Utsav Foundation

Session 2025-2026

Class 10 NIOS Mathematics Curriculum (120 Hours)

Total Marks: 100 | Passing Criteria: 33%

Course Structure

- **Total Hours: 120**
- **Total Chapters: 14**
- **Weekly Lessons: 3-4 hours (for a 30-week schedule)**
- **Assessment: Internal self-assessment + External 100-mark written exam**

Unit-Wise Curriculum Breakdown

Unit 1: Number System (8 Hours)

📌 **Topics Covered:**
✓ **Recall of Natural, Whole, and Rational Numbers**
✓ **Equivalent Forms of Rational Numbers**
✓ **Decimal Representation & Conversions**
✓ **Introduction to Irrational Numbers**

✍ **Activities & Self-Practice:**
🔹 **Number line representation, solving rational number problems**

Unit 2: Exponents and Radicals (8 Hours)

📌 **Topics Covered:**
✓ **Exponential Notation & Laws of Exponents**
✓ **Negative and Integral Exponents**
✓ **Introduction to Surds & Rationalization**

✍ **Activities & Self-Practice:**
🔹 **Simplifying expressions using exponent rules**

Unit 3: Algebraic Expressions and Polynomials (10 Hours)

📌 **Topics Covered:**
✓ **Basics of Algebra, Variables & Constants**

✓ Polynomial Degree, Zeroes, and Factorization
✓ Addition, Subtraction & Multiplication of Polynomials

✍ Activities & Self-Practice:
◈ Polynomial evaluations and simplifications

Unit 4: Special Products and Factorization (10 Hours)

📌 Topics Covered:
✓ Special Product Formulas ($a^2 - b^2$, $(a + b)^2$)
✓ HCF & LCM of Polynomials
✓ Rational Expressions

✍ Activities & Self-Practice:
◈ Factoring quadratic expressions

Unit 5: Linear Equations (10 Hours)

📌 Topics Covered:
✓ Solving Equations in One & Two Variables
✓ Graphing Linear Equations
✓ Application-Based Word Problems

✍ Activities & Self-Practice:
◈ Solving real-life problems with linear equations

Unit 6: Quadratic Equations (10 Hours)

📌 Topics Covered:
✓ Standard Form of Quadratic Equations
✓ Factorization & Quadratic Formula
✓ Word Problems on Quadratic Equations

✍ Activities & Self-Practice:
◈ Solving quadratic equations using different methods

Unit 7: Arithmetic Progression (8 Hours)

📌 Topics Covered:
✓ Definition of AP & Common Difference
✓ nth Term & Sum of First n Terms

✍ **Activities & Self-Practice:**

🔹 **Solving sequence-based problems**

Unit 8: Percentage & Its Applications (8 Hours)

📌 **Topics Covered:**

✓ **Conversion between Fraction, Decimal & Percentage**

✓ **Percentage-Based Profit, Loss & Discounts**

✍ **Activities & Self-Practice:**

🔹 **Real-life percentage calculations**

Unit 9: Installment Buying (5 Hours)

📌 **Topics Covered:**

✓ **Basic Terms in Installment Schemes**

✓ **Calculating Interest, Total Installments & Cash Price**

✍ **Activities & Self-Practice:**

🔹 **EMI calculations for different interest rates**

Unit 10: Lines and Angles (8 Hours)

📌 **Topics Covered:**

✓ **Angle Pair Properties**

✓ **Types of Triangles & Their Properties**

✍ **Activities & Self-Practice:**

🔹 **Solving angle-related problems in triangles**

Unit 11: Coordinate Geometry (9 Hours)

📌 **Topics Covered:**

✓ **Cartesian Plane & Plotting Points**

✓ **Distance & Section Formula**

✓ **Triangle Centroid Calculation**

✍ **Activities & Self-Practice:**

🔹 **Finding midpoints and centroids**

Unit 12: Perimeters and Areas (10 Hours)

📌 **Topics Covered:**
✓ **Areas of Quadrilaterals, Triangles & Circles**
✓ **Heron's Formula**
✓ **Composite Figures**

✍ **Activities & Self-Practice:**
🔹 **Real-life area calculations**

Unit 13: Surface Area & Volume (10 Hours)

📌 **Topics Covered:**
✓ **Surface Area & Volume of Cubes, Cylinders, Cones & Spheres**

✍ **Activities & Self-Practice:**
🔹 **Comparing volumes of different shapes**

Unit 14: Data Representation (6 Hours)

📌 **Topics Covered:**
✓ **Collection, Organization & Representation of Data**
✓ **Graphs & Cumulative Frequency**

✍ **Activities & Self-Practice:**
🔹 **Graphical representation of data**

Assessment & Exam Structure (100 Marks)

Question Type	Marks
Multiple Choice Questions (MCQs)	20
Very Short Answer (VSA)	15
Short Answer (SA)	25
Long Answer (LA)	25
Very Long Answer (VLA)	15

✓ **Total Marks: 100**
✓ **Passing Marks: 33**

Why is this Curriculum Effective?

✅ **Balanced Time Allocation - More complex topics get more time.**
✅ **Practical Applications - Real-world problem-solving activities.**
✅ **Engaging Learning - Includes self-assessment, exercises & graphs.**
✅ **Comprehensive Evaluation - Covers all question types fairly.**

Utsav Foundation

Session 2025-2026

Class 10 NIOS Mathematics Syllabus (120 Hours, 100 Marks, Passing 33%)

Unit-Wise Breakdown

Unit No.	Chapter Name	Topics Covered	Hours Allocated
Unit 1	Number Systems	Natural, Whole, and Rational Numbers, Decimal Representation, Rationalization, Irrational Numbers	8 Hours
Unit 2	Exponents & Radicals	Laws of Exponents, Surds, Operations & Rationalization of Surds	8 Hours
Unit 3	Algebraic Expressions & Polynomials	Variables & Constants, Degree & Zero of a Polynomial, Operations on Polynomials	10 Hours
Unit 4	Special Products & Factorization	Algebraic Identities, Factorization, HCF & LCM of Polynomials	10 Hours
Unit 5	Linear Equations	Equations in One & Two Variables, Graphical Solutions, Word Problems	10 Hours

Unit 6	**Quadratic Equations**	**Standard Form, Solution Methods (Factorization, Quadratic Formula), Word Problems**	**10 Hours**
Unit 7	**Arithmetic Progressions**	**Number Patterns, General (nth) Term, Sum of First n Terms, Applications**	**8Hours**
Unit 8	**Percentage & Applications**	**Conversions (Fraction, Decimal, Percentage), Profit & Loss, Discounts**	**8 Hours**
Unit 9	**Installment Buying**	**Concept of Installments, Interest Calculation, Compound Interest**	**5 Hours**
Unit 10	**Lines & Angles**	**Types of Angles, Properties of Triangles, Transversals & Parallel Lines**	**8 Hours**
Unit 11	**Coordinate Geometry**	**Cartesian Plane, Distance Formula, Section Formula, Midpoint Theorem**	**9 Hours**
Unit 12	**Perimeters & Areas of Plane Figures**	**Triangles, Quadrilaterals, Circles, Heron's Formula, Compound Figures**	**10 Hours**
Unit 13	**Surface Areas & Volumes of Solid Figures**	**Cube, Cuboid, Cylinder, Cone, Sphere - Surface Area & Volume**	**10 Hours**
Unit 14	**Data Representation (Statistics)**	**Collection & Organization, Graphical Representation, Mean, Median, Mode**	**6 Hours**
Total			**120 Hours**

Evaluation Scheme (100 Marks, 3 Hours Exam)

Question Type	**Marks**	
Multiple Choice Questions (MCQs)	**20**	
Very Short Answer Questions	**15**	
Short Answer Questions	**25**	
Long Answer Questions	**25**	

Very Long Answer Questions	**15**	
Total Marks	**100**	
Passing Marks (33%)	**33**	

Passing Marks (33%)	**33**

SCHEME OF EVALUATION

Subject: Mathematics
Total Marks: 100
Exam Duration: 3 Hours
Passing Marks: 33

Question Paper Structure

Question Type	No. of Questions	Marks per Question	Total Marks		
Multiple Choice Questions (MCQs)	**10**	**2**	**20**		
Very Short Answer (VSA)	**5**	**3**	**15**		
Short Answer (SA)	**5**	**5**	**25**		
Long Answer (LA)	**3**	**8**	**24**		
Very Long Answer (VLA)	**2**	**8**	**16**		
Total	**25 Questions**	**-**	**100 Marks**		

Details of Question Types

◈ Multiple Choice Questions (MCQs) – 20 Marks

- **10 questions, each carrying 2 marks.**
- **Covers basic concepts and fundamental understanding.**

◈ Very Short Answer (VSA) – 15 Marks

- **5 questions, each carrying 3 marks.**
- **Requires one-word or one-line answers.**

◈ Short Answer (SA) – 25 Marks

- **5 questions, each carrying 5 marks.**
- **Involves step-wise calculations and concept application.**

◈ Long Answer (LA) – 24 Marks

- **3 questions, each carrying 8 marks.**
- **Requires detailed explanation and logical reasoning.**

🔷 Very Long Answer (VLA) – 16 Marks

- **2 questions, each carrying 8 marks.**
- **Includes case-based or real-life application problems.**

Passing Criteria

✓ Minimum Marks to Pass: 33 out of 100

✓ Step-wise marking will be followed for all questions except MCQs.

This structure ensures a balanced assessment of conceptual knowledge, practical application, and problem-solving skills.

Mathematics

Code No. 211

Introduction

Mathematics is the study of numbers, counting, and measuring, but that is only the beginning. Mathematics involves the study of number patterns and relationships, too. It is also a way to communicate ideas, and perhaps more than anything, it is a way of reasoning that is unique to human beings. Mathematics plays a vital role in the modernization of this civilization. It is everywhere and affects the everyday lives of people. Although it is abstract and theoretical knowledge, it emerges from the real world. It is also a way to communicate and analyze ideas, a tool for organizing and interpreting data and above all, perhaps, a method of logical reasoning unique to man. Mathematics is a necessary part of other sciences. Its use in today's world has assumed great importance, since without its application higher technology cannot be mastered and harnessed for increasing production of goods and services and promoting human welfare. Over the centuries there has been spectacular progress in the development of Mathematics as a branch of knowledge. Mathematics education is concerned with the acquisition, understanding and application of skills. Mathematical literacy is of central importance in providing the learner with the necessary skills to live a full life as a child and later as an adult.

Rationale

Mathematics is an important discipline of learning at the secondary stage. It helps the learners in acquiring decision-making ability through its applications to real life both in familiar and unfamiliar situations. It predominantly contributes to the development of precision, rational and analytical thinking, reasoning and scientific temper. Mathematics helps the learner to understand and solve the day to day life problems faced by them. It also helps them to acquire the skill of representing data in the form of tables/graphs and to draw conclusions from the same. One of the basic aims of teaching Mathematics at the Secondary stage is to inculcate the skill of quantification of experiences around the learner. The idea is to allow the learner to realize how and why Mathematics is all around us.

The present curriculum in Mathematics includes the appreciation of the historical development of mathematical knowledge with special reference to the contribution of Indian mathematicians particularly in the introduction of zero and the decimal system of numeration in the international form (popularly known as Hindu – Arabic numerals). Greater emphasis has been given on applications of various concepts so that learner can construct their own knowledge and relate mathematics to their life experiences.

Objectives

After completing this course, learner will be able to:

- **describe basic concepts, facts, principles, terms, symbols and processes of Mathematics;**
- **convert the word problems in to the mathematical forms and solve them;**
- **explain different ways of processing the given data and help them in arriving at conclusions;**
- **express the skills of quantification of experiences around them and make linkage with their life;**
- **solve wide variety of mathematical problems in daily life and reflect in different context of learning;**
- **relate mathematical knowledge and skills to solve variety problems and develop positive attitude towards Mathematics and its application;**
- **interpret tabular/graphical representation of the quantitative data ; and**
- **articulate logically and use the quantitative data to find many results;**

Scope and job opportunity

This field has a large number of opportunities for employment in different profession, some of these are: Engineering, Architecture, Statisticians, Banking, Econometrics and other professions involves Measurement and Calculation.

Eligibility conditions

Age: 14 years

Qualification: Ability to read and write

Medium of instruction: Hindi, English, Urdu, Marathi, Telugu, Gujarati, Malayalam, Tamil and Odia medium.

Duration of the course: 1 Year

Weightage Theory: 85

Marks Practical:15

Marks

Tutor Marked Assignment (TMA): 20% Marks of the theory

Scheme of studies: 240 hours for the theory and 60 hours practical work, TMA (self paced)

Scheme of evaluation

Mode of evaluation	Duration	Weightage
Tutor Marked Assignment (TMA)	Self Paced	20% of Theory
Public/Final Examination	Theory- 2 Hours 30 Minutes	85 Marks
	Practical- 3 Hours	15 Marks

Pass criteria: 33% marks

Course content

S. No.	Module/Topics	Duration (in hours)	Module Approach/Description	Weightage (marks)
1	**Module-IAlgebra** **1. Number System** **2. Exponents and Radicals** **3. Algebraic expressions and Polynomials** **4. Special Products and factorization** **5. Linear Equations** **6. Quadratic Equations** **7. Arithmetic Progressions**	**55**	**Algebra is generalized form of arithmetic. It may be recalled that the study of numbers begin with natural numbers without which we would not be able to count. The system of natural numbers is extended to rational number system. To be able to measure all lengths in terms of a given unit, the rational numbers have to be extended to real numbers. The concept of exponents and radicals would facilitate simplification of repeated multiplication.** **Algebraic expressions and polynomials would be introduced with the help of four fundamental operations on unknowns. Equating two algebraic expressions or polynomials leads to equations. The study of linear and quadratic equations would be taken up to solve problems of daily life. Arithmetic Progression is a special type of number pattern. The learners would be studying arithmetic progressions in details through day-to-day life examples.**	
2.	**Module-IICommercial Mathematics** 8. **Percentage and its Applications** 9. **Instalment Buying**	**25**	**The learners would be acquainted with applications of percentage to compound interest in the form of rate of growth (appreciation) and depreciation (decay) in detail. The Concept of Percentage, Computations involving percentage.**	08

			Applications of percentage to: profit and loss, simple interest, discount (single discount only), and compound interest. Buying under instalment plan. Calculation of interest under instalment plan has been discussed in this module.	
3.	**Module-III Geometry** 10. **Lines and Angles** 11. **Congruence of Triangles** 12. **Concurrent Lines** 13. **Quadrilaterals** 14. **Similarity of Triangles** 15. **Circles** 16. **Angles in a circle and Cyclic Quadrilaterals** 17. **Secants, Tangents and their Properties** 18. **Constructions** 19. **Co-ordinate Geometry**	**75**	**To satisfy the learner's curiosity and to enhance knowledge about the above things, the lessons on Lines and Angles, congruent and similar triangles and circles will be introduced. Some of the important results dealing with above concepts would be verified experimentally while a few would be proved logically. Different types of quadrilaterals would also be introduced under the lessons on Quadrilaterals.The learners would also be given practice to construct some geometrical figures using geometrical instruments. In order to strengthen knowledge of graphing linear equations, the basic concept of coordinate geometry has been introduced.**	**25**
4.	**Module-IV Mensuration** 20. **Perimeter and Area of Plane Figures** 21. **Surface Area and Volume of Solid Figures**	**25**	**In this module the learners would be familiar with rectilinear figures. Perimeter and area of a square, rectangle, triangle, trapezium, quadrilateral, parallelogram and rhombus. Area of a triangle using Hero's formula. Area of rectangular paths. Non rectilinear figures: Circumference and area of a circle. Area and perimeter of a sector. Area of circular paths. Surface area and volume of a cube, cuboid, cylinder, cone, sphere and hemisphere.**	**10**

5.	**Module-VTrigonometry** 22. **Introduction to Trigonometry** 23. **Trigonometric Ratios of some Special Angles**	**25**	**In astronomy one often encounters the problems of predicting the position and path of various heavenly bodies, which in turn requires the way of finding the remaining sides and angles of a triangle provided some of its sides and angles are known. The solutions of these problems has also numerous applications to engineering and geographical surveys, navigation etc. An attempt has been made in this module to solve these problems. It is done by using ratios of the sides of a right triangle with respect to its acute angle called trigonometric ratios. The module will enable the learners to find other trigonometric ratios provided one of them is known. It also enables the learners to establish well known identities and to solve problems based on trigonometric ratios and identities.** **The learners would be acquainted with measurement of accessible lengths and heights. The learners will be able to distinguish between angles of elevation and depression and use trigonometric ratios for solving simple real life problems based on heights and distances.**	10
6.	**Module-VI Statistics** 24. **Data and their Representations** 25. **Measures of Central Tendency** 26. **Introduction to Probability**	**35**	**To make the learners acquainted with the methods of recording, presentation of data, condensing and culling out relevant information from the given data in the lesson on Data and their Representation. Sometimes it is required to describe data arithmetically like average age**	12

			of a group median score of a group or modal collar size of a group. To be able to do this, the learners would be introduced to the lesson on Measures of Central Tendency. They would also be taught characteristics and limitation of these measures.The learners would be introduced to the study of elementary probability as measure of uncertainty, through games of chance- tossing a coin, throwing a die, drawing a card at random from a well shuffled pack etc.	
7.	**Practicals**	**60**	**As activities make the learning more effective; Laboratory manual is also provided with 30 mathematical activities from Algebra, Geometry and Mensuration module. It is expected that learners would perform these activities at their study centres, which will make learning of mathematical concepts more interesting and, a fun.**	**15**

Mathematics (211) Bifurcation of Syllabus Module I TMA (40% of Syllabus) II Public Examination (60% of syllabus) (10 Lessons) (16 Lessons) Module-I Algebra (7 Lesson) 1. Number system 2. Exponent and Radicals 3. Algebraic Expression and Polynomials 4. Special Product and Factorisation 5. Linear Equation 6. Quadratic Equation 7. Arithmetic Progression Module-II Commercial Mathematics (2 Lesson) 8. Percentage and its Applications 9. Installment Buying Module-III Geometry (10 Lesson) 10. Lines and Angle 11. Congruence of Triangle 12. Concurrent Lines 13. Quadrilaterals 14. Similarity of Triangle 15. Circle 16. Angle in a Circle and Cyclic Quadrilaterals 17. Secants, tangents and their Properties 18. Constructions 19. Co-ordinate Geometry Module-IV Mensuration (2 Lesson) 20. Perimeter and Area of Plane Figure 21. Surface Area and Volume Module-V Trigonometry (2 Lesson) 22. Introduction to Trigonometry 23. Trigonometric Ratio of Some Special Angle Module-VI Statistics (3 Lesson) 24. Data and their Representation 25. Measure of Central Tendency 26. Introduction to Probability

Materials Required: Sheets of paper of different Colours, Glazed paper scales, Wooden boards, Nails, Threads, Thermo cole piece, Cardboard square and Triangular grids, Pins and Clips, Wooden and paper strip, Cutter (paper), Scissor, Adhesive/fevicol, sketch pen, Gun geometry box (Bigger – Wooden), Graph paper (inches/cm both, Pencils of different colours, Colour box, Knobs, Tracing paper Human Resoure: It is desirable to have a laboratory assistant (with mathematics background), in charge of the mathematical lab. He expected to have special skills required to handle different instruments, needed for practical work. He should be able to repair things, if they are not in order and keep the materials ready for carrying out activities in the following days. Time – Desired: 15% to 20% of total time for mathematics syllabus to be devoted to mathematics laboratory. Scheme of Evaluation: 15 marks The division of marks in the examination can be done as follows:

Activity Assessment of Activity Performed/Records of activities prepared Viva – voce Total i) ii) Mark 10 5 15 The proposed practical test is suggested to be held at least 15 days before the theory examination. Every students may be given two activities out of which he has to select one and perform it these (in case, the students not comfortable with the given activities, he may be allowed to select one activity of his choice) iii) Viva-voce can be done at the examination centre by asking questions related to the activity/project he/she has done. S.No. List of Activities Verification of the identities (1 to 4)

1. $(a+b)2 = a2 + 2ab + b2$

2. $(a-b)\ 2 = a2 - 2ab + b2$

3. $(a2-b2) = (a +b)\ (a-b)$

4. $(a+b)3 = a3 + b3 +3a2b+3ab2$

5. To find the HCF of two given numbers by division method.

6. Equivalent fractions

7. To verify that a linear equation in two variables has infinite number of solutions.

8. To find the condition for consistency of a system of linear equations.

9. To verify the relation between roots and coefficients of a quadratic equation.

10. To verify graphically that a quadratic polynomial can have at most two zeroes.

11. To verify that a given sequence is an A.P.

12. To find the sum of first n odd natural numbers.

13. To find the sum of first n natural numbers.

14. To find the sum of first n terms of an arithmetic progression.

15. To verify that the sum of the angles of a triangle is 180o

16. To verify that the angles opposite to equal sides of a triangle are equal.

17. To verify mid point theorem.

18. To verify basic proportionality theorem.

19. To verify Pythagoras theorem.

20. To verify the relation between the ratio of areas of two similar triangles and their sides.

21. To find the area of a circle.

22. To demonstrate that the opposite angles of a cyclic quadrilateral are supplementary.

23. To verify that the equal chords of congruent circles subtend equal angles at the centre.

24. To find the area of a trapezium.

25. To find the total surface area of a cube.

26. To find the formula for the curved surface area of a cone. 27. To find the relationship among the volumes of right circular cone, right circular cylinder and a hemisphere of same radius and same height.

28. To verify the identity a3 - b3=(a-b)(a2 + ab + b2)

29.To draw a triangle equal in area to parallelogram .

30.To find the incentre of different types of triangles.