

SYLLABUS 2021-2022

CLASS: 11

SUBJECT: MATHEMATICS

UNIT	CONTENT
1. Sets, Relations and Functions	1.1. Introduction 1.2. Sets 1.2.1. Properties of Set Operations 1.4. Constants and Variables, Intervals and Neighbourhoods 1.4.1. Constants and Variables 1.4.2. Intervals and Neighbourhoods 1.5. Relations 1.5.1. Type of Relations 1.6. Functions 1.6.1. Ways of Representing Functions 1.6.2. Some Elementary Functions 1.6.5. Inverse of a Function 1.6.6. Algebra of Functions 1.6.7. Some Special Functions
2. Basic Algebra	2.1. Introduction 2.3. Absolute Value 2.3.1. Definition and Properties 2.3.2. Equations Involving Absolute Value 2.3.3. Some Results For Absolute Value 2.3.4. Inequalities Involving Absolute Value 2.4. Linear Inequalities 2.5. Quadratic Functions 2.5.1. Quadratic Formula 2.5.2. Quadratic Inequalities 2.7. Rational Functions 2.7.1. Rational Inequalities 2.7.2. Partial Fractions 2.8. Exponents and Radicals 2.8.1. Exponents 2.8.2. Radicals

	<ul style="list-style-type: none"> 2.8.3. Exponential Function 2.9. Logarithm 2.9.1. Properties of Logarithm 2.10. Application of Algebra in Real Life
3. Trigonometry	<ul style="list-style-type: none"> 3.1. Introduction 3.2. A recall of basic results 3.2.5. Coterminal angles 3.3. Radian Measure 3.3.1. Relationship between Degree and Radian Measures 3.4. Trigonometric functions and their properties 3.4.1. Trigonometric Functions of any angle in terms of Cartesian coordinates 3.4.2. Trigonometric Functions of real numbers 3.4.3. Allied Angles 3.4.4. Some Characteristics of Trigonometric Functions 3.5. Trigonometric Identities 3.5.1. Sum and difference identities or compound angles formulas 3.5.2. Multiple angle identities and submultiple angle identities 3.5.3. Product to Sum and Sum to Product Identities
4. Combinatorics and Mathematical Induction	<ul style="list-style-type: none"> 4.1. Introduction 4.2. Fundamental principles of counting 4.3. Factorials 4.4. Permutations (Theorem 4.1-4.3 without proof) 4.4.1. Permutations of distinct objects 4.4.2. Properties of Permutations. (without proof) 4.4.3. Objects always together (String method) 4.4.4. No two things are together (Gap method) 4.4.5. Permutations of not all distinct objects 4.5. Combinations

	<p>4.5.1. Properties of Combinations (without proof)</p> <p>4.6. Mathematical induction</p>
5. Binomial Theorem, Sequences and Series	<p>5.1. Introduction (Theorem 5.2, 5.3 without proof)</p> <p>5.4. Finite Sequences</p> <p>5.4.1. Arithmetic and Geometric Progressions</p> <p>5.5. Finite Series</p> <p>5.5.2. Telescopic Summation for Finite Series</p> <p>5.6. Infinite Sequences and Series</p> <p>5.6.1. Fibonacci Sequence</p> <p>5.6.2. Infinite Geometric Series</p> <p>5.6.4. Telescopic Summation for Infinite Series</p> <p>5.6.5. Binomial Series</p>
6. Two Dimensional Analytical Geometry	<p>6.1. Introduction</p> <p>6.2. Locus of a point</p> <p>6.3. Straight Lines</p> <p>6.3.1. The relationship between the angle of inclination and slope</p> <p>6.3.2. Intercepts of a Line</p> <p>6.3.3. Different Forms of an equation of a straight line</p> <p>6.3.4. General form to other forms</p> <p>6.4. Angle between two straight lines</p> <p>6.4.1. Condition for Parallel Lines</p> <p>6.4.2. Condition for perpendicular Lines</p> <p>6.4.3. Position of a point with respect to a straight line</p> <p>6.4.4. Distance Formulas</p> <p>6.4.5. Family of lines</p> <p>6.4.6. One parameter families</p> <p>6.4.7. Two parameters families</p> <p>6.5. Pair of Straight Lines</p> <p>6.5.1. Pair of Lines Passing through the Origin</p> <p>6.5.2. Angle between Pair of Straight Lines</p> <p>6.5.3. Equation of the bisectors of the angle between the lines $ax^2+2hxy+by^2=0$</p> <p>6.5.4. General form of Pair of Straight Lines</p>

7. Matrices and Determinants	<ul style="list-style-type: none"> 7.1. Introduction 7.2. Matrices 7.2.4. Properties of Matrix Addition, Scalar Multiplication and Product of Matrices 7.2.5. Operation of Transpose of a Matrix and its Properties 7.2.6. Symmetric and Skew-symmetric Matrices 7.3. Determinants 7.3.1. Determinants of Matrices of different order 7.3.2. Properties of Determinants (without proof) 7.3.3. Application of Factor Theorem to Determinants. 7.3.4. Product of Determinants 7.3.5. Relation between a Determinant and its Cofactor Determinant 7.3.6. Area of a Triangle 7.3.7. Singular and non Singular matrix
8. Vector Algebra-I	<ul style="list-style-type: none"> 8.1. Introduction 8.2. Scalars and Vectors 8.3. Representation of a vector and types of vectors 8.4. Algebra of Vectors 8.4.1. Addition of Vectors 8.4.2. Difference between two Vectors 8.4.3. Scalar multiplication of a vector 8.4.4. Some properties and results 8.5. Position vectors 8.6. Resolution of Vectors 8.6.1. Resolution of a vector in two dimension 8.6.2. Resolution of a vector in three dimension 8.6.3. Matrix representation of a vector 8.7. Direction Cosines and Direction Ratios 8.8. Product of Vectors 8.8.1. Angle between two vectors 8.8.2. Scalar product

	<ul style="list-style-type: none"> 8.8.3. Properties of Scalar Product (without proof) 8.8.4. Vector Product 8.8.5. Properties of vector product (without proof)
9. Differential Calculus- Limits and Continuity	<ul style="list-style-type: none"> 9.1. Introduction (Theorem 9.4 and Results 9.1-9.4 without proof) 9.2. Limits <ul style="list-style-type: none"> 9.2.1. The calculation of limits 9.2.2. One sided limits 9.2.3. Theorems on limits 9.2.4. Infinite limits and limits at infinity 9.2.5. Limits at infinity 9.2.6. Limits of rational functions 9.2.7. Applications of limits 9.2.8. Sandwich Theorem 9.2.9. Two special Trigonometrical limits 9.2.10. Some important other limits 9.3. Continuity <ul style="list-style-type: none"> 9.3.1. Examples of functions Continuous at a point 9.3.2. Algebra of continuous functions 9.3.3. Removable and Jump Discontinuities
10. Differential Calculus- Differentiability and Methods of Differentiation	<ul style="list-style-type: none"> 10.1. Introduction (Theorem 10.1-10.6 without proof) 10.2. The concept of derivative <ul style="list-style-type: none"> 10.2.1. The tangent line problem 10.2.2. Velocity of Rectilinear motion 10.2.3. The derivative of a Function 10.2.4. One sided derivatives (left hand and right hand derivatives) 10.3. Differentiability and Continuity 10.4. Differentiation Rules <ul style="list-style-type: none"> 10.4.1. Derivatives of basic elementary functions 10.4.2. Examples on Chain Rule 10.4.3. Implicit Differentiation

	<p>10.4.4. Logarithmic Differentiation</p> <p>10.4.5. Substitution method</p> <p>10.4.6. Derivatives of variables defined by parametric equations</p> <p>10.4.7. Differentiation of one function with respect to another function :</p> <p>10.4.8. Higher order Derivatives</p>
11. Integral Calculus	<p>11.1. Introduction</p> <p>11.2. Newton-Leibnitz Integral</p> <p>11.3. Basic Rules of Integration</p> <p>11.4. Integrals of the Form $\int f(ax+b)dx$</p> <p>11.5. Properties of Integrals (without proof)</p> <p>11.6. Simple applications</p> <p>11.7. Methods of Integration</p> <p>11.7.1. Decomposition method</p> <p>11.7.2. Decomposition by Partial Fractions</p> <p>11.7.3. Method of substitution or change of variable</p> <p>11.7.4. Important Results</p> <p>11.7.5. Integration by parts</p> <p>11.7.6. Bernoulli's formula for Integration by Parts</p> <p>11.7.8. Integrals of the form (i) $\int e^{ax} \sin bxdx$ (ii) $\int e^{ax} \cos bxdx$</p> <p>11.7.9. Integration of Rational Algebraic Functions</p>
12. Introduction to probability Theory	<p>12.1. Introduction</p> <p>12.2. Basic definitions</p> <p>12.3. Finite sample space (Theorem 12.3-12.6,12.8,12.10,12.11 without proof)</p> <p>12.4. Probability</p> <p>12.4.3. ODDS</p> <p>12.5. Some basic Theorems on Probability</p> <p>12.6. Conditional Probability</p> <p>12.6.1. Independent Events</p> <p>12.7. Total Probability of an event</p> <p>12.8. Bayes' Theorem</p>
(*All examples and exercise problems for the content mentioned above)	