General Instructions

- As per CCE guidelines, the syllabus of Mathematics for classes IX and X has been divided termwise.
- The units specified for each term shall be assessed through both formative and summative assessment.
- In each term, there will be two formative assessments, each carrying 10% weightage
- The summative assessment in term I will carry 20% weightage and the summative asssessment in the II term will carry 40% weightage.
- Listed laboratory activities and projects will necessarily be assessed through formative assessments.

Course Structure

Class IX

First Term		**Marks : 80**
UNITS		**MARKS**
I.	NUMBER SYSTEM	15
II.	ALGEBRA	22
III.	GEOMETRY	35
IV.	CO-ORDINATE GEOMETRY	05
V.	MENSURATION	03
	TOTAL THEORY	**80**

UNIT I : NUMBER SYSTEMS

1. REAL NUMBERS **(18) Periods**

Review of representation of natural numbers, integers, rational numbers on the number line. Representation of terminating / non-terminating recurring decimals, on the number line through successive magnification. Rational numbers as recurring/terminating decimals.

Examples of nonrecurring / non terminating decimals such as $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ etc. Existence of non-rational numbers (irrational numbers) such as $\sqrt{2}$, $\sqrt{3}$ and their representation on the number line. Explaining that every real number is represented by a unique point on the number line and conversely, every point on the number line represents a unique real number.

Existence of $\sqrt{x}$ for a given positive real number x (visual proof to be emphasized).

Definition of nth root of a real number.

Recall of laws of exponents with integral powers. Rational exponents with positive real bases (to be done by particular cases, allowing learner to arrive at the general laws.)

Rationalization (with precise meaning) of real numbers of the type (& their combinations)

$$\frac{1}{a + b\sqrt{x}} \quad \& \quad \frac{1}{\sqrt{x} + \sqrt{y}}$$ where x and y are natural number and a, b are integers.

UNIT II : ALGEBRA

1. **POLYNOMIALS** **(23) Periods**

Definition of a polynomial in one variable, its coefficients, with examples and counter examples, its terms, zero polynomial. Degree of a polynomial. Constant, linear, quadratic, cubic polynomials; monomials, binomials, trinomials. Factors and multiples. Zeros/roots of a polynomial / equation. State and motivate the Remainder Theorem with examples and analogy to integers. Statement and proof of the Factor Theorem. Factorization of $ax^2 + bx + c$, $a \neq 0$ where a, b, c are real numbers, and of cubic polynomials using the Factor Theorem.

Recall of algebraic expressions and identities. Further identities of the type $(x + y + z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$, $(x \pm y)^3 = x^3 \pm y^3 \pm 3xy\,(x \pm y)$.

$x^3 + y^3 + z^3 — 3xyz = (x + y + z)\,(x^2 + y^2 + z^2 — xy — yz — zx)$ and their use in factorization of polymonials. Simple expressions reducible to these polynomials.

UNIT III : GEOMETRY

1. INTRODUCTION TO EUCLID'S GEOMETRY **(6) Periods**

History - Euclid and geometry in India. Euclid's method of formalizing observed phenomenon into rigorous mathematics with definitions, common/obvious notions, axioms/postulates and theorems. The five postulates of Euclid. Equivalent versions of the fifth postulate. Showing the relationship between axiom and theorem.

1. Given two distinct points, there exists one and only one line through them.
2. (Prove) two distinct lines cannot have more than one point in common.

2. LINES AND ANGLES **(10) Periods**

1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is 180^o and the converse.
2. (Prove) If two lines intersect, the vertically opposite angles are equal.
3. (Motivate) Results on corresponding angles, alternate angles, interior angles when a transversal intersects two parallel lines.
4. (Motivate) Lines, which are parallel to a given line, are parallel.
5. (Prove) The sum of the angles of a triangle is 180^o.
6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interiors opposite angles.

3. TRIANGLES **(20) Periods**

1. (Motivate) Two triangles are congruent if any two sides and the included angle of one triangle is equal to any two sides and the included angle of the other triangle (SAS Congruence).
2. (Prove) Two triangles are congruent if any two angles and the included side of one triangle is equal to any two angles and the included side of the other triangle (ASA Congruence).
3. (Motivate) Two triangles are congruent if the three sides of one triangle are equal to three sides of the other triangle (SSS Congruene).
4. (Motivate) Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle.
5. (Prove) The angles opposite to equal sides of a triangle are equal.
6. (Motivate) The sides opposite to equal angles of a triangle are equal.
7. (Motivate) Triangle inequalities and relation between 'angle and facing side' inequalities in triangles.

UNIT IV : COORDINATE GEOMETRY

1. COORDINATE GEOMETRY **(9) Periods**

The Cartesian plane, coordinates of a point, names and terms associated with the coordinate plane, notations, plotting points in the plane, graph of linear equations as examples; focus on linear equations of the type $ax + by + c = 0$ by writing it as $y = mx + c$ and linking with the chapter on linear equations in two variables.

UNIT V : MENSURATION

1. AREAS **(4) Periods**

Area of a triangle using Hero's formula (without proof) and its application in finding the area of a quadrilateral.