MATHEMATICS (X)

(CODE NO. 041)

Session 2021-22

Term-wise Syllabus

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. The present revised syllabus has been designed in accordance with National Curriculum Framework 2005 and as per guidelines given in the Focus Group on Teaching of Mathematics which is to meet the emerging needs of all categories of students. For motivating the teacher to relate the topics to real life problems and other subject areas, greater emphasis has been laid on applications of various concepts.

The curriculum at Secondary stage primarily aims at enhancing the capacity of students to employ Mathematics in solving day-to-day life problems and studying the subject as a separate discipline. It is expected that students should acquire the ability to solve problems using algebraic methods and apply the knowledge of simple trigonometry to solve problems of height and distances. Carrying out experiments with numbers and forms of geometry, framing hypothesis and verifying these with further observations form inherent part of Mathematics learning at this stage. The proposed curriculum includes the study of number system, algebra, geometry, trigonometry, mensuration, statistics, graphs and coordinate geometry, etc. The teaching of Mathematics should be imparted through activities which may involve the use of concrete materials, models, patterns, charts, pictures, posters, games, puzzles and experiments.

Objectives

The broad objectives of teaching of Mathematics at secondary stage are to help the learners to

- consolidate the Mathematical knowledge and skills acquired at the upper primary stage;

- acquire knowledge and understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles and symbols and underlying processes and skills;

- develop mastery of basic algebraic skills;

- develop drawing skills;

- feel the flow of reason while proving a result or solving a problem;

- apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method;

- to develop ability to think, analyze and articulate logically;

- to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of gender biases;

- to develop necessary skills to work with modern technological devices and mathematical software's.

- to develop interest in mathematics as a problem-solving tool in various fields for its beautiful structures and patterns, etc.

- to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics;

- 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.

COURSE STRUCTURE

CLASS –X (2021-22)

FIRST TERM

One Paper

90 Minutes

NO.	UNIT NAME	MARKS
I	**NUMBER SYSTEMS**	6
II	**ALGEBRA**	10
III	**COORDINATE GEOMETRY**	6
IV	**GEOMETRY**	6
V	**TRIGONOMETRY**	5
VI	**MENSURATION**	4
VII	**STATISTICS & PROBABILITY**	3
	Total	40
	INTERNAL ASSESSMENT	10
	TOTAL	50

INTERNAL ASSESSMENT	MARKS	TOTAL MARKS
Periodic Tests	**3**	
Multiple Assessments	**2**	
Portfolio	**2**	**10 marks for the term**
Student Enrichment Activities-practical work	**3**	

UNIT-NUMBER SYSTEMS

1. REAL NUMBER

Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples. Decimal representation of rational numbers in terms of terminating/non-terminating recurring decimals.

UNIT-ALGEBRA

2. POLYNOMIALS

Zeroes of a polynomial. Relationship between zeroes and coefficients of quadratic polynomials only.

3. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Pair of linear equations in two variables and graphical method of their solution, consistency/inconsistency. Algebraic conditions for number of solutions. Solution of a pair of linear equations in two variables algebraically - by substitution and by elimination. Simple situational problems. Simple problems on equations reducible to linear equations.

UNIT-COORDINATE GEOMETRY

4. COORDINATE GEOMETRY

LINES (In two-dimensions)

Review: Concepts of coordinate geometry, graphs of linear equations. Distance formula. Section formula (internal division)

UNIT-GEOMETRY

5. TRIANGLES

Definitions, examples, counter examples of similar triangles.

1. (Prove) If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

2. (Motivate) If a line divides two sides of a triangle in the same ratio, the line is parallel to the third side.

3. (Motivate) If in two triangles, the corresponding angles are equal, their corresponding sides are proportional and the triangles are similar.

4. (Motivate) If the corresponding sides of two triangles are proportional, their corresponding angles are equal and the two triangles are similar.

5. (Motivate) If one angle of a triangle is equal to one angle of another triangle and the sides including these angles are proportional, the two triangles are similar.

6. (Motivate) If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse, the triangles on each side of the perpendicular are similar to the whole triangle and to each other.

7. (Motivate) The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.

8. (Prove) In a right triangle, the square on the hypotenuse is equal to the sum of the squares on the other two sides.

9. (Motivate) In a triangle, if the square on one side is equal to sum of the squares on the other two sides, the angle opposite to the first side is a right angle.

UNIT- TRIGONOMETRY

6. INTRODUCTION TO TRIGONOMETRY

Trigonometric ratios of an acute angle of a right-angled triangle. Proof of their existence (well defined). Values of the trigonometric ratios of 30^0, 45^0 and 60^0. Relationships between the ratios.

TRIGONOMETRIC IDENTITIES

Proof and applications of the identity $\sin^2 A + \cos^2 A = 1$. Only simple identities to be given

UNIT-MENSURATION

7. AREAS RELATED TO CIRCLES

Motivate the area of a circle; area of sectors and segments of a circle. Problems based on areas and perimeter / circumference of the above said plane figures. (In calculating area of segment of a circle, problems should be restricted to central angle of 60° and 90° only. Plane figures involving triangles, simple quadrilaterals and circle should be taken.)

UNIT- STATISTICS & PROBABILITY

8. PROBABILITY

Classical definition of probability. Simple problems on finding the probability of an event.

SECOND TERM

NO.	UNIT NAME	MARKS
I	ALGEBRA(Cont.)	10
II	GEOMETRY(Cont.)	9
III	TRIGONOMETRY(Cont.)	7
IV	MENSURATION(Cont.)	6
V	STATISTICS & PROBABILITY(Cont.)	8
	Total	40
	INTERNAL ASSESSMENT	10
	TOTAL	50

UNIT-ALGEBRA
1. QUADRATIC EQUATIONS
(10) Periods
Standard form of a quadratic equation $ax^2 + bx + c = 0$, $(a \neq 0)$. Solutions of quadratic equations (only real roots) by factorization, and by using quadratic formula. Relationship between discriminant and nature of roots. Situational problems based on quadratic equations related to day to day activities (problems on equations reducible to quadratic equations are excluded)

2. ARITHMETIC PROGRESSIONS
Motivation for studying Arithmetic Progression Derivation of the nth term and sum of the first n terms of A.P. and their application in solving daily life problems.
(Applications based on sum to n terms of an A.P. are excluded)

UNIT- GEOMETRY
3. CIRCLES
Tangent to a circle at, point of contact
1. (Prove) The tangent at any point of a circle is perpendicular to the radius through the point of contact.
2. (Prove) The lengths of tangents drawn from an external point to a circle are equal.

4. CONSTRUCTIONS
1. Division of a line segment in a given ratio (internally).
2. Tangents to a circle from a point outside it.

UNIT-TRIGONOMETRY
5. SOME APPLICATIONS OF TRIGONOMETRY
HEIGHTS AND DISTANCES-Angle of elevation, Angle of Depression.
Simple problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only 30°, 45°, 60°.

UNIT-MENSURATION
6. SURFACE AREAS AND VOLUMES
1. Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres and right circular cylinders/cones.
2. Problems involving converting one type of metallic solid into another and other mixed problems. (Problems with combination of not more than two different solids be taken).

UNIT-STATISTICS & PROBABILITY
 7. STATISTICS
 Mean, median and mode of grouped data (bimodal situation to be avoided). Mean by Direct Method and Assumed Mean Method only

INTERNAL ASSESSMENT	MARKS	TOTAL MARKS
Periodic Tests	3	
Multiple Assessments	2	
Portfolio	2	**10 marks for the term**
Student Enrichment Activities-practical work	3	

PRESCRIBED BOOKS
 1. Mathematics - Textbook for class IX - NCERT Publication
 2. Mathematics - Textbook for class X - NCERT Publication
 3. Guidelines for Mathematics Laboratory in Schools, class IX - CBSE Publication
 4. Guidelines for Mathematics Laboratory in Schools, class X - CBSE Publication
 5. Laboratory Manual - Mathematics, secondary stage - NCERT Publication
 6. Mathematics exemplar problems for class IX, NCERT publication.
 7. Mathematics exemplar problems for class X, NCERT publication.