

GURU HARKRISHAN PUBLIC SCHOOLS, NEW DELHI

SUBJECT: STANDARD MATHEMATICS (041)

DIVISION OF SYLLABUS SESSION 2022-2023

CLASS XII

Books - Mathematics, XII, Part I- By NCERT

- Mathematics, XII, Part II- By NCERT

Month-wise Distribution of Syllabus

APRIL-2022 & MAY-2022	CH-1 RELATIONS & FUNCTIONS CH-2 INVERSE TRIGONOMETRIC FUNCTIONS CH-3 MATRICES CH-4 DETERMINANTS
JULY-2022	CH-5 CONTINUITY & DIFFERENTIABILITY CH-6 APPLICATION OF DERIVATIVES
AUGUST-2022	CH-7 INTEGRALS CH-8 APPLICATIONS OF INTEGRALS
SEPTEMBER-2022	CH-9 DIFFERENTIAL EQUATIONS CH-10 VECTOR ALGEBRA
OCTOBER-2022	CH-11 3-D GEOMETRY CH-12 LINEAR PROGRAMMING PROBLEMS
NOVEMBER-2022	CH-13 PROBABILITY

Unit-wise Distribution of Syllabus

S.No	Month	Test	Chapter
➤	July 2022	Unit Test-I 25 Marks	➤ MATRICES (CH-3) ➤ DETERMINANTS (CH-4)
➤	Aug 2022	Unit Test-II 25 Marks	➤ CONTINUITY & DIFFERENTIABILITY (CH-5) ➤ APPLICATION OF DERIVATIVES (CH-6)
➤	Sept 2022	Terminal-I 80 Marks	➤ CH-1 TO CH-6 ➤ INTEGRALS (CH-7) ➤ APPLICATION OF INTEGRALS (CH-8)
➤	Nov/Dec 2022	Pre-Board-I 80 Marks	➤ FULL SYLLABUS
➤	Dec-22/ Jan 23	Pre-Board-II 80 Marks	➤ FULL SYLLABUS

**CLASS-XII
(2022-23)**

No.	Units	No. of Periods	Marks
I.	RELATIONS AND FUNCTIONS	30	08
II.	ALGEBRA	50	10
III.	CALCULUS	80	35
IV.	VECTORS AND THREE – DIMENSIONAL GEOMETRY	30	14
V.	LINEAR PROGRAMMING	20	05
VI.	PROBABILITY	30	08
	TOTAL	240	80
	INTERNAL ASSESSMENT		20

INTERNAL ASSESSMENT MARKS	20
Periodic Test (Best 2 out of 3 tests conducted)	10 Marks
Mathematics Activities	10 Marks

Note: For activities NCERT Lab Manual may be referred.

Assessment of Activity Work:

Throughout the year any 10 activities shall be performed by the student from the activities given in the NCERT Laboratory Manual for the respective class (XI or XII) which is available on the link: <http://ncert.nic.in/exemplar/labmanuals.html> record of the same may be kept by the student.

The weightage are as under:

- The activities performed by the student throughout the year and record keeping : 5 marks
- Assessment of the activity performed during the year end test : 3 marks
- Viva-voce: 2 marks

Detailed Chapter wise Syllabus

- 1. Relations and Functions** **15 Periods**
Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.
- 2. Inverse Trigonometric Functions** **15 Periods**
Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.
- 1. Matrices** **25 Periods**
Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. On-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).
- 2. Determinants** **25 Periods**
Determinant of a square matrix (up to 3×3 matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by example, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.
- 1. Continuity and Differentiability** **20 Periods**
Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, like $\sin^{-1}x$, $\cos^{-1}x$ and $\tan^{-1}x$, derivative of implicit functions. Concept of exponential and logarithmic functions.
Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.
- 2. Applications of Derivatives** **10 Periods**
Applications of derivatives: rate of change of bodies, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).
- 3. Integrals** **20 Periods**
Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals

15 Periods

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

5. Differential Equations

15 Periods

Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of a separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

1. Vectors

15 Periods

Vectors and scalars, magnitude and direction of vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

2. Three – dimensional Geometry

15 Periods

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angles Between two lines.

1. Probability

30 Periods

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.

1. Linear Programming

20 Periods

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).