

# SYLLABUS

## MATHEMATICS (041) CLASS XII (2021-22)

### TERM-II

Time : 2 Hours		Marks : 40
No.	Units	Marks
III.	Calculus	18
IV.	Vectors and Three-Dimensional Geometry	14
VI.	Probability	8
Total		40
Internal Assessment		10
Total		50

### 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, parabolas; area of circles/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 :  $\frac{dy}{dx} = f(y/x)$ . Solutions of linear differential equation of the type:

$$\frac{dy}{dx} + py = q, \text{ where } p \text{ and } q \text{ are functions of } x \text{ or constant.}$$

## 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 and Viva	5 Marks

**Note :** For activities NCERT Lab Manual may be referred.

