TERMWISE SYLLABUS AS PER CIRCULAR NO 53- APPLICABLE FROM 26 JULY 2021

SUBJECT: MATHEMATICS (041)

SESSION 2021-22

The Syllabus in the subject of Mathematics has undergone changes from time to time in accordance with growth of the subject and emerging needs of the society. Senior Secondary stage is a launching stage from where the students go either for higher academic education in Mathematics or for professional courses like Engineering, Physical and Biological science, Commerce or Computer Applications. The present revised syllabus has been designed in accordance with National Curriculum Framework 2005 and as per guidelines given in Focus Group on Teaching of Mathematics 2005 which is to meet the emerging needs of all categories of students. Motivating the topics from real life situations and other subject areas, greater emphasis has been laid on application of various concepts.

Objectives

The broad objectives of teaching Mathematics at senior school stage intend to help the students:

- to acquire knowledge and critical understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles, symbols and mastery of underlying processes and skills.
- to feel the flow of reasons while proving a result or solving a problem.
- to apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method.
- to develop positive attitude to think, analyze and articulate logically.
- to develop interest in the subject by participating in related competitions.
- to acquaint students with different aspects of Mathematics used in daily life.
- to develop an interest in students to study Mathematics as a discipline.
- to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of gender biases.
- to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics.

UNIT WISE SYLLABUS TERM I
CLASS XI (2021-22)

ONE PAPER		
NO	**UNITS**	
I	CHAPTER 1-SETS	
	CHAPTER 2- RELATIONS AND FUNCTIONS	
II	CHAPTER 5-COMPLEX NUMBERS	
III	CHAPTER 9-SEQUENCES AND SERIES	
	CHAPTER 10-STRAIGHT LINES	
IV	CHAPTER 13- LIMITS	
V	CHAPTER 15-STATISTICS	
THEORY	**40 MARKS**	
INTERNAL ASSESSMENT	**10 MARKS**	
GRAND TOTAL	**50 MARKS**	

DETAILED SYLLABUS UNIT WISE-TERM I

UNIT-I

CHAPTER 1 SETS

Sets and their representations. Empty set. Finite and Infinite sets. Equal sets. Subsets. Subsets of a set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and Intersection of sets.

ACTIVITY To find the number of subsets of a given set and verify that if a set has n number of elements, then the total number of subsets is 2^n.

CHAPTER 2 RELATIONS & FUNCTIONS

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (R x R only).Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs.

ACTIVITY To distinguish between a Relation and a Function.

UNIT-II

CHAPTER 5 COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quardratic equations. Algebraic properties of complex numbers. Argand plane. Statement of Fundamental Theorem of Algebra, solution of quadratic equations (with real coefficients) in the complex number system.

ACTIVITY Quiz on complex numbers through quizizz.com

UNIT III

CHAPTER 9 SEQUENCE AND SERIES

Sequence and Series. Arithmetic Progression (A. P.). Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.

ACTIVITY To demonstrate that the Arithmetic mean of two different positive numbers is always greater than the Geometric mean.

CHAPTER 10 STRAIGHT LINES

Brief recall of two dimensional geometry from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form, two-point form, intercept form and normal form. General equation of a line. Distance of a point from a line.

UNIT IV

CHAPTER 13 LIMITS

Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions

ACTIVITY To find analytically $\lim_{x\to c} f(x) = \frac{x^2 - c^2}{x-c}$

UNIT V

CHAPTER 15 STATISTICS

Measures of Dispersion: Range, mean deviation, variance and standard deviation of ungrouped/grouped data.

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

UNIT WISE SYLLABUS TERM II
CLASS XI (2021-22)

ONE PAPER		
NO	**UNITS**	
VI	CHAPTER 3-TRIGONOMETRIC FUNCTIONS	
	CHAPTER 6- LINEAR INEQUALITIES	
VII	CHAPTER 7-PERMUTATIONS AND COMBINATIONS	
VIII	CHAPTER 11-CONIC SECTIONS	
	CHAPTER 12-INTRODUCTION TO 3 DIM ENSIONAL COORDINATE GEOMETRY	
IX	CHAPTER 13- DERIVATIVES	
X	CHAPTER 15-PROBABILITY	
THEORY	**40 MARKS**	
INTERNAL ASSESSMENT	**10 MARKS**	
GRAND TOTAL	**50 MARKS**	

DETAILED SYLLABUS UNIT WISE-TERM II

UNIT VI

CHAPTER 3 TRIGONOMETRIC FUNCTIONS

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin 2x + \cos 2x = 1$, for all x. Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing *sin (x±y)* and *cos (x±y)* in terms of $\sin x$, $\sin y$, $\cos x$ & $\cos y$ and their simple applications. Deducing identities like the following:

$\tan(x \pm y) = \frac{tanx \pm tany}{1 \mp \tan x \tan y}$, $\cot(x \pm y) = \frac{\cot x \cot y \mp 1}{\cot y \pm \cot x}$

$\sin\alpha \pm \sin\beta = 2\sin\frac{(\alpha \pm \beta)}{2}\cos\frac{(\alpha \mp \beta)}{2}$

$\cos\alpha + \cos\beta = 2\cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)$

$cos\alpha - cos\beta = -2sin\left(\frac{\alpha+\beta}{2}\right) sin\left(\frac{\alpha-\beta}{2}\right)$

Identities related to $\sin 2x$, $\cos 2x$, $\tan 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$.

CHAPTER 6 LINEAR INEQUALITIES

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Graphical method of finding a solution of system of linear inequalities in two variables.

ACTIVITY Make an art integrated activity using concept of linear inequalities.

UNIT VII

CHAPTER 7 PERMUTATIONS AND COMBINATIONS

Fundamental principle of counting. Factorial *n.* (n!) Permutations and combinations, formula for ${}^{n}P_{r}$ and ${}^{n}C_{r}$, simple applications.

ACTIVITY To find the number of ways in which three cards can be selected from given five cards.

UNIT VIII

CHAPTER 11 CONIC SECTIONS

Sections of a cone: circles, ellipse, parabola, hyperbola. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

ACTIVITY To construct an ellipse when two fixed points are given.

CHAPTER 12 INTRODUCTION TO THREE-DIMENSIONAL GEOMETRY

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

ACTIVITY To explain the concept of octants by three mutually perpendicular planes in space.

UNIT IX

CHAPTER 13 LIMITS AND DERIVATIVES

Derivative introduced as rate of change both as that of distance function and geometrically. Definition of Derivative, relate it to scope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

UNIT X

CHAPTER 16 PROBABILITY

Random experiments; outcomes, sample spaces (set representation). Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Probability of an event, probability of 'not', 'and' and 'or' events.

ACTIVITY To write the sample space, when a coin is tossed once, two times, three times, four times.

Prescribed Books:

1) Mathematics Textbook for Class XI, NCERT Publications

2) Mathematics Exemplar Problem for Class XI, Published by NCERT

3) Mathematics Lab Manual class XI, published by NCERT

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

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 (XI or XII) which is available on the link : 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