MATHEMATICS

REVISED SYLLABUS FOR HIGHER SECONDARY FIRST YEAR COURSE

The Syllabus in the subject of Mathematics has undergone changes from time to time in accordance with growth of the subject and emerging needs of the society. Senior Secondary stage is a launching stage from where the students go either for higher academic education in Mathematics or for professional courses like engineering, physical and Bioscience, commerce or computer applications. The present revised syllabus has been designed in accordance with National Curriculum Frame work 2005 and as per guidelines given in Focus Group on Teaching of Mathematics 2005 which is to meet the emerging needs of all categories of students. Motivating the topics from real life situations and other subject areas, greater emphasis has been laid on application of various concepts.

Objectives :

The broad objectives of teaching Mathematics at senior school stage intend to help the pupil:

- ❖ to acquire knowledge and critical understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles, symbols and mastery of underlying processes and skills .
- ❖ to feel the flow of reasons while proving a result or solving a problem .
- ❖ to apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method .
- ❖ to develop positive attitude to think, analyze and articulate logically.
- ❖ to develop interest in the subject by participating in related competitions.
- ❖ to acquaint students with different aspects of mathematics used in daily life.
- ❖ to develop an interest in students to study mathematics as a discipline.
- ❖ to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of sex biases.
- ❖ to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics.

SLLABUS FOR HIGHER SECONDARY FIRST YEAR COURSE

One Paper **Time : Three hours** **Marks : 100**

Unitwise Distribution of Marks & Periods :

Unit	Topics	Marks	Periods
Unit-1	Sets and Functions	26	37
Unit-II	Algebra	30	55
Unit-III	Coordinate Geometry	20	36
Unit-IV	Calculus	12	22
Unit-V	Statistics and Probability	12	30
	Total :	**100**	**180**

APPENDIX:

1. Infinite Series :

2. Mathematical Modelling :

Unitwise Distribution of Course contents:

Unit-I : SETS AND FUNCTIONS

1. Sets: **Marks- 09** **Periods-12**

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

2. Relations and Functions : **Marks 08** **Periods-12**

Cartesian product of sets, Number of elements in the Cartesian product of two finitesets, Cartesian product of the reals with itself (upto R×R×R).

Definition of relation, pictorial diagrams, domain, co-domain 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 and 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.

3. Trigonometric Functions : **Marks 09** **Periods-13**

Positive and negative angles, Measuring angles in radians and in degrees and conversion from one measure to another, Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x + \cos^2 x = 1$, for all x. Sings of trigonometric functions and sketch of their graphs, Expressing sin(x+y) and cos(x+y) in terms of sinx, siny, cosx and cosy, Deducing the identities like following :

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

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

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

Identities related to sin2x, cos2x, tan2x, sin3x, cos3x and tan3x,

Unit-II : ALGEBRA

1. Complex Numbers and Quadratic Equations: Marks 06 **Periods-12**

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, The modulus and the conjugate of a complex number. Argand plane and polar representation.

2. Linear Inequalities : **Marks 04** **Periods-06**

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.

3. Permutations and Combinations : **Marks 07** **Periods-12**

Fundamental principle of counting, Factorial *n*. Permutations and combinations, derivation of formulae and their connections, simple applications.

4. Binomial Theorem : **Marks 07** **Periods-12**

Statement and proof of the binomial theorem for positive integral indices, Pascal'striangle, simple applications.

5. Sequence and Series : **Marks 06** **Periods-13**

Sequence and Series. Geometric progression (G.P.), general term of a GP., sum of n terms of a GP., geometric mean (G.M.), relation between A.M. and GM.

Unit-III : COORDINATE GEOMETRY

1. Straight Lines : **Marks 08** **Periods-14**

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, intercept form and General equation of a line, Distance of a point from a line.

2. Conic Sections : **Marks 08** **Periods-14**

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: Marks 04 **Periods-08**

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

Unit-IV : CALCULUS

Limits and -Derivatives **Marks 12** **Periods-22**

Intuitive idea of limits. Limits of polynomials and rational functions, trigonometric, exponential and logarithmic functions. Definition of derivative relate it to scope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

Unit-V : STATISTICS AND PROBABILITY

1. Statistics: **Marks 07** **Periods-18**

Measure of Dispersion, Range, Mean deviation, variance and standard deviation of ungrouped/ grouped data.

2. Probability: **Marks 05** **Periods-12**

Events, Occurrence of events, 'not', '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.

Appendix

1. Infinite Series :

Binomial theorem for any index, infinite geometric series, exponential and logarithmic series.

2. Mathematical Modelling :

Consolidating the understanding developed up to Class X. Focus on modelling problems related to real-life (like environment, travel, etc.) and connecting with other subjects of study where many constraints may really need to be ignored, formulating the model, looking for solutions, interpreting them in the problem situation and evaluating the model.

Prescribed Textbook : Mathematics for Class XI, Published by NCERT.
গিণত Published by AHSEC.

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