

K.T.S.P.Mandal's
Hutatma Rajguru Mahavidyalaya, Rajgurunagar
Department of Mathematics
Teaching Plan
Academic Year-2025-26
Sem-I

Sr. No.	Class	Subject	Name of Teacher
1	F.Y.B.Sc.	Algebra and Calculus-I	Prof. Wayal R. M.
2	S.Y.B.Sc.	Mathematics for Physical Sciences-I	Prof. Wayal R.M.

Class: F.Y.B.Sc

Name: Prof. R. M. Wayal

Subject : Algebra and Calculus-I

No. of lectures per week - 02

Month	Topic
June	Introduction
July	Well ordering principle and principle of mathematical induction, divisibility of integers, gcd, lcm, Euclidean algorithm, relatively prime integers. Fundamental theorem of arithmetic, Euclid's lemma, theory of congruences, Fermat's theorem, Euler's phi function, Euler's theorem.
August	Definition and algebra of polynomials, gcd of polynomials, synthetic division, remainder theorem, factor theorem, relation between roots and co-efficient of polynomial.
September	Algebraic properties of real numbers. Absolute value of a real number, geometrical meaning, absolute value properties of R, triangle inequality, examples on absolute value of R. Boundedness of R, neighborhood of a point on real line. Intervals, lower bound, upper bound and examples. Well ordering principle of N. Supremum and infimum of a subset of R and examples. Completeness property of R. Definition and examples on limit.
October	Continuity of a function at a point, algebra of a continuous function,

	properties, continuity on interval, definition and examples of bounded function, boundedness theorem. Absolute maximum and minimum of function. Location of roots theorem, Bolzano's theorem.
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Class: S.Y.B.Sc

Subject : Mathematics for Physical Sciences-I

Name: Prof. R. M. Wayal

No. of lectures per week - 02

Month	Topic
June	Introduction
July	Definition of function of several variables, definition of the partial derivative. The total differential and total derivative, Exact and inexact differentials.
August	The chain rule, Change of variables. Scalars and vectors, Addition and subtraction of vectors, Multiplication by a scalar, Magnitude of a vector, Angle between the vectors, Multiplication of vectors, Scalar Product, Vector Product, Scalar Triple Product, Vector Triple Product.
October	Differentiation of vectors, Vector operators, Gradient of a scalar field. Example on tangent plane and normal line.

Sem-II

Sr. No.	Class	Subject	Name of Teacher
1	F.Y.B.Sc.	Algebra and Calculus-II	Prof. Wayal R. M.
2	S.Y.B.Sc.	Mathematics for Physical Sciences-II	Prof. Wayal R.M.

Class: F.Y.B.Sc
Name: Prof. R. M. Wayal

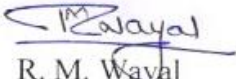
Subject : Algebra and Calculus-II
No. of lectures per week - 03

Month	Topic
December	Matrices and Matrix Operations.
January	Inverses; Algebraic Properties of Matrices, Elementary Matrices and a Method for Finding A^{-1} , Matrix, Matrix Notation and Size of Matrix, Diagonal, Triangular, and Symmetric Matrices, More on Linear Systems and Invertible Matrices. Introduction to Systems of Linear Equations, Gaussian Elimination Method, Determinants by Cofactor Expansion, Evaluating Determinants by Row Reduction.
February	Properties of Determinants; Cramer's Rule. Applications towards Balancing Chemical Equations, Applications in Cryptography, The Derivative as a Function, Differentiation Rules, The Derivative as a Rate of Change, Derivatives of Trigonometric Functions, The Chain Rule.
March	Applications, Extreme Values of Functions. The Mean Value Theorem, L'Hospital Rule, Cauchy's Mean Value Theorem.

Class: S.Y.B.Sc
Name: Prof. R. M. Wayal

Subject : Mathematics for Physical Sciences-II
No. of lectures per week - 02

Month	Topic
December	Introduction to the Initial value problems, Euler's method, Modified Euler's method
January	Second Order Runge-Kutta Method, Fourth Order Runge-Kutta Method, Nature of Solutions, Separable Equations, First Order Linear Equations, Exact Equations, Homogeneous Equations, Integrating Factors.
February	Real life applications of First Order Differential Equations, Bacterial growth, Half-Life decay of radioactive materials, Age of fossil, Newton's law of cooling, Population dynamics. Second-order linear equations, General solutions to homogeneous differential equations with constant coefficients.
March	Solution of Euler's differential equations Real life applications of Second Order Differential Equations Vibrations and oscillation. Undamped Simple Harmonic Motion, Damped Vibrations.


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