CLASS – XI (C.B.S.E.) Syllabus

MATHEMATICS

S.No.	Units	Marks
I.	SETS AND FUNCTIONS	29
II.	ALGEBRA	37
III.	COORDINATE GEOMETRY	13
IV.	CALCULUS	06
V.	MATHEMATICAL REASONING	03
VI.	STATISTICS AND PROBABILITY	12

UNIT-I: SETS AND FUNCTIONS

1. Sets :

Sets and their representations. Empty set. Finite & Infinite sets. Equal sets. Subsets. Subsets of the set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set.

2. Relations & Functions:

Ordered pairs, Cartesian product of sets. Number of elements in the cartesian product of two finite sets. Cartesian product of the reals with itself (upto R x R x R). Definition of relation, pictorial diagrams, domain. codomain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain & range of a function.
Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

$$\tan (x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y} \ , \cot (x \pm y) = \frac{\cot x \cot y \mp 1}{\cot y \pm \cot x} \ ,$$

$$\sin x + \sin y = 2 \sin\frac{x+y}{2} \cos \frac{x-y}{2}, \ \cos x + \cos y = 2 \cos \frac{x+y}{2} \cos \frac{x-y}{2} \ ,$$

$$\sin x - \sin y = 2 \cos \frac{x+y}{2} \sin \frac{x-y}{2}, \ \cos x - \cos y = -2 \sin \frac{x+y}{2} \sin \frac{x-y}{2} \ ,$$

identities related to sin 2x, cos2x, tan 2x, sin3x, cos3x and tan3x. General solution of trigonometric equations of the type $\sin \theta = \sin \alpha$, $\cos \theta = \cos \alpha$ and $\tan \theta = \tan \alpha$, Properties of Triangle.

UNIT-II: ALGEBRA

1. Principle of Mathematical Induction :

Processes of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.

2. Complex Numbers and Quadratic Equations:

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve every quadratic equation. Brief description of algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, Square Root of Complex number, solution of quadratic equations in the complex number system.

3. Linear Inequalities:

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Solution of system of linear inequalities in two variables- graphically.

4. Permutations & Combinations :

Fundamental principle of counting. Factorial *n.* (*n!*)Permutations and combinations, Derivation of formulae and their connections, Simple applications.

5. Binomial Theorem :

History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle term in binomial expansion, simple applications.

6. Sequence and Series :

Sequence and Series. Arithmetic progression (A. P.). arithmetic mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of *n* terms of a G.P., geometric mean(G.M.), Relation between A.M. and G.M. Sum to *n* terms of the special series Σn, Σn^2 and Σn^3,Infinite G.P.

UNIT-III : COORDINATE GEOMETRY

1. Straight Lines:

Brief recall of 2D from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axes, point-slope form, slope-intercept form, two point form, intercepts form and normal form. General equation of a line. Distance of a point from a line.

2. Conic Sections:

Sections of a cone: circle, ellipse, parabola, hyperbola, a point, a straight line and pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

3. Introduction to Three -dimensional Geometry

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

UNIT-IV : CALCULUS

Limits and Derivatives :

Derivative introduced as rate of change both as that of distance function and geometrically, intuitive idea of limit. Limits of Exponential and Logarithmic Functions, Definition of derivative, related it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

UNIT-V : MATHEMATICAL REASONING

Mathematical Reasoning :
Mathematically acceptable statements. Connecting words/ phrases - consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words difference between contradiction, converse and contra positive.

UNIT-VI: STATISTICS & PROBABILITY

1. Statistics :

Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

2. Probability:

Random experiments: outcomes, sample spaces (set representation). Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events Axiomatic (set theoretic) probability, connections with the theories of earlier classes. Probability of an event, probability of 'not', 'and' & 'or' events.

WEIGHTAGE & PATTERN OF ANNUAL EXAMINATION 2016

A. Weightage to different topics/ contents units

S.N.	Units	Topics	Marks
1.	Sets and Functions	Sets	29
		Relations & Functions	
		Trigonometric Functions	
2.	Algebra	Principal of Mathematical Induction	37
		Complex No's & Quadratic Equations	
		Linear Inequalities	
		Permutations & Combinations	
		Binomial Theorem	
		Sequence and Series	
3.	Coordinate Geometry	Straight Lines	13
		Conic Sections	
		Introduction to 3-Dim. Geometry	
4	Calculus	Limits & Derivatives	06
5.	Mathematical Reasoning	Mathematical Reasoning	03
6.	Statistics & Probability	Statistics, Probability	12

B. Weightage to different forms of questions

S.No.	Forms of questions	Marks	No.of questions	Total
1	Very Short Answer	01	06	06
2.	Short Answer	04	13	52
3.	Long Answer	06	07	42
	Total		*26*	*100*

C. Scheme of Options

There will be no overall choice. An internal Choice in any four questions of four marks and any two questions of six marks each.

D. Difficulty Level of questions

S.No.	Estimated Difficulty level	Percentage of Marks
1	Easy	15
2.	Average	70
3.	Difficult	15