

AP EAMCET – 2016 SYLLABUS

NOTE

- ❖ In accordance to G.O.Ms.No: 16 Edn., (EC) Dept., Dt: 25th Feb' 04, AP EAMCET Committee has specified the syllabus of AP EAMCET-2016 as given hereunder.
- ❖ The syllabus is in tune with the syllabus introduced by the Board of Intermediate Education, A.P., for Intermediate course with effect from the academic year 2012-2013(1st year) and 2013-2014 (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, AP.
- ❖ The syllabus is designed to indicate the scope of subjects included for AP EAMCET - 2016. The topics mentioned therein are not to be regarded as exhaustive. Questions may be asked in AP EAMCET-2016 syllabus 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 AP EAMCET-2016.

Subject: MATHEMATICS**1. ALGEBRA**

Functions: Types of functions – Definitions, Inverse functions and Theorems, Domain, Range, Inverse of real valued functions.

Mathematical Induction: Principle of Mathematical Induction & Theorems, Applications of Mathematical Induction, Problems on divisibility.

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.

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.

De Moivre's Theorem: De Moivre's theorem- Integral and Rational indices - n^{th} roots of unity- Geometrical Interpretations – Illustrations.

Quadratic Expressions: Quadratic expressions, equations in one variable - Sign of quadratic expressions – Change in signs – Maximum and minimum values - Quadratic inequations.

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.

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 and certain theorems.

Binomial Theorem: Binomial theorem for positive integral index - Binomial theorem for rational Index (without proof) - Approximations using Binomial theorem.

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.

2. TRIGONOMETRY

Trigonometric Ratios, variations, Graphs and Periodicity of Trigonometric functions - Trigonometric ratios and Compound angles - Trigonometric ratios of multiple and sub- multiple angles - Transformations - Sum and Product rules

Trigonometric Equations: General Solution of Trigonometric Equations - Simple Trigonometric Equations – Solutions

Inverse Trigonometric Functions: To reduce a Trigonometric Function into a bijection - Graphs of Inverse Trigonometric Functions - Properties of Inverse Trigonometric Functions

Hyperbolic Functions: Definition of Hyperbolic Function – Graphs - Definition of Inverse Hyperbolic Functions – Graphs - Addition formulas of Hyperbolic Functions

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 - In-circle and Ex-circle of a Triangle

3. VECTOR ALGEBRA

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

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. 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.

5. 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 Bayee’s theorem

Random Variables and Probability Distributions - Random Variables - Theoretical discrete distributions – Binomial and Poisson Distributions.

6. COORDINATE GEOMETRY

Locus : Definition of locus – Illustrations - To find equations of locus - Problems connected to it

Transformation of Axes : Transformation of axes - Rules, Derivations and Illustrations - Rotation of axes - Derivations – Illustrations

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

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.

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.

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.

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.

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.

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.

Three Dimensional Coordinates: Coordinates - Section formulas - Centroid of a triangle and tetrahedron.

Direction Cosines and Direction Ratios: Direction Cosines - Direction Ratios

Plane : Cartesian equation of Plane - Simple Illustrations.

7. CALCULUS

Limits and Continuity: Intervals and neighborhoods – Limits - Standard Limits – Continuity

Differentiation: Derivative of a function - Elementary Properties - Trigonometric, Inverse Trigonometric, Hyperbolic, Inverse Hyperbolic Function – Derivatives - Methods of Differentiation - Second Order Derivatives

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.

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.

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

Differential equations: Formation of differential equation-Degree and order of an ordinary differential equation - Solving differential equation by – a) Variables separable method – b) Homogeneous differential equation – c) Non - Homogeneous differential equation – d) Linear differential equations.

Subject – PHYSICS

1. PHYSICAL WORLD: What is physics?, Scope and excitement of Physics, Physics, technology and society, Fundamental forces in nature, Gravitational Force, Electromagnetic Force, Strong Nuclear Force, Weak Nuclear Force, Towards Unification of Forces, Nature of physical laws.

2. UNITS AND MEASUREMENTS: Introduction, The international system of units, Measurement of Length, Measurement of Large Distances, Estimation of Very Small Distances, Size of a Molecule, Range of Lengths, Measurement of Mass, Range of Masses, Measurement of time, Accuracy, precision of instruments and errors in measurement, Systematic errors, random errors, least count error, Absolute Error, Relative Error and Percentage Error, Combination of Errors, Significant figures, Rules for Arithmetic Operations with Significant Figures, Rounding off the Uncertain Digits, Rules for Determining the Uncertainty in the Results of Arithmetic Calculations, Dimensions of Physical Quantities, Dimensional Formulae and dimensional equations, Dimensional Analysis and its Applications, Checking the Dimensional Consistency of Equations, Deducing Relation among the Physical Quantities.

3. MOTION IN A STRAIGHT LINE: Introduction, position, path length and displacement, average velocity and average speed, instantaneous velocity and speed, acceleration, kinematic equations for uniformly accelerated motion, relative velocity.

4. MOTION IN A PLANE: Introduction, scalars and vectors, position and displacement vectors, equality of vectors, multiplication of vectors by real numbers, addition and subtraction of vectors - graphical method, resolution of vectors, vector addition - analytical method, motion in a plane, position vector and displacement, velocity, acceleration, motion in a plane with constant acceleration, relative velocity in two dimensions, projectile motion, equation of path of a projectile, time of maximum height, maximum height of a projectile, horizontal range of projectile, uniform circular motion.

5. LAWS OF MOTION: Introduction, Aristotle's fallacy, The law of inertia, Newton's first law of motion, Newton's second law of motion, momentum, Newton's third law of motion, Impulse, Conservation of momentum, Equilibrium of a particle, Common forces in mechanics, friction, types of friction, Circular motion, Motion of a car on a level road, Motion of a car on a banked road, solving problems in mechanics.

6. WORK, ENERGY AND POWER: Introduction, The Scalar Product, Notions of work and kinetic energy, The work-energy theorem, Work, Kinetic energy, Work done by a variable force, The work-energy theorem for a variable force, The concept of Potential Energy, The conservation of Mechanical Energy, The Potential Energy of a spring, Various forms of energy, the law of conservation of energy, Heat, Chemical Energy, Electrical Energy, The Equivalence of Mass and Energy, Nuclear Energy, The Principle of Conservation of Energy, Power, Collisions, Elastic and Inelastic Collisions, Collisions in one dimension, Coefficient of Restitution and its determination, Collisions in Two Dimensions.

7. SYSTEMS OF PARTICLES AND ROTATIONAL MOTION: Introduction, What kind of motion can a rigid body have?, Centre of mass, Centre of Gravity, Motion of centre of mass, Linear momentum of a system of particles, Vector product of two vectors, Angular velocity and its relation with linear velocity, Angular acceleration, Kinematics of rotational motion about a fixed axis, Torque and angular momentum, Moment of force (Torque), Angular momentum of particle, Torque and angular momentum for a system of a particles, conservation of angular momentum, Equilibrium of a rigid body, Principle of moments, Moment of inertia, Theorems of perpendicular and parallel axes, Dynamics of rotational motion about a fixed axis, Angular momentum in case of rotations about a fixed axis, Conservation of Angular Momentum, Rolling motion, Kinetic Energy of Rolling Motion.

8. OSCILLATIONS: Introduction, Periodic and oscillatory motions, Period and frequency, Displacement, Simple harmonic motion (S.H.M.), Simple harmonic motion and uniform circular motion, Velocity and acceleration in simple harmonic motion, Force law for Simple harmonic Motion, Energy in simple harmonic motion, Some systems executing Simple Harmonic Motion, Oscillations due to a spring, The Simple Pendulum, Damped simple harmonic motion, Forced