Class: XII

Subject: Mathematics

		SYLLABUS	
MONTH	**CHAPTER (NCERT Text book)**	**CONTENT (Topics)**	**Practical/Activities**
April	Chapter 1: Relation and Functions	Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.	**Activity 1: (Activity File)** 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.
	Chapter 2: Inverse Trigonometric Functions	Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions	**Activity 2: (Activity File)** To demonstrate a function which is not one-one but is onto.
	Chapter 3: Matrices	Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. Non-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 of inverse, if it exists; (Here all matrices will have real entries).	**Activity 3: (Activity File)** 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). **Activity 4: (Activity File)** To sketch the graphs of a^x and $\log_a x$, a > 0, a ≠ 1 and to examine that they are mirror images of each other. **Activity 5: (Activity File)**
	Ch-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 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	To establish a relationship between common logarithm (to the base 10) and natural logarithm (to the base e) of the number x.
May	Chapter 5: Continuity and Differentiability	Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, $like$ $\sin^{-1}$, $\cos^{-1} x$ and $\tan^{-1}x$, derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.	**Activity 6: (Activity File)** 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. **Activity 7: (Activity File)** To understand the concepts of absolute maximum and minimum values of a function in a given closed interval through its graph.
	Chapter 6: Applications of Derivatives	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).	**Activity 8: (Activity File)** To construct an open box of maximum volume from a given rectangular sheet by cutting equal squares from each corner. **Activity 9: (Activity File)** To find the time when the area of a rectangle of given dimensions become maximum, if the length is decreasing and the breadth is increasing at given rates. **Activity 10: (Activity File)** To find the time when the area of a rectangle of given dimensions

			become maximum, if the length is decreasing and the breadth is increasing at given rates.
July	Chapter 7: 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. $\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$ $\int \frac{px + q}{ax^2 + bx + c} dx, \int \frac{px + q}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2}\, dx, \int \sqrt{x^2 - a^2}\, dx$ $\int \sqrt{ax^2 + bx + c}\, dx,$ Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.	**Activity:** flip classroom; students will prepare a PPT and explain the concept in the class.
	Chapter 8: Applications of the Integrals	Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)	
August	Chapter 9: 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: dy/dx + py = q, where p and q are functions of x or constants. d/d + px = q, where p and q are functions of y or constants.	**Activity:** Use software like Desmos or GeoGebra to graph solutions of differential equations.
	Chapter 10: 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	**Activity:** To understand the concept of vector addition through graphical representation

		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.	
September	Chapter 11: 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.	Activity: Using 3D Graphing calculator to plot the points and understand its various properties.
October	Chapter 12: 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)	**Activity:** Real-World Optimization Challenge
	Chapter 13: Probability	Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.	**Activity:** Coin Tossing Experiment
November	Revision Pre-Board Exam	Chapter wise revision Sample papers & Previous years Board Exam papers	
December	Revision Pre-Board Exam	Remedial classes	
January	Revision Pre-Board Exam Board Practical Exams	Remedial classes	
February	Revision Board Exam	Remedial classes	
March	Revision Board Exams	Remedial classes	

ASSESSMENT SYLLABUS	
PERIODIC ASSESSMENT -1	Chapter 1: Relation and Functions Chapter 2: Inverse Trigonometric Functions Chapter 3: Matrices Chapter 4: Determinants
PERIODIC ASSESSMENT -2	Chapter 5: Continuity and Differentiability Chapter 6: Applications of Derivatives Chapter 7: Integrals
MID TERM EXAM	Chapter 1: Relation and Functions Chapter 2: Inverse Trigonometric Functions Chapter 3: Matrices Chapter 4: Determinants Chapter 5: Continuity and Differentiability Chapter 6: Applications of Derivatives Chapter 7: Integrals Chapter 8: Applications of the Integrals Chapter 9: Differential Equations
FINAL EXAMINATION	Chapter 1: Relation and Functions Chapter 2: Inverse Trigonometric Functions Chapter 3: Matrices Chapter 4: Determinants Chapter 5: Continuity and Differentiability Chapter 6: Applications of Derivatives Chapter 7: Integrals Chapter 8: Applications of the Integrals Chapter 9: Differential Equations Chapter 10: Vectors Chapter 11: Three - dimensional Geometry Chapter 12: Linear Programming Chapter 13: Probability