

## Course Structure CLASS-IX

- As per CCE guidelines, the syllabus of Mathematics for classes IX and X has been divided term wise.
- The units specified for each term shall be assessed through both Formative and Summative Assessments.
- In **each term, there will be two Formative Assessments, each carrying 10% weightage** out of these **one i.e. FA 4 would be problem solving assessment(PSA)**.-
- The **Summative Assessment in term I will carry 30% weightage and the Summative Assessment in the II term will carry 30% weightage.**
- **Listed laboratory activities and projects** will necessarily be assessed through formative assessments.

### First Term Marks: 90

S.No	Units	Chapter	MARKS
1	I.	NUMBER SYSTEMS	17
2	II.	ALGEBRA	25
3	III.	GEOMETRY	37
4	IV.	COORDINATE GEOMETRY	06
5	V.	MENSURATION	05
		<b>Total</b>	<b>90</b>

**DESIGN OF QUESTION PAPER**  
**CLASS–IX** **MATHEMATICS**  
**SUMMATIVE ASSESSMENT –I &II**

S. No.	Typology of Questions	Very Short Answer (VSA) (1 mark)	Short Answer-1 (2 marks)	Short Answer –II (3 marks)	Long Answer (LA) (4 Marks)	Total Marks	% Weightage
1	<b>Remembering - (Knowledge based</b> Simple recall questions, to know specific facts, terms, concepts, principles, or theories; Identify, define, or recite, information)	1	2	2	3	23	26%
2	<b>Understanding- (Comprehension</b> -to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	1	1	2	14	16%
3	<b>Application</b> (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	<b>High Order Thinking Skills (Analysis &amp; Synthesis</b> - 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	<b>Creating, Evaluation and Multi-Disciplinary- - -</b> (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%
	<b>TOTAL</b>	4x1=4	6x2=12	10x3=30	11x4=44	<b>90</b>	<b>100%</b>

The question paper will include a section on Open Text based assessment (questions of 5 marks each from the syllabus-a total of 10 marks). The case studies will be supplied to students in advance. These case studies are designed to test the analytical and higher order thinking skills of students. \*One of the LA (4 marks) will assess the values inherent in the texts



S.NO	Month	Units / Chapters	Detailed Split-up Syllabus	Total No. of Periods
	<b>JULY</b>	<p><b>1. INTRODUCTION TO EUCLID'S GEOMETRY</b></p> <p><b>2. LINES AND ANGLES</b></p> <p><b>3. COORDINATE GEOMETRY</b></p>	<p><b>1. INTRODUCTION TO EUCLID'S GEOMETRY (6) Periods</b> History - Geometry in India and Euclid's geometry. 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, for example:  (Axiom) 1. Given two distinct points, there exists one and only one line through them.  (Theorem) 2. (Prove) Two distinct lines cannot have more than one point in common.</p> <p><b>2. LINES AND ANGLES (10) Periods</b>  1. (Motivate) If a ray stands on a line, then the sum of the two adjacent angles so formed is <math>180^\circ</math> 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 <math>180^\circ</math>.  6. (Motivate) If a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles</p> <p><b>Formative assessment-1</b></p> <p style="text-align: center;"> <math>4 \times 1 \text{ mark} = 4</math>  <math>4 \times 2 \text{ marks} = 8</math>  <math>4 \times 3 \text{ marks} = 12</math>  <math>4 \times 4 \text{ marks} = 16</math>  <i>Total 16 questions = 40 marks</i> </p> <p><b>3. COORDINATE GEOMETRY (9) Periods</b>  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 <math>ax + by + c = 0</math> by writing it as <math>y = m x + c</math>.</p> <p><b>Two skill based Math's Lab activities / Project</b></p>	<p>6</p> <p>10</p> <p>9</p>

S.NO	Month	Units / Chapters	Detailed Split-up Syllabus	Total No. of Periods
3	<b>AUGUST</b>	<b>1. AREAS</b>  <b>2. TRIANGLES</b>	<b>1. AREAS (4) Periods</b> Area of a triangle using Hero's formula (without proof) and its application in finding the area of a quadrilateral  <b>2. TRIANGLES (20) Periods</b> 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 Congruence). 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. . <b>Two skill based Math's Lab activities / Project</b>	4      15
4	<b>SEPTEMBER</b>	<b>1. TRIANGLES (contd.)</b>  <b>Revision for Summative Assessment -1</b>	<b>1. TRIANGLES (20) Periods contd.</b>  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  <b>Revision for Summative Assessment – I</b>	5     8

**Course Structure**  
**CLASS-IX**  
**TERM II**

<b>S.No</b>	<b>Unit No.</b>	<b>Topic</b>	<b>Weightage</b>
1	II	<b>ALGEBRA</b>	<b>16</b>
2	III	<b>GEOMETRY(CONTD)</b>	<b>38</b>
3	v	<b>MENSURATION(CONTD.)</b>	<b>18</b>
4	VI	<b>STATISTICS AND PROBABILITY</b>	<b>18</b>
		<b>Total</b>	<b>90</b>

**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. A Handbook for Designing Mathematics Laboratory in Schools - NCERT Publication
6. Laboratory Manual - Mathematics, secondary stage - NCERT Publication

**SYLLABUS/CURRICULUM  
MATHEMATICS (041)  
TERM II CLASS-IX**

S.NO	Month	Units / Chapters	<b>Detailed Split-up Syllabus</b> (Along with number of periods)	Total no. of Periods
1	October	<p><b>1.LINEAR EQUATIONS IN TWO VARIABLES</b></p> <p><b>2.Quadrilaterals</b></p>	<p><b>1. LINEAR EQUATIONS IN TWO VARIABLES (14) Periods</b> Recall of linear equations in one variable. Introduction to the equation in two variables. Prove that a linear equation in two variables has infinitely many solutions and justify their being written as ordered pairs of real numbers, plotting them and showing that they seem to lie on a line. Examples, problems from real life, including problems on Ratio and Proportion and with algebraic and graphical solutions being done simultaneously.</p> <p><b>2. QUADRILATERALS (10) Periods</b> 1. (Prove) The diagonal divides a parallelogram into two congruent triangles. 2. (Motivate) In a parallelogram opposite sides are equal, and conversely. 3. (Motivate) In a parallelogram opposite angles are equal, and conversely. 4. (Motivate) A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal. 5. (Motivate) In a parallelogram, the diagonals bisect each other and conversely. 6. (Motivate) In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and (motivate) its converse. <b>Two skill based Math's Lab activities / Project</b></p>	<p>14</p> <p>10</p>

	Nov emb er	1. CONSTRUCTIONS  2. AREA	<p><b>1. CONSTRUCTIONS (10) Periods</b></p> <ol style="list-style-type: none"> <li>1. Construction of bisectors of line segments and angles, <math>60^{\circ}</math>, <math>90^{\circ}</math>, <math>45^{\circ}</math> angles, etc., equilateral triangles</li> <li>2. Construction of a triangle given its base, sum/difference of the other two sides and one base angle.</li> <li>3. Construction of a triangle of given perimeter and base angles.</li> </ol> <p><b>2. AREA (4) Periods</b> Review concept of area, recall area of a rectangle.</p> <ol style="list-style-type: none"> <li>1. (Prove) Parallelograms on the same base and between the same parallels have the same area.</li> <li>2. (Motivate) Triangles on the same base and between the same parallels are equal in area and its converse</li> </ol>	10  4
S.NO	Mont h	Units / Chapters	<b>Detailed Split-up Syllabus</b> (Along with number of periods)	<b>Periods</b>
	Nov emb er	3. CIRCLES	<p><b>CIRCLES (15) Periods</b></p> <p>Through examples, arrive at definitions of circle related concepts, radius, circumference, diameter, chord, arc, subtended angle.</p> <ol style="list-style-type: none"> <li>1. (Prove) Equal chords of a circle subtend equal angles at the center and (motivate) its converse.</li> <li>2. (Motivate) The perpendicular from the center of a circle to a chord bisects the chord and conversely, the line drawn through the center of a circle to bisect a chord is perpendicular to the chord.</li> <li>3. (Motivate) There is one and only one circle passing through three given non-collinear points.</li> <li>4. (Motivate) Equal chords of a circle (or of congruent circles) are equidistant from the center(s) and conversely.</li> <li>5. (Prove) The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle.</li> <li>6. (Motivate) Angles in the same segment of a circle are equal.</li> <li>7. (Motivate) If a line segment joining two points subtends equal angle at two other points lying on the same side of the line containing the segment, the four points lie on a circle.</li> <li>8. (Motivate) The sum of the either pair of the opposite angles of a cyclic quadrilateral is <math>180^{\circ}</math> and its converse.</li> </ol> <p><b>Two skill based Math's Lab activities / Project</b></p>	15
	DEC EMB ER	1. PROBABILITY  2. SURFACE AREAS AND VOLUMES	<p><b>1. PROBABILITY (12) Periods</b></p> <p>History, Repeated experiments and observed frequency approach to probability. Focus is on empirical probability. (A large amount of time to be devoted to group and to individual activities to motivate the concept; the experiments to be drawn from real - life situations, and from examples used in the chapter on statistics).</p> <p><b>2. SURFACE AREAS AND VOLUMES (12) Periods</b></p> <p>Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones <b>Two skill based Math's Lab activities / Project</b></p>	12  5



	JAN UAR Y	1.SURFACE AREAS AND VOLUMES(contd.)	<p><b>1. SURFACE AREAS AND VOLUMES (12) Periods</b> Surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones</p> <p style="text-align: center;"><b>FORMATIVE ASSESEMENT -3</b></p> <p style="text-align: center;"><math>4 \times 1 \text{ mark} = 4</math>  <math>4 \times 2 \text{ marks} = 8</math>  <math>4 \times 3 \text{ marks} = 12</math>  <math>4 \times 4 \text{ marks} = 16</math>  <i>Total 16 questions = 40 marks</i></p>	<b>7</b>
S.N O	Mont h	Units / Chapters	<b>Detailed Split-up Syllabus</b> (Along with number of periods)	<b>Periods</b>
	JAN UAR Y	<b>STATISTICS</b>	<p><b>1. STATISTICS (13) Periods</b> Introduction to Statistics : Collection of data, presentation of data — tabular form, ungrouped / grouped, bar graphs, histograms (with varying base lengths), frequency polygons, qualitative analysis of data to choose the correct form of presentation for the collected data. Mean, median, mode of ungrouped data <b>Two skill based Math's Lab activities / Project</b></p>	<b>13</b>
	FEB	<b>OTBA REVISION FOR SA2</b>	<b>OTBA REVISION FOR SA2</b>	
	MAR CH	SA 2	SA 2	

**Three activities i.e. written assignments, Group projects and Math’s Lab. Activities will be common under the scheme of FA 2 and FA 4 in addition a teacher is free to conduct one meaningful activity .**

**CRITERIA FOR ASSESSING VARIOUS ACTIVITIES**

NAME OF THE ACTIVITY	CRITERIA FOR ASSESSMENT (OUT OF 10)
PROBLEM SOLVING, MCQ	Based on the correct answers
DATA HANDLING AND ANALYSIS	<ul style="list-style-type: none"> <li>✓ Collection of data – 03 marks</li> <li>✓ Representation of data – 03 marks</li> <li>✓ Interpretation of data – 03 marks</li> <li>✓ Timely submission – 01 mark</li> </ul>
INVESTIGATIVE PROJECTS	<ul style="list-style-type: none"> <li>✓ Neatness in presentation – 02 marks</li> <li>✓ Understanding the concept – 03 marks</li> <li>✓ Clarity of the concept – 03 marks</li> <li>✓ Timely submission – 02 marks</li> </ul>
MATHS LAB ACTIVITIES	<ul style="list-style-type: none"> <li>✓ Active participation – 03 marks</li> <li>✓ Presentation – 02 marks</li> <li>✓ Accuracy and inference – 02 marks</li> <li>✓ Viva – 02 marks</li> <li>✓ Completion of activity in time – 01 mark</li> </ul>
MODELS	<ul style="list-style-type: none"> <li>✓ Finishing – 03 marks</li> <li>✓ Description of the model – 03 marks</li> <li>✓ Viva – 02 marks</li> <li>✓ Timely submission – 02 marks</li> </ul>
GROUP PROJECTS	<ul style="list-style-type: none"> <li>✓ Active participation – 03 marks</li> <li>✓ Individual contribution – 03 marks</li> <li>✓ Viva – 02 marks</li> <li>✓ Team work – 01 mark</li> <li>✓ Timely submission – 01 mark</li> </ul>

PEER ASSIGNMENT	<ul style="list-style-type: none"> <li>✓ Active participation – 03 marks</li> <li>✓ Individual contribution – 03 marks</li> <li>✓ Viva – 02 marks</li> <li>✓ Team work – 01 mark</li> <li>✓ Timely submission – 01 mark</li> </ul>
PRESENTATION USING IT	<ul style="list-style-type: none"> <li>✓ Selection of presentation set up – 02 marks</li> <li>✓ Content relevance – 04 marks</li> <li>✓ Clarity in presentation – 02 marks</li> <li>✓ Timely submission – 02 marks</li> </ul>

**Note:** i) The above is only suggestive for a normal class

ii) Teacher can change the above criteria to suite their students level

iii) Teacher has to provide the objectives , method and evaluation criteria of the activity, to the students before conducting the activity.