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# Course Structure

## Class X (First Term)

Marks: 90

Units	Marks
I Number System	11
II. Algebra	23
V. Geometry	17
III. Trigonometry	22
VII. Statistics	17
<b>Total</b>	<b>90</b>

### Unit I – Number Systems

(15 Periods)

#### 1. Real Numbers

Euclid's division lemma, Fundamental Theorem of Arithmetic - statements after reviewing work done earlier and after illustrating and motivating through examples, Proofs of results - irrationality of  $\sqrt{2}, \sqrt{3}, \sqrt{5}$ , decimal expansions of rational numbers in terms of terminating / non-terminating recurring decimals.

### Unit II – Algebra

#### 1. Polynomials

(7 Periods)

Zeros of a polynomial. Relationship between zeros and coefficients of quadratic polynomials. Statement and simple problems on division algorithm for polynomials with real coefficients.

#### 2. Pair of Linear Equations in Two Variables

(15 Periods)

Pair of linear equations in two variables and their graphical solutions. Geometric representation of different possibilities of solutions / inconsistency.

Algebraic conditions for number of solutions. Solution of a pair of linear equation in two variables algebraically by substitution, by elimination and by cross multiplication. Simple situational problems must be included. Simple problems on equations reducible to linear equations may be included.

### Unit V – Geometry

#### 1. Triangles

(15 Periods)

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, then 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 triangle on each side of the perpendicular are similar to the whole triangle and to each other.
7. (Prove) The ratio of the areas of two similar triangles is equal to the ratio of the squares on 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. (Prove) In a triangle, if the square on one side is equal to sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

### **Unit III – Trigonometry**

#### **1. Introduction to Trigonometry**

**(10 Periods)**

Trigonometric ratios of an acute angle of a right angled triangle. Proof of their existence (well defined); motivate the ratios, whichever are defined at  $0^\circ$  &  $90^\circ$ . Values (with proofs) of the trigonometric ratios of  $30^\circ$ ,  $40^\circ$  and  $60^\circ$ . Relationships between the ratios.

#### **2. Trigonometric Identities**

**(15 Periods)**

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

### **Unit VII – Statistics and Probability**

#### **1. Statistics**

**(18 Periods)**

Mean, median and mode of grouped data (bimodal situation to be avoided). Cumulative frequency graph.

# Course Structure

## Class X (Second Term)

Marks: 90

Units	Marks
II Algebra (contd.)	23
V. Geometry (contd.)	17
III. Trigonometry (contd.)	08
VII. Statistics and Probability	08
IV. Coordinate Geometry	11
VI. Mensuration	23
<b>Total</b>	<b>90</b>

### Unit II – Algebra (Contd.)

(15 Periods)

#### 3. Quadratic Equations

Standard form of a quadratic equation  $ax^2 + bx + c = 0$  ( $a \neq 0$ ). Solution of the quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula. Relationship between discriminant and nature of roots.

Problems related to day to day activities to be incorporated.

#### 4. Arithmetic Progressions

(8 Periods)

Motivation for studying AP. Derivation for standard results of finding the  $n$ th term and sum of first  $n$  terms and their application in solving daily life problems.

### Unit V – Geometry (Contd.)

(8 Periods)

#### 2. Circles

Tangents to a circle motivated by chords drawn from points coming closer and closer to the point.

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 circle are equal.

#### 3. Constructions

(8 Periods)

1. Division of a line segment in a given ratio (Internally)

2. Tangent to a circle from a point outside it.

3. Construction of a triangle similar to a given triangle.

### Unit III – Trigonometry

#### 3. Heights and Distances

(8 Periods)

Simple and believable problems on heights and distances. Problems should not involve more than two right triangles. Angles of elevation / depression should be only of  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ .

## **Unit VII – Statistics and Probability**

### **2. Probability (10 Periods)**

Classical definition of probability. Connection with probability as given in Class IX. Simple problems on single events, not using set notation.

## **Unit IV – Coordinate Geometry**

### **1. Lines (in Two-dimensions) (14 Periods)**

Review the concepts of coordinate geometry done earlier including graphs of linear equations. Awareness of geometrical representation of quadratic polynomials. Distance between two points and section formula (internal). Area of a triangle.

## **Unit VI – Mensuration**

### **1. Areas Related to Circles (12 Periods)**

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  $60^\circ$ ,  $90^\circ$  &  $120^\circ$  only. Plane figures involving triangles, simple quadrilaterals and circle should be taken).

### **2. Surface Areas and Volumes (12 Periods)**

(i) Problems on finding surface areas and volumes of combinations of any two of the following : cubes, cuboids, spheres, hemispheres and right circular cylinders/ cones. Frustum of a cone.

(ii) 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).