ANNUAL SYLLABUS (2022-23)
CLASS XII
SUBJECT: MATHEMATICS (041)

CONTENT

Unit-I: Relations and Functions

1.Relations and Functions
Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and ontofunctions.

2. Inverse Trigonometric Functions
Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

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. 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 ofinverse, if it exists; (Here all matrices will have real entries).

2. Determinants
Determinant of a square matrix (up to 3 x 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 examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

Unit-III: Calculus

1.Continuity and Differentiability
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 functionsexpressed in parametric forms. Second order derivatives.

2.Applications of Derivatives

Applications of derivatives: rate of change of bodies, increasing/decreasing functions, maxima andminima (first derivative test motivated geometrically and second derivative test given as a provabletool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

3.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

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

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

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

4.Applications of the Integrals:

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

5. 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. Solutions of linear differential equation 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

$\frac{dx}{dy} + px = q$ Where p and q are functions of y or constants.

Mid Term Syllabus Must Be Completed By 30 September 2022
Revision of Mid Term Syllabus
Mid Term Examination
Discussion of Mid Term Question Paper
CONTENT

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, skew lines, shortest distance between two lines. Angle between two lines.

Unit-V: Linear Programming
1.Linear Programming

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).

Unit-VI: Probability
1.Probability

Conditional probability, multiplication theorem on probability, independent events, total probability,

Bayes' theorem, Random variable and its probability distribution, mean of random variable.

Note- Syllabus to be completed by 15 December 2022.

Preparation for Pre Board Examination

Pre Board Examination 2022-23
Discussion of Pre Board Question Paper
Complete Syllabus will be covered in Board Examination.
                      Board Examination 2022-23

MATHEMATICS (Code No. - 041)

QUESTION PAPER DESIGN CLASS - XII

(2022-23)

Time: 3 hours   **Max. Marks: 80**

S. No.	Typology of Questions	Total Marks	% Weightage
1	**Remembering:** Exhibit memory of previously learned materialby recalling facts, terms, basic concepts, and answers. **Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, givingdescriptions, and stating main ideas	44	55
2	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a differentway.	20	25
3	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a setof criteria. **Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions	16	20
	Total	80	100

1.   *No chapter wise weightage. Care to be taken to cover all the chapters*

2.   *Suitable internal variations may be made for generating various templates keeping the overall weightage to different form of questions and typology of questions same.*

Choice(s):

There will be no overall choice in the question paper.

However, 33% internal choices will be given in all the sections

INTERNAL ASSESSMENT	20 MARKS
Periodic Tests (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://www.ncert.nic.in/exemplar/labmanuals.htmla record of the same may be kept by the student. An year end test on the activity may be conducted

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