

Subject: Basic Mathematics.

Semester: B.Com (Ist Sem)

Class- Minor

Month / week	First	Second	Third	Fourth	Fifth
July			Introduction to Course and Overview of Calculus Concepts	Functions and Variables: Introduction to Differential Calculus	Homogeneity of Functions and Euler's Theorem
August	Partial Derivatives up to Second Order and Applications	Differentiation of Implicit Functions; Maxima and Minima	Integration as Anti-derivative Process, Standard Forms	Methods of Integration: Substitution and Partial Fractions	Definite Integration and Applications (Areas, Surplus Problems)
September	Nature of Commodities Learning Curve; Leontief Input-Output Model	Matrices: Definition, Types, and Operations	Matrix Algebra: Addition, Subtraction, Multiplication	Determinants: Properties and Calculation up to Third Order	Determinants: Properties and Calculation up to Third Order
October	Adjoint and Inverse of a Matrix; Cramer's Rule	Adjoint and Inverse of a Matrix; Cramer's Rule	System of Linear Equations using Matrices	System of Linear Equations using Matrices	REVISION
NOVEMBER	Revision and Discussion of Previous Papers	Final Review and Preparation for End Term Examination			

TEACHING PLAN 2025-26 (ODD SEMESTER)**Department: Mathematics****Sub:- Function and Algebra (B.sc. Ist Sem)**

Month	1st Week	2nd Week	3rd Week	4th Week	5thWeek
July			Relation , Functions along with domain and Range, Composition of function	Invertibility and inverse of functions, One –to- one correspondence and the cardinality of a set.	Relation between the roots and coefficients of general polynomial equation in one variable.
August	Solutions of polynomial equations having conditions on roots	Common roots and multiple roots.	Transformation of equations.	Nature of the roots of an equation	Descarte Rule of Sign.
September	Solutions of cubic equations (Cardon’s method). Biquadratic equations and their solutions.	Solutions of cubic equations (Cardon’s method). Biquadratic equations and their solutions.	Matrix and its Types.	. Matrix and its Types.	Rank of a Matrix and its Applications
October	Row rank, column rank	Elementary operations on matrices	Normal form, PAQ Form	Linera independence and dependence of rows and columns of matrices	Theorem on consistency of a system of linear rquations.

November	Cayley Hamilton Theorem , Minimal polynomial of a Matrix	Characteristics equation of a matrix, To find the inverse of a Matrix			
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TEACHING PLAN 2025-26 (ODD SEMESTER)

Department: Mathematics

Subject: Ordinary Differential Equations (MAJOR)

Class: B.Sc. Physical Science (IIIrd Sem)

Month/Week	1st	2 nd	3rd	4th	5th
JULY			Geometrical meaning of a differential equation, Exact differential equation	Integrating Factors, First order higher degree equations solvable for x,y,p.	Lagrange and Clairaut's Equation, Equation reducible to Clairaut's form, Singular form
AUGUST		Orthogonal Trajectories: Cartesian and Polar coordinates, Self-Orthogonal Family of curves	Linear ordinary differential equations with constant coefficients	Homogeneous linear ordinary differential equations	Equations reducible to Homogeneous
SEPTEMBER	Linear differential equations of second order	Transformation of the equation by changing the dependent/	Solution by operators of non-homogeneous	Reduction of order of a differential equation	Method of variations of parameters

	: Reduction to normal form	independent variable	linear differential equations		
OCTOBER	Method of undetermined coefficients	Ordinary simultaneous differential equations	Solution of simultaneous differential equation involving operators $x(d/dx)$ or $t(d/dt)$, Diwali Break	Diwali Break	Simultaneous equation of the form $dx/P = dy/Q = dz/R$
NOVEMBER		Total differential equation, Condition for $P dx + Q dy + R dz = 0$ to be exact	General method of solving $P dx + Q dy + R dz = 0$ by taking one variable constant	Method of auxiliary equations	

Subject :- GROUPS AND RING

CLASS : B.Sc Physical Science (Vth Sem)

Month	1st Week	2nd Week	3rd Week	4th Week	5 th Week
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July				Definition of a group, Subgroups and Subgroup criteria, Generation of groups, cyclic groups,	Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences
August	Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences	Normal subgroups, Quotient groups,	Normal subgroups, Quotient groups,	Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group.	Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group.
September	Automorphisms of cyclic groups, Permutations groups. Even and odd permutations. Alternating Groups	Cayley's theorem, Center of a group and derived group of a group	Introduction to rings, subrings, integral domains and fields	Introduction to rings, subrings, integral domains and fields	Characteristics of a ring. Ring homomorphisms, ideals (principle, prime and Maximal) and Quotient rings, Field of quotients of an integral domain.
October	Characteristics of a ring. Ring homomorphisms, ideals (principle, prime and Maximal) and	Euclidean rings, Polynomial rings, Polynomials over the rational field	Euclidean rings, Polynomial rings, Polynomials over the rational field	The Eisenstein's criterion, Polynomial rings over commutative rings	The Eisenstein's criterion, Polynomial rings over commutative rings

	Quotient rings, Field of quotients of an integral domain.				
November	Unique factorization domain	Unique factorization domain			

Sub:- REAL ANALYSIS (B.Sc Vth Sem)

Month	1st Week	2nd Week	3rd Week	4th Week	5th Week
July			Riemann integral, Integrability of continuous and monotonic functions	Riemann integral, Integrability of continuous and monotonic functions	The Fundamental theorem of integral calculus.
August	The Fundamental theorem of integral calculus. Mean value theorems of integral calculus.	Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests,	Improper integrals and their convergence, Comparison tests, Abel's and Dirichlet's tests,	Frullani's integral, Integral as a function of a parameter	Continuity, Differentiability and integrability of an integral of a function of a parameter.

September	Continuity, Differentiability and integrability of an integral of a function of a parameter.	Definition and examples of metric spaces, neighborhoods	limit points, interior points, open and closed sets, closure and interior, boundary points	subspace of a metric space, equivalent metrics, Cauchy sequences, completeness	subspace of a metric space, equivalent metrics, Cauchy sequences, completeness
October	Cantor's intersection theorem, Baire's category theorem, contraction Principle	Cantor's intersection theorem, Baire's category theorem, contraction Principle	Continuous functions, uniform continuity, compactness for metric spaces	Continuous functions, uniform continuity, compactness for metric spaces	sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property
November	sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property	continuity in relation with compactness, connectedness, components, continuity in relation with connectedness			REVISION

Sub:- NUMERICAL ANALYSIS (B.Sc Vth Sem)

Month	1st Week	2nd Week	3rd Week	4th Week	5 th Week
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July			Finite Differences operators.	Finding the missing terms and effect of error in a difference tabular values,	Interpolation with equal intervals: Newton's forward
August	Newton's backward interpolation formulae.	Interpolation with unequal intervals: Newton's divided difference,	Lagrange's Interpolation formulae, Hermite Formula.	Central Differences: Gauss forward interpolation formula	Gauss's backward interpolation formula
September	Sterling, Bessel Formula.	Probability distribution of random variables, Binomial distribution, Poisson's distribution	Normal distribution: Mean, Variance and Fitting.	Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II.	Eigen Value Problems: Power method
October	Jacobi's method, Given's method	House-Holder's method, QR method, Lanczos method	Numerical Integration: Newton-Cote's Quadrature formula	Trapezoidal rule, Simpson's one third rule , Simpson's three-eighth rule	Chebychev formula, Gauss Quadrature formula, Numerical solution of ordinary differential equations
November	Single step methods-Picard's method, Taylor's series method	Euler's method, Runge-Kutta Methods			

Subject: Operational Research Technique
Semester: B.Com (IIIrd Sem)

Month / week	Ist	Second	Third	Fourth	Fifth
July			Introduction to Operations Research: Models, Methodology, and Classification	Linear Programming Problems (LPP): Introduction and Formulation	Graphical Method of Solving LPP with Illustrations
August	Standard Form of LPP and Canonical Form	Simplex Method: Concepts, Basic Feasible Solutions, and Algorithm	Simplex Method: Table Form and Applications	Simplex Method: Table Form and Applications	Two-Phase Simplex Method
September	Big-M Method	Big-M Method	Duality in Linear Programming: Concepts and Applications	Duality in Linear Programming: Concepts and Applications	Transportation Problem – Introduction and Mathematical Formulation
October	Transportation Problem – Methods to Find Initial Basic Feasible Solution	Transportation Problem – MODI Method and Degeneracy Cases	Unbalanced Transportation Problems and Applications	Assignment Problem – Introduction and Formulation	Hungarian Method for Solving Assignment Problems
November	Applications of Assignment Problems in Business and Management	Comprehensive Practice on LPP, Transportation, and Assignment Problems			

Subject: Mathematical Foundation of Computer Science.

Semester: First

Class- BCA

Month/ Week	1st	2 nd	3rd	4th	5th
JULY			Set, Set operation, Properties of Set operations	Subset, Venn Diagrams, Cartesian Product	Relation, Properties of Relations, Types of Relations
AUGUST	Equivalence Relation, closure of Relations	Warshell' s Algorithm, Functions	Properties of Functions(Domain, Range)	Composition of functions, Surjective	Injective, Polynomial, Ceiling, Floor and Bijective Functions
SEPTEMBER	Counting and Recurrence Relation	Permutation, Combinations	Binomail Coefficients and Theorem	Recurrence Relations with Examples, the tower of Hanoi problem	Solving Recurrence relation with constant coefficients using characteristic equation root method.
OCTOBER	Basic terminologies of graphs, connected and disconnected graphs.	Subgraphs , paths and cycles	Complete graph, digraphs ,weighted graphs	Trees, properties of trees	Types of matrices, determinat of a matrix, symmetric and skew- symmetric matrices

NOVEMBER	Orthogonal matrix, Rank of a matrix, inverse of a matrix	Application of matrices to solve system of linear equation, Cayley – Hamilton Theorem			
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