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YEARLY SYLLABUS OF MATHEMATICS (041)

SESSION – 2025-2026

STD – XII

MONTH	WORKING DAYS	TOPIC TO BE TAUGHT	ACTIVITY	LEARNING OUTCOME	VALUES & SKILLS IMPARTED	ASSESSMENT
APRIL	21	**1. Relations and Functions** Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions. **2. Inverse Trigonometric Functions** Definition, range, domain, principal value branch.	To verify that the relation R in the set L of all lines in a plane, defined by R = $\{(l, m) : l \wedge m\}$ is symmetric but neither reflexive nor transitive. To verify that the relation R in the set L of all lines in a plane, defined by R = $\{(l, m): l \| \| m\}$ is an equivalence relation.	Students will be able to : ● Define set as well-defined collection of objects ● Represent a set in Roster form and Set builder form ● Identify different types of sets on the basis of number of elements in the set ● Differentiate between equal set and equivalence set ● Enlist all subsets of a set	Relation and Function in real life give us the link between any two entities. In our daily life, we come across many patterns and links that characterize relations such as a relation of a father and a son, brother and sister, etc.	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked * Short & Long type questions will be asked * Case-study based Questions will be asked

			To demonstrate function which is one-one but not onto.	● Find number of subsets of a given set ● Find number of elements of a power set ● Express subset of real numbers as intervals ● Apply the concept of Venn diagram to understand the relationship between sets ● Solve problems using Venn diagram ● Perform operations on sets to solve practical problems ● Explain the significance of specific arrangement of elements in a pair ● Write Cartesian product of two		

				sets ● Find the number of elements in a Cartesian product of two sets ● Explain the significance of specific arrangement of elements in a pair ● Write Cartesian product of two sets ● Find the number of elements in a Cartesian product of two sets ● Define and illustrate different types of relations: Empty relation and universal relation ● Examine whether the		

				relation is equivalence or not ● Define function as a special type of relation ● Categorize relations that are functions and non-functions Topics Assessment : 1. Relations and Functions 2. Inverse Trigonometric Functions		
MAY	09	**3. 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- commutatively of multiplication of matrices,	To draw the graph of $\sin^{-1} x$, using the graph of sin x and demonstrate the concept of mirror reflection (about the line $y = x$).	● Define matrix ● Identify different kinds of matrices ● Find the size / order of matrices ● Determine equality of two matrices ● Write	The Learning Matrix Tool helps to clarify these decisions both at school and at home. It provides a quick overview of the whole day, making it more obvious when each learning component and	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked

		Invertible matrices; (Here all matrices will have real entries).		transpose of given matrix ● Define symmetric and skew symmetric matrix ● Perform operations like addition & subtraction on matrices of same order ● Perform multiplication of two matrices of appropriate order ● Perform multiplication of a scalar with matrix Topics Assessment : 1. Matrices	related IEP goals could be focused on across the day.	* Short & Long type questions will be asked * Case-study based Questions will be asked
JUNE	11	**4. 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		● Find determinant of a square matrix ● Use elementary properties of	The determinant gives the (signed) volume of the parallelepiped whose edges are the rows (or	* Exercise Questions & Answers to be assessed * Questions from other reference

		square matrix. Solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.		determinants ● Define the inverse of a square matrix ● Apply properties of inverse of matrices ● Solve the system of simultaneous equations Topics Assessment : 1. Determinants	columns) of a matrix. The volume interpretation is often useful when computing multidimensional integrals ('change of variables'). It is also useful for understanding (or defining) the 'cross product' in physics or mechanics.	books will be done * MCQ based Questions will be asked * Short & Long type questions will be asked * Case-study based Questions will be asked
JULY	26	**5. Continuity & Differentiability** Continuity and differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives. **6. Application of Derivatives**	To find analytically the limit of a function $f(x)$ at $x = c$ and also to check the continuity of the function at that point.	● Define continuity of a function ● Find the derivative of function of a function ● Understand the gradient of	Students' critical thinking skills towards the relationship between the concepts of continuity and derivatives of functions	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked * Short & Long type questions will

		Applications of derivatives: Rate of change of quantities , increasing/decreasing functions,, 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-life situations).	To understand the concepts of local maxima, local minima and point of inflexion.	tangent and normal to a curve at a given point ● Write the equation of tangents and normal to a curve at a given point Topics Assessment : 1. Continuity And Differentiability 2. Application of Derivatives		be asked * Case-study based Questions will be asked
AUGUST	24	**7. 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).		● Familiarize with terms related to Linear Programming Problem ● Formulate Linear Programming Problem ● Identify and formulate different types	Linear programming helps in attaining the optimum use of productive resources. It also indicates how a decision-maker can employ his productive factors effectively by selecting and	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked * Short & Long type questions will

				of LPP ● Draw the Graph for a system of linear inequalities involving two variables and to find its solution graphically ● Understand feasible and infeasible solutions ● Find optimal feasible solution Topics Assessment : 1. Linear Programming	distributing (allocating) these resources. Linear programming techniques improve the quality of decisions.	be asked * Case-study based Questions will be asked
SEPTEMBER	21	**Revision &Half Yearly Exam**				
OCTOBER	18	**8. 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.	To verify that angle in a semi-circle is a right angle, using vector method.	● Understand and determine indefinite integrals of simple functions as anti-derivative	Definite integrals can be used to determine the mass of an object if its density function is known. Work	* Exercise Questions & Answers to be assessed * Questions from other reference

		∫dxx2±a2,∫dx√x2±a2,∫dx√a2−x2,∫dx ax2+bx+c,∫dx√ax2+bx+c ∫px+qax2+bx+cdx,∫px+q√ax2+bx+c dx,∫√a2±x2 dx,∫√x2−a2dx Fundamental Theorem of Calculus (without proof).Basic properties of definite integrals and evaluation of definite integrals.		● Evaluate indefinite integrals of simple algebraic functions by method of: i) substitution ii) partial fraction iii) by parts Topics Assessment : 1. Integrals	can also be calculated from integrating a force function, or when counteracting the force of gravity, as in a pumping problem.	books will be done * MCQ based Questions will be asked * Short & Long type questions will be asked * Case-study based Questions will be asked
NOVEMBER	23	**9. Applications of 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). **10. 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: $dydx=f$(y/x). Solutions of		● Define definite integral as area under the curve ● Understand fundamental theorem of Integral calculus and apply it to evaluate the definite integral ● Apply properties of definite integrals to solve the	Students critical thinking skills toward concepts differences in finding area of a plane region and definite integral	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked * Short & Long type questions will be asked

		linear differential equation of the type: dy/dx + py =q where p and q are functions of x or constant.		problems Topics Assessment : 1. Application of Integrals 2. Differential Equations		* Case-study based Questions will be asked
		11. 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.	To verify geometrically that $\vec{c}\times(\vec{a}+\vec{b})=\vec{c}\times\vec{a}+\vec{c}\times\vec{b}$	explain the concepts of base and dimension of vector space explain the concept of dimension of a vector space express vector spaces in different dimensions explain base concept of a vector space and properties of vectors on the base express row and column space of a matrix Topics	Students will be able understand the concept of displacement and velocity, i.e. the importance of direction while travelling a distance.	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked * Short & Long type questions will be asked * Case-study based Questions will be asked

				Assessment : 1. Vectors		
DECEMBER	19	**12. 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. **13. Probability** Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution.	To locate the points to given coordinates in space, measure the distance between two points in space and then to verify the distance using distance formula. To explain the computation of conditional probability of a given event A, when event B has already occurred, through an example of throwing a pair of dice.	* Define event, outcome, trial, simple event, sample space and calculate the probability that an event with occur. Topics Assessment : 1. Three Dimensional Geometry 2. Probability	* Probability plays a crucial role in scoring good marks in maths. Probability is a very important topic from any examination perspective.	* Exercise Questions & Answers to be assessed * Questions from other reference books will be done * MCQ based Questions will be asked * Short & Long type questions will be asked * Case-study based Questions will be asked
JANUARY	22	**Revision & Pre-Board Exam**				
FEBRUARY	22	**Board Exam**				

Subject Teacher : Madhu Sudan Ghosh **Principal**