UTSAV FOUNDATION

NIOS BOARD Mathematics Curriculum

Class: IX, X & XII

Rationale

Mathematics forms the active, changing experiences that we have in our everyday lives-in context of technology, travel, health care our education etc. To make every citizen equipped with the mathematical temperament, it is imperative to include Mathematics as a subject of study for all. This will take the learners towards a healthy and productive life.

Due to the rapid development in fields of technology and mathematical knowledge, many mathematical principles have become our everyday need, therefore, it is very difficult to navigate in today's world without knowledge about these. Indeed, mathematical knowledge is the knowledge that opens the vistas of the new age for us. In formal schools Mathematics is taught as a compulsory subject till the secondary level and NIOS aims to provide all its learners with equivalent knowledge of Mathematics. This course of Mathematics subject in Open Basic Education (OBE) programmed at level 'C' has been designed to not only endow learners with basic mathematical concepts related to the subject but also to enable them in developing a mathematical outlook towards their society, environment, customs and culture.

Mathematics also develops questioning attitude in learners asking how? And why? Is very important part of mathematical study. This course is also meant to inspire learners into adopting questioning attitude, critical thinking and employing scientific methods and analysis in solving problems. This course will also make the learners aware of importance of the natural resources, their usages and conservation for next generations. The present course also focuses on the process of learning so that the learners are able to develop skills and creativity required for further studies in Mathematics. This course includes information on the principles of mathematics and mathematical study. It also describes the contributions made by various mathematicians from India and abroad to various fields of mathematical study.

Prerequisites for the course

Before entering this course, this learner is expected to have knowledge of certain important terms like educational, ingredient, process/ reaction, historical, environmental and morals in scientific way. To accomplish this learner are expected to have completed OBE 'B' level course of NIOS or equivalent from any other recognized board in India.

Objectives

Science endeavors to understand the linear as well as non-linear and complex processes of nature. It also attempts to describe the nature and its processes and project future of natural

phenomena on the basis of what is being observed today. Study of Science equips the learner with the attitude, training and skills to seek, find and process the truth.

General Objectives

After completing this course successfully, the learner will be able to

1. Explain about the mathematical principles and basics

2. Establish the importance of mathematical temperament for individual and society.

3. Describe the history and evolution of mathematics as a subject (especially in context of India) and look at it as a career option

4. Describe the conceptual principles and practical usages of these principles.

5. Review the creativity, natural curiosity and aesthetics in study of mathematics

6. Develop mathematical outlook as well as moral values

Specific Objectives

After completing this course successfully, the learner will be able to:-

- Describe various types of numbers like whole number, natural number, integers, Prime number Rational numbers & irrational numbers.
- Identify different types of Quadrilaterals
- Give examples of different types of Geometrical shapes like Square, rectangle, Triangle, Rhombus & parallelogram
- Explain various types of graphs like bar graph, Histogram & Pie chart
- Describe the square of number & their square roots
- Describe cubes of number & their cube roots
- Discuss the concept of Percentage, Profit & Loss, Discount, various types of Taxes & Compound interest
- Explain Algebraic Expressions & various types of identities which is helpful to solve the algebraic Expression
- Explain the various types of solid shapes like Cylinder, Cube, Cuboid & Sphere.
- Determine the various types of 2-D & 3-D shapes Area, Perimeter & volume by using their formula. Describe various types of Laws of Exponents & also solve questions by using these identities
- Explain direct & inverse proportion by using various Examples of daily life.
- Determine factors of various Algebraic Expressions using different-different types of method.

- Determine division of Algebraic Expressions.
- Describe various types of Graphs & also find co-ordinates using graph.
- Describe representation of data mathematically & graphically

Brief Description of the Course

This course has been divided into 16 chapters. The time taken to cover the whole course is 100 hours divided in 40 minutes period per day. The chronology of Chapters is as following-

NIOS Mathematics Syllabus for Class 10

Topics Covered

Chapter 1 (Number Systems)

Sub topics:-

RECALL OF NATURAL NUMBERS, WHOLE NUMBERS AND INTEGERS, RATIONAL NUMBERS, EQUIVALENT FORMS OF A RATIONAL NUMBER. RATIONAL NUMBERS ON THE NUMBER LINE, COMPARISON OF RATIONAL NUMBERS, FOUR FUNDAMENTAL OPERATIONS ON RATIONAL NUMBERS, DECIMAL REPRESENTATION OF A RATIONAL NUMBER, EXPRESSING DECIMAL EXPANSION OF A RATIONAL NUMBER IN p/q FORM, IRRATIONAL NUMBERS, INADEQUACY OF RATIONAL NUMBERS, FINDING IRRATIONAL NUMBER BETWEEN TWO GIVEN NUMBERS. ROUNDING OFF NUMBERS TO A GIVEN NUMBER OF DECIMAL PLACES.

Chapter 2 (Exponents And Radicals)

Sub topics:-

EXPONENTIAL NOTATION, PRIME FACTORISATION, LAWS OF EXPONENTS, NEGATIVE INTEGERS AS EXPONENTS, LAWS OF EXPONENTS FOR INTEGRAL EXPONENTS, MEANING OF 2P/4, SURDS, PURE AND MIXED SURD, ORDER OF A SURD, LAWS OF RADICALS, LAWS OF SURDS, SIMILAR (OR LIKE) SURDS, SIMPLEST (LOWEST) FORM OF A SURD, FOUR FUNDAMENTAL OPERATIONS ON SURDS, COMPARISON OF SURDS, RATIONALISATION OF SURDS

Chapter 3 (Algebraic Expressions and Polynomials)

Sub topics:-

INTRODUCTION TO ALGEBRA, VARIABLES AND CONSTANTS, ALBEGRAIC EXPRESSIONS AND POLYNOMIALS, DEGREE OF A POLYNOMIAL, EVALUATION OF POLYNOMIALS, ZERO OF A POLYNOMIAL, ADDITION AND SUBTRACTION OF POLYNOMIALS, MULTIPLICATION OF POLYNOMIALS, DIVISION OF POLYNOMIALS

Chapter 4 (Special Products. and Factorization)

Sub topics:-

SPECIAL PRODUCTS, SOME OTHER SPECIAL PRODUCTS, FACTORIZATION OF POLYNOMIALS, HCF AND LCM OF POLYNOMIALS, RATIONAL EXPRESSIONS OPERATIONS ON RATIONAL EXPRESSIONS

Chapter 5 (Linear Equations)

Sub topics:-

LINEAR EQUATIONS, FORMATION OF LINEAR EQUATIONS IN ONE VARIABLE, SOLUTION OF LINEAR EQUATIONS IN ONE VARIABLE. WORD PROBLEMS, LINEAR EQUATIONS IN TWO VARIABLES, GRAPH OF A LINEAR EQUATION IN TWO VARIABLES, SYSTEM OF LINEAR EQUATIONS IN TWO VARIABLES, WORD PROBLEMS

Chapter 6 (Quadratic Equations)

Sub topics:-

QUADRATIC EQUATIONS, STANDARD FORM OF A QUADRATIC EQUATION, SOLUTION OF A QUADRATIC EQUATION, WORD PROBLEMS

Chapter-7 (Arithmetic Progressions)

Sub topics:-

SOME NUMBER PATTERNS, ARITHMETIC PROGRESSION GENERAL (nth) TERM OF AN AP, SUM OF FIRST nth TERMS OF AN AP.

Chapter 8 (Percentage and its Applications)

Sub topics:-

PERCENT, CONVERSION OF A FRACTION INTO PERCEN AND VICE VERSA, CONVERSION OF DECIMAL INTO A PERCENT AND VICE VERSA, CALCULATION OF PERCENT OF A QUANTITY OR A NUMBER, APPLICATION OF PERCENTAGE

Chapter 9 (Installment Buying)

Sub topics:-

INSTALMENT BUYING SCHEME-SOME DEFINITIONS, TO FIND THE INTEREST IN AN INSTALMENT PLAN, TO FIND THE AMOUNT OF INSTALMENT, TO FIND CASH PRICE, PROBLEMS INVOLVING COMPOUND INTEREST,

Chapter 10 (Lines And Angles)

Sub topics:-

POINT, LINE AND ANGLE, PAIRS OF ANGLES, TRIANGLE, ITS TYPES AND PROPERTIES, LOCUS,

Chapter 11(Co-ordinate Geometry)

Sub topics:-

CO-ORDINATE SYSTEM, CO-ORDINATES OF A POINT, QUADRANTS, PLOTTING OF A POINT WHOSE CO- ORDINATES ARE GIVEN, DISTANCE BETWEEN TWO POINTS, SECTION FORMULA, CENTROID OF A TRIANGLE

Chapter 12 (Perimeters And Areas of Plane Figures)

Sub topics:-

PERIMETERS AND AREAS OF SOME SPECIFIC QUADRILATEALS AND TRIANGLES, HERON'S FORMULA, AREAS OF RECTANGULAR PATHS AND SOME RECTILINEAR FIGURES, AREAS OF CIRCLES AND CIRCULAR PATHS, PERIMETER AND AREA OF A SECTOR AREAS OF COMBINATIONS OF FIGURES INVOLVING CIRCLES.

Chapter13 (Surface Areas And Volumes of solid Figures)

Sub topics:-

MEANINGS OF SURFACE AREA ,VOLUME, CUBOIDS AND CUBES. RIGHT CIRCULAR CYLINDER, RIGHT CIRCULAR CONE, SPHERE.

Chapter 14(Data and their representations)

Sub topics:-

STATISTICS AND STATISTICAL DATA, COLLECTION OF DATA, PRESENTATION OF DATA, CUMULATIVE FREQUENCY TABLE, GRAPHICAL REPRESENTATION OF DATA

Scheme of Study

This course is essentially for self-study. The course material has been designed keeping in mind the social, psychological & intellectual conditions of the learners. At the end of each article, Exercise related to the lesson are given, so that learners are able to understand concepts as well as learn to express them. Learners also have the option to attending contact classes at their AAs, learners will be able to clarify any subject related doubts in these sessions and discuss difficult topics with their peer group. Learners can also clarify their subject related problems at the literacy center and adult education center.

Scheme of Evaluation

1 Self-Assessment

Learner can keep doing their evaluation throughout the course. For this purpose, a practice paper is provided after every lesson, which contains questions related to the lesson. Learners can answer these questions and then evaluate their answers by looking at the correct answers provided at the end. This is the self-evaluation method adopted for this course.

2 External Assessment

After completing the course, the learner will appear for external evaluation. The method for this evaluation is written examination, which will consist of 100 marks. The duration of this exam will be three hours and question paper will comprise questions based on lessons and concepts in them. The questions will be objective type, very short answer type, & short answer type