planar vectors , Algebra of vectors , Addition of vectors, Scalar multiplication of Vectors, Position vectors, Scalar products and its properties, Vector products and its properties, Angle between two vectors, Collinearity and Coplanarity of vectors, Section formula., Midpoint formula, Centroid formula, Scalar triple product., Volume of parallelopiped, Applications of vectors to Geometry. Applications of vectors to mechanics. Vector area of triangle and parallelogram.
21. Three Dimensional Geometry	<p>Direction Cosines and Direction Ratios: Relation between direction cosines and direction ratios, Angle between two lines, Condition of perpendicular and parallel lines,</p> <p>Line : Equation of line passing through given point and parallel to given vector, Equation of line passing through given two points, (Vector and Cartesian form), Plane: Equation of plane in different forms, Equation of plane passing through three points, angle between two planes, (Vector and Cartesian form). Distance of line from a point, Skew lines Distance between skew lines. Distance between parallel lines.</p> <p>Plane : Angle between line and plane, coplanarity of two lines. Distance of a point from a plane. Equation of plane passing through the intersection of two planes.</p>
22. Linear Programming	Solution of linear inequalities in one & two variable, Introduction of concepts, Formation of linear programming problem, Graphical solution of linear programming problem. Solution of linear programming problems by graphical methods (a) ISO profit and ISO cost line (b) Corner method.
23. Statistics	<p>Measures of dispersion : Range, Mean Deviation, Variance and standard deviation, Quartile deviation,</p> <p>Bivariate frequency Distribution: Tabulation, Correlation, Scatter diagram, Covariance, Karl Pearson's coefficient of correlation.</p> <p>Probability : Events and Algebra of events, Definition of probability, Addition theorem, Multiplication theorem, Conditional probability, Independent events, Baye's theorem, Random variable, Discrete and continuous random variable, Probability distribution of discrete and continuous random variable. Binomial distribution, Bernoulli Trial, Binomial distribution. Condition for Binomial Distribution. Mean and variance of Binomial distribution. Normal distribution. Mean and variance of Normal distribution. Standard Normal variables.</p>