

CLASS XII
MATHEMATICS (CODE 041)
TERM-WISE SYLLABUS
SESSION (2021-22)

TERM-I

One Paper

90 minutes

Max Marks: 40

No.	Units	Marks
I.	Relations and Functions	08
II.	Algebra	10
III.	Calculus	17
V.	Linear Programming	05
	Total	40
	Internal Assessment	10
	Total	50

CONTENT

Unit-I: Relations and Functions

1.Relations and Functions:

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

2.Inverse Trigonometric Function:

Definition, range, domain, principal value branch.

Unit-II: Algebra

1.Matrices : 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. Non-commutativity of multiplication of matrices, invertible matrices; (Here all matrices will have real entries).

2. Determinants: Determinants of square matrix (upto 3 x 3 matrices), minors, co- factors and applications of determinants in finding the area of triangle. Adjoint and inverse of a square matrix. Solving system of linear equations in two or three variables (having unique solution) using inverse of matrix.

Unit-III: Calculus

1. Continuity and Differentiability: Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions. Derivative of implicit functions. Concept of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

2. Applications of Derivatives:

Applications of derivatives: increasing/decreasing functions, tangents and normal, 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-livesituations).

Unit-V: Linear Programming

1. Linear Programming: Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, graphical method of solution for problems in two variables, feasible and infeasible regions(bounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints)

INTERNAL ASSESSMENT	10 MARKS
Periodic Test	5 Marks
Mathematics Activities: Activity file record +Term end assessment of one activity & Viva	5 Marks

Note: For activities NCERT Lab Manual may be referred

TERM II

One Paper
90 Minutes

Max Marks: 40

No.	Units	Marks
III.	Calculus	18
IV.	Vectors and Three-Dimensional Geometry	14
VI.	Probability	8
	Total	40
	Internal Assessment	10
	Total	15

Unit-III: Calculus

1.Integrals

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. $\int \frac{dx}{x^2 \pm a^2}$, $\int \frac{dx}{\sqrt{x^2 \pm a^2}}$, $\int \frac{dx}{\sqrt{a^2 - x^2}}$, $\int \frac{dx}{ax^2 + bx + c}$, $\int \frac{dx}{\sqrt{ax^2 + bx + c}}$, $\int \frac{px + q}{ax^2 + bx + c} dx$,

$\int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx$, $\int \sqrt{a^2 \pm x^2} dx$, $\int \sqrt{x^2 - a^2} dx$

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

2.Applications of the Integrals:

Applications in finding the area under simple curves, especially lines, circles/parabolas/ellipses (in standard form only), (the region should be clearly identifiable).

3 .Differential Equations:

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

$$\frac{dy}{dx} = f\left(\frac{y}{x}\right)$$

Solutions of linear differential equation of the type:

$\frac{dy}{dx} + py = q$ Where p and q are functions of x or constants

Unit-IV: Vectors and Three-Dimensional Geometry

1. Vectors:

Vectors and scalars, magnitude and direction of a 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 a 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:

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Distance of a point from a plane.

Unit-VI: Probability

1 .Probability: Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution.

INTERNAL ASSESSMENT	10 MARKS
Periodic Test	5 Marks
Mathematics Activities: Activity file record +Term end assessment of one activity & Viva	5Marks

Note: For activities NCERT Lab Manual may be referred

Assessment of Activity Work:

In first term any 4 activities and in second term any 4 activities shall be performed by the student from the activities given in the NCERT Laboratory Manual for the respective class XII which is available on the link

[:http://www.ncert.nic.in/exemplar/labmanuals.html](http://www.ncert.nic.in/exemplar/labmanuals.html) a record of the same may be kept by the student. A term end test on the activity is to be conducted.

The weightage are as under:

- The activities performed by the student in each term and record keeping : 3 marks
- Assessment of the activity performed during the term end test and Viva-voce : 2 marks

Prescribed Books:

- 1) Mathematics Part I - Textbook for Class XII, NCERT Publication
- 2) Mathematics Part II - Textbook for Class XII, NCERT Publication
- 3) Mathematics Exemplar Problem for Class XII, Published by NCERT
- 4) Mathematics Lab Manual class XII, published by NCERT