Tamil Nadu Curriculum Framework 2025

Proposed Draft Syllabus, Pedagogical Approaches and Assessment Strategies

Mathematics – (Classes 9 and 10)

Mathematics education is vital in equipping all citizens with essential knowledge and skills, while developing the ability to think logically, critically and analytically in order to participate and thrive in the future economy and society.

Mathematical knowledge grows when we observe patterns, make predictions and test their correctness using logical thinking. This testing can be done either by proving an idea or citing an example showing its falsehood. Involving in mathematics requires creative thinking. Many mathematical problems can be solved in different ways. So, mathematics is seen as both an art and a science.

Although mathematics uses symbols and formal language, real understanding often begins only with simple ideas and informal thinking. Building strong intuition is an important part of learning mathematics, especially at the secondary level. At this stage, students further develop the ability to justify their ideas using logical reasoning. They also become more comfortable working with abstract concepts and develop core mathematical and computational skills, such as modelling, real-world situations and creating algorithms to solve problems.

The goals of secondary mathematics education are:

- To help all students gain enough mathematical understanding to use in daily life,
- To support students who have the interest and ability to learn mathematics more so that they can continue learning mathematics or related subjects in higher education.

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CG-1 Develops a comprehensive understanding of the real number system by identifying and classifying rational and irrational numbers, representing them on the number line, analyzing the relationship among them and performing operations accurately		
COMPETENCIES	**Contents**	
	Class -9	**Class - 10**
C 1.1 Identifies rational numbers, distinguishes between terminating and non-terminating recurring decimals and converts decimals into rational numbers and vice versa. C 1.2 Identifies and locates irrational numbers on the number line.	**REAL NUMBERS:** **Rational Numbers and Their Decimal Forms** ● Rational Numbers, Decimal Representation of rational Numbers (Terminating and Non-terminating recurring decimals) ● Denseness Property of Rational Numbers ● Conversion of Terminating decimals, Non-terminating and Recurring decimals into rational numbers and vice versa ● Finding the rational numbers between any two given rational numbers **Irrational Numbers** ● Represents Irrational Numbers such as $\sqrt{2}, \sqrt{3}$ on the number line using Pythagoras theorem. ● Decimal Representation to Identify Irrational Numbers $\sqrt{3} = 1.73$....) ● Euclid Division Algorithm – Statement only	

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C 1.3 Represents real numbers on the number line, understands relationship among numbers and performs basic operations on real numbers	• Fundamental theorem of Arithmetic – Statement only • $\sqrt{2}$ is an irrational number by established proven facts • Represents real numbers on the number line • Classifies and represents the real number system • Operations on Real Numbers.	
CG-2 Applies deductive and inductive reasoning to investigate, establish and justify mathematical relationship and theorems related to numbers, sequences and series.		
C 2.1 Arithmetic progressions by identifying the terms of an A.P, G.P and finding the common difference/common ratio. C 2.2 Applies appropriate formulae to find the sum of finite series including the sum of n terms of an A.P, G.P and special series.		**SEQUENCES AND SERIES** • Different kinds of patterns in sequence with examples • Terms, Common Difference and n^{th} term of an Arithmetic Progression(A.P) • Sum of first 'n' terms of A.P. • Sum of first n natural numbers • Sum of first n odd natural numbers • Terms, Common Ratio and n^{th} Term of a Geometric Progression (G.P) • Sum of the first n terms of a G.P

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CG-3 Understands and works with polynomials by classifying, operating, factorising and finding zeros.		
C 3.1 Classifies polynomials based on degree, number of terms and performs arithmetic operations on polynomials. C 3.2 Factorises polynomials up to degree 3 by algebraic identities and identifies factors	**POLYNOMIALS** ● Algebraic Expressions and Polynomials ● Polynomial in One Variable ● Standard Form of a Polynomial ● Degree of a Polynomial ● Basic arithmetic operations of Polynomials (Addition, Subtraction and Multiplication). ● Zeros of a Polynomial ● Linear relationship and its visualisation ● Slope as a Rate of Change ● Modelling linear growth and decay **ALGEBRAIC IDENTITIES** ● Product of Three Binomials $(x+a)\,(x+b)\,(x+c)$ ● Exploring the expansion of $(a+b+c)^2$, $(x+y)^3$, $(x-y)^3$ and factorization of x^3+y^3, x^3-y^3	**FACTORISATION:** ● Factorises polynomials up to degree 3 by algebraic identities and identifying numerical factors.

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CG-4 Solves and analyzes linear and quadratic equations, interprets the nature of roots and represents their graphical relationships		
C 4.1 Solves simultaneous linear equations in two variables and draws linear graphs using the coordinates of two points.	**LINEAR EQUATIONS** ● Formulate simultaneous linear equations in two variables from contextualised examples. ● Graphical representation of a pair of linear equations with different possibilities of solutions – (consistency /inconsistency) ● Methods of solving simultaneous linear equations (Substitution Method, Elimination Method) in two variable.	
C 4.2 Solves quadratic equations by finding roots (zeroes), forms quadratic equations, solves problems using appropriate methods and analyses the nature of roots. C 4.3 Draws and visualises the graph of quadratic polynomials.		**QUADRATIC EQUATIONS** ● Standard form of a Quadratic Equation ● Roots of Quadratic Equations ● Formation of a Quadratic Equation ● Solving Quadratic Equations by factorisation and quadratic formula ● Nature of Roots of a Quadratic Equation ● Relation between Roots and Coefficients of a Quadratic Equation ● Modelling quadratic growth and decay ● Draws the graph of a Quadratic polynomial and understands its relation to the nature of roots. ● Solves real life problems involving Quadratic Equations

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CG–5 Develops spatial visualization and deductive reasoning by constructing geometric figures, proving and applying theorems related to similarity, congruence, properties of triangles, parallelograms and circles.		
C 5.1 Proves theorems on Basic Proportionality, Angle Bisector and Pythagoras Theorems and applies them to solve problems. C 5.2 Proves the theorem on the diagonal of a parallelogram using congruent triangles. C 5.3 States the theorems on parallelogram and midpoint of triangle and understands visually.	**GEOMETRY** • Euclid's axioms **Lines and angles** • Pair of angles formed by Intersecting Lines, Adjacent angles, Linear pair, vertically opposite angles and its related theorems **Congruent Triangles** • Conditions for congruence of triangles and their proofs • Theorems on triangles **PROPERTIES OF QUADRILATERALS** • Types and properties of quadrilaterals (Recall) **State and Prove:** • A diagonal of a parallelogram divides it into two congruent triangles **Statement and application problems of the following theorems (Proof excluded):** • In a parallelogram, opposite sides and opposite angles are equal • The diagonals of a parallelogram bisect each other	**SIMILAR TRIANGLES** • Similarity, Similar triangles, Criteria of Similarity with their proof • Condition of similar triangles and applications of theorems on similar triangles **THEOREMS OF TRIANGLES** **State and Prove:** • Basic Proportionality Theorem (BPT) or Thales theorem, • Angle Bisector Theorem, • Pythagoras Theorem. **Statement of the following theorem (Proof excluded):** • Converse of the Basic Proportionality Theorem • Converse of Angle Bisector Theorem • Converse of Pythagoras Theorem

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	• Opposite sides of a parallelogram are congruent • Midpoint Theorem for a Triangle and its Converse	
C 5.4 Proves / visually proves theorems and converses on chords, angles in a circle, perpendiculars from the centre, equal chords and cyclic quadrilaterals.	**CIRCLE** **Basic Properties Of Circles** ● Circle through three points **Theorems On Chords Of a Circle** **To prove:** ● Equal chords of a circle subtend equal angles at the center and its converse (with visual proof). ● 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. **Statement and application problems of the following theorem (Proof excluded):** ● The perpendicular from the center of a circle to a chord bisects the chord and converse. ● Angles in the same segment of a circle are equal **THEOREM ON CYCLIC QUADRILATERAL:** **Statement and application problems of the following theorem (Proof excluded):** ● The sum of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.	

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C 5.5 Constructs and visualises, circumcentre, incentre and similar triangles. C 5.6 Constructs tangents to a circle using its centre and pair of tangents to a circle from an external point.	**PRACTICAL GEOMETRY** • Construction of the Circumcentre of a Triangle and the Circumcircle	**PRACTICAL GEOMETRY** • Construction of similar triangles **Circles And Tangents** • Construction of the Incentre of a Triangle and the Incircle • tangent to a circle and its related theorems
CG-6 Applies coordinate geometry concepts to determine distance, section and midpoint and computes areas of triangles and quadrilaterals using vertices in the Cartesian plane.		
C 6.1 Applies the Cartesian coordinate system to find the distance between two points, divide a line segment in a given ratio using the section formula and determine the midpoint of a line segment. C 6.2 Calculates area of a triangle and quadrilateral when the coordinates of their vertices are given.	**INTRODUCTION TO COORDINATE GEOMETRY** • Plotting the given points on a plane • Cartesian coordinates • Explores the formulae for distance between two points • Midpoint of a line segment • Section formulae.	**COORDINATE GEOMETRY** • Distance between any two points, Midpoint of a line segment, Section formulae (Recall) • Area of a triangle with given coordinates as vertices. • Area of a quadrilateral with given coordinates as vertices.

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CG–7 Understands and applies trigonometric ratios and identities to solve problems involving standard angles , heights and distances.		
C 7.1 Understands and applies trigonometric ratios and their reciprocals; calculates ratios for standard angles (0°, 30°, 45°, 60°, 90°) and complementary angles. C 7.2 Solves problems on heights and distances involving angles of elevation and depression using trigonometric ratios.		**INTRODUCTION TO TRIGONOMETRY** ● Trigonometric ratios and reciprocal ratios (i.e. sine, cosine, tangent, cosecant, secant and cotangent) ● Plotting the points on a unit circle. ● Trigonometric ratios of 45°, 30°, 60°, 0° and 90° ● Trigonometric ratios for complementary angles **TRIGONOMETRY AND ITS APPLICATION** ● Trigonometric Identities ($\sin^2 A + \cos^2 A = 1$; $1 + \tan^2 A = \sec^2 A$; $\cot^2 A + 1 = \text{cosec}^2 A$) ● Solves simple and daily life problems on heights and distances
CG–8 Applies area, Surface Area and volume formulas to compute measures of plane and solid figures and uses volume conservation to solve transformation problems		
C 8.1 Applies Heron's formula to calculate the areas of triangles and cyclic quadrilaterals.	**AREA** ● Circumference of a circle , length of an Arc ● Area of circle and sector. ● Application of Heron's Formula in finding area of triangle and Cyclic Quadrilaterals.	

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C 8.2 Calculates surface area and volume of cuboid, cube, cylinder, cone, sphere, hemisphere and combined solids.	**SURFACE AREA AND VOLUME** ● Surface Area and Volume of Cuboid, Cube, Cylinder and Cone.	**SURFACE AREA AND VOLUME** ● Surface Area and Volume of Sphere, Hemisphere. ● Volume of Combined Solids
CG–9 Analyzes data using measures of central tendency and dispersion and applies probability concepts to determine probabilities of outcomes of simple experiments.		
C 9.1 Calculates and interprets measures of central tendency and dispersion (range, variance and standard deviation) for grouped and ungrouped data. C9.2 Represents outcomes using tree diagrams and applies basic probability concepts to calculate the probabilities of events in simple experiments.	**MEASURES OF CENTRAL TENDENCY** ● Calculates the mean, median and mode for both grouped and ungrouped data using various methods	**MEASURES OF DISPERSION** ● Range ● Standard Deviation, Variance and their application **PROBABILITY** ● Random experiment and representation of outcomes using Tree diagram ● Concept and Definition of Probability ● Simple real-life problems involving single events

Pedagogical Approaches

Teaching mathematics at the secondary level requires approaches that help learners build deep conceptual understanding, develop logical reasoning and apply mathematical ideas in meaningful contexts. At this stage, students transition from concrete understanding to more abstract forms of thinking; therefore, pedagogy must support exploration, reasoning and communication in the classroom.

A mathematics classroom encourages students to recognise patterns, form conjectures and verify them through logical arguments. Learning experiences should be designed to promote active engagement rather than passive reception. Activity-based and experiential methods such as

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using manipulatives, geometric tools, models, data sets and real-life situation enable learners to construct mathematical ideas on their own. Such approaches not only strengthen understanding but also help students appreciate the relevance of mathematics in everyday life.

Problem-solving should be placed at the centre of mathematics instruction. Students should be encouraged to investigate problems, explore different strategies and justify their thinking. Opportunities for discovery, inquiry and guided exploration help them internalise mathematical concepts more effectively. Using multiple representations -verbal explanations, diagrams, graphs, algebraic expressions and symbolic notation helps students connect ideas and develop flexibility in thinking.

The use of technology is essential at the secondary stage. Tools such as dynamic geometry software, graphing utilities and simulations can make abstract concepts more accessible and promote inquiry-based learning.

Assessment Strategies

Assessment at secondary-level plays a crucial role in understanding students' conceptual understanding, procedural fluency, reasoning abilities and problem-solving skills. Effective assessment treats students' thinking, justification and application of mathematical concepts in varied concepts rather than assessing computational skills. A balance between formative and summative assessment supports deeper learning, sustained improvement and mathematical communication. Students should be encouraged to explain their reasoning verbally and in writing. Open-ended questions, proof-based tasks and justification prompts help teachers understand the depth of students' thinking.

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