COURSE STRUCTURE
CLASS X

First Term   **Marks : 90**

UNITS	MARKS
I. NUMBER SYSTEMS	11
II. ALGEBRA	23
III. GEOMETRY	17
IV TRIGONOMETRY	22
V STATISTICS	17
TOTAL	**90**

UNIT I : NUMBER SYSTEMS

1.   REAL NUMBERS   (15) Periods

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 Ö2, Ö3, Ö5, 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 solution. Geometric representation of different possibilities of solutions/inconsistency.

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

UNIT III : 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, 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. (**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 on the other two sides, the angles opposite to the first side is a right traingle.

UNIT IV : 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 $0°$ and $90°$. Values (with proofs) of the trigonometric ratios of $30°$, $45°$ and $60°$. 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 V : 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
III. GEOMETRY (Contd.	17
IV. TRIGONOMETRY (Contd.)	08
V PROBABILITY	08
VI COORDINATE GEOMETRY	11
VII. MENSURATION	23
TOTAL	**90**

Course Structure (First Term)

UNIT II : ALGEBRA (Contd.)

3. QUADRATIC EQUATIONS (15) Periods

Standard form of a quadratic equation $ax^2 + bx + c = 0$, $(a ¹ 0)$. 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 Arithmetic Progression Derivation of standard results of finding the nth term and sum of first n terms and their application in solving daily life problems.

UNIT III : GEOMETRY (Contd.)

2. CIRCLES (8) Periods

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 IV : 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 $30°$, $45°$, $60°$.

UNIT V : 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 VI : 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 VII : 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 $60°$, $90°$ and $120°$ 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.)

QUESTIONS PAPER DESIGNS 2014–15
CLASS–X

MATHEMATICS CODE NO. 041 Time–3 Hours Marks–90

S. No.	Typology of Questions	Very Short Answer (VSA) (1 Mark)	Short Answer - I (SA) (2 Marks)	Short Answer - II (SA) (3 Marks)	Long Answer (LA) (4 Marks)	Total Marks	% Weightage
1	**Remembering - (Knowledge based** Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)	1	2	2	3	**23**	26%
2	**Understanding- (Comprehension** -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	1	1	2	**14**	16%
3	**Application** (Use abstract information in concrete situation, to apply knowledge to new situations; Use given content to interpret a situation, provide an example, or solve a problem)	1	2	3	2	**22**	24%
4	**High Order Thinking Skills (Analysis & Synthesis -** Classify, compare, contrast, or differentiate between different pieces of information; Organize and/or integrate unique pieces of information from a variety of sources)	1	1	4	1	**19**	21%
5	**Creating, Evaluation and Multi- Disciplinary-** (Generating new ideas, product or ways of viewing things Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)			-	3*	**12**	13%
	TOTAL	4x1=4	6x2=12	10x3=30	11x4=44	90	100%

*One of the LA (4 marks) will to assess the values inherent in the texts.