

# Mathematics

## Subject Code - 041

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	10 marks for the term
Multiple Assessments	2	
Portfolio	2	
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

Zeros of a polynomial. Relationship between zeros 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  $30^\circ$ ,  $45^\circ$  and  $60^\circ$ . 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  $60^\circ$  and  $90^\circ$  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  $n$ th 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  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ .

### 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
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### 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.