

DEPARTMENT OF MATHEMATICS

Subject – Abstract Algebra

Name of Teacher- Dr. Raman

CLASS- M.Sc. (Pre.)

SESSION – 2024-25

TOPICS	DATE	REMARKS
p-groups, Sylow p-subgroups, Sylow theorems, Applications of Sylow theorems	05/08/24 to 12/08/24	
Description of groups of order p^2 and pq , Survey of groups up to order 15.	20/08/24 to 27/08/24	
Normal and subnormal series, Solvable series, Derived series	28/08/24 to 04/09/24	
Solvable groups, Solvability of S_n -the symmetric group of degree n	05/09/24 to 12/09/24	
Central series, Nilpotent groups and their properties, Upper and lower central series	13/09/24 to 20/09/24	
Composition series, Zassenhaus lemma, Jordan-Holder theorem.	21/09/24 to 28/09/24	
Modules, Cyclic modules, Simple modules, Schur lemma, Free modules	30/09/24 to 07/10/24	
Torsion modules, Torsion free modules, Fundamental structure theorem for finitely generated free modules	08/10/24 to 15/10/24	
Modules over principal ideal domain and its applications to finitely generated abelian groups	16/10/24 to 23/10/24	
Unit Test	24/10/24 & 26/10/24	
Noetherian and Artinian modules, Noetherian and Artinian rings	28/10/24 to 04/11/24	
Nil and nilpotent ideals in Noetherian and Artinian rings	05/11/24 to 12/11/24	
Hilbert basis theorem. $\text{Hom}_R(R,R)$, Opposite rings, Wedderburn-Artin theorem, Maschke theorem	13/11/24 to 20/11/24	
Revision and Test	21/11/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

Subject – Advanced Calculus

Name of Teacher- Dr. Poonam Kumari & Dr. Usha Yadav

CLASS- B.A II

SESSION – 2024-25

TOPICS	DATE	REMARKS
Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. Mean value theorems;	22/07/24 to 30/07/24	
Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations. Taylor's Theorem with various forms of remainders, Darboux intermediate value theorem for derivatives,	01/08/24 to 08/08/24	
Indeterminate forms. Limit and continuity of real valued functions of two variables. Partial differentiation	09/08/24 to 16/08/24	
Total Differentials; Composite functions & implicit functions. Change of variables. Homogenous functions & Euler's theorem on homogeneous functions.	17/08/24 to 20/08/24	
Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables.	21/08/24 to 29/08/24	
Differentiability of real valued functions of two variables. Schwarz and Young's theorem.	30/08/24 to 09/09/24	
Implicit function theorem. Maxima, Minima and saddle points of two variables.	10/09/24 to 18/09/24	
Lagrange's method of multipliers.	19/09/24 to 27/09/24	
Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae.	28/09/24 to 14/10/24	
Locus of the centre of curvature, Spherical curvature, Locus of centre of Spherical curvature, Involutives,	15/10/24 to 23/10/24	
evolutes, Bertrand Curves. Surfaces: Tangent planes, one parameter family of surfaces, Envelopes.	24/10/24 to 14/11/24	
Revision and Test	16/11/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS**Subject – Advanced Calculus****Name of Teacher- Dr. Poonam Kumari & Dr. Usha Yadav****CLASS- B.A- II****SESSION – 2024-25**

TOPICS	DATE	REMARKS
Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity	22/07/24 to 27/07/24	
chain rule of differentiability. Mean value theorems; Rolle's Theorem	29/07/24 to 03/08/24	
Lagrange's mean value theorem and their geometrical interpretations. Taylor's Theorem with various forms of remainders	05/08/24 to 10/08/24	
Darboux intermediate value theorem for derivatives, Indeterminate forms.	12/08/24 to 17/08/24	
Limit and continuity of real valued functions of two variables	20/08/24 to 24/08/24	
Partial differentiation. Total Differentials; Composite functions & implicit functions.	27/08/2024 to 31/08/2024	
Change of variables. Homogenous functions & Euler's theorem on homogeneous functions	02/09/24 to 07/09/24	
Taylor's theorem for functions of two variables.	09/09/24 to 14/09/24	
Differentiability of real valued functions of two variables	16/09/2024 to 21/09/2024	
Schwarz and Young's theorem	23/09/2024 to 28/09/2024	
Implicit function theorem. Maxima, Minima and saddle points of two variables	30/09/24 to 05/10/24	
Lagrange's method of multipliers.	07/10/24 to 12/10/24	
Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae	14/10/24 to 19/10/24	
Locus of the centre of curvature, Spherical curvature, Locus of centre of Spherical curvature	21/10/24 to 26/10/24	
Involutes, evolutes, Bertrand Curves. Surfaces: Tangent planes	04/11/24 to 09/11/24	

one parameter family of surfaces, Envelopes	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

Subject – Advanced Calculus

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC-II(A)

SESSION – 2024-25

TOPICS	DATE	REMARKS
Continuity, Sequential Continuity, properties of continuous functions, Uniform continuity, chain rule of differentiability. Mean value theorems;	22/07/24 to 30/07/24	
Rolle's Theorem and Lagrange's mean value theorem and their geometrical interpretations. Taylor's Theorem with various forms of remainders, Darboux intermediate value theorem for derivatives,	01/08/24 to 08/08/24	
Indeterminate forms. Limit and continuity of real valued functions of two variables. Partial differentiation	09/08/24 to 16/08/24	
Total Differentials; Composite functions & implicit functions. Change of variables. Homogenous functions & Euler's theorem on homogeneous functions.	17/08/24 to 20/08/24	
Euler's theorem on homogeneous functions. Taylor's theorem for functions of two variables.	21/08/24 to 29/08/24	
Differentiability of real valued functions of two variables. Schwarz and Young's theorem.	30/08/24 to 09/09/24	
Implicit function theorem. Maxima, Minima and saddle points of two variables.	10/09/24 to 18/09/24	
Lagrange's method of multipliers.	19/09/24 to 27/09/24	
Curves: Tangents, Principal normals, Binormals, Serret-Frenet formulae.	28/09/24 to 14/10/24	
Locus of the centre of curvature, Spherical curvature, Locus of centre of Spherical curvature, Involutives,	15/10/24 to 23/10/24	
evolutes, Bertrand Curves. Surfaces: Tangent planes, one parameter family of surfaces, Envelopes.	24/10/24 to 14/11/24	
Revision and Test	16/11/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- Analytic Number Theory

Name of Teacher- Dr. Poonam Bai

CLASS- M.Sc (F)

SESSION – 2024-25

TOPICS	DATE	REMARKS
Distribution of primes, Fermat and Mersenne number	22/07/24 to 27/07/24	
Farey series and some results concerning Farey series,	29/07/24 to 03/08/24	
Approximation of irrational numbers by rationals, Hurwitz's theorem, Irrationality of e and π .	05/08/24 to 10/08/24	
The arithmetic in \mathbb{Z}_n , The group U_n , Prim, the group U_{p^n} itive roots .	12/08/24 to 17/08/24	
their existence (p -odd) and U_{2^n} , The group of quadratic residues Q_n ,	20/08/24 to 24/08/24	
Quadratic residues for prime power moduli and arbitrary moduli.	27/08/2024 to 31/08/2024	
The algebraic structure of U_n and Q_n .	02/09/24 to 07/09/24	
Riemann Zeta Function $\zeta(s)$ and its convergence, Application to prime numbers.	09/09/24 to 14/09/24	
The algebraic structure of U_n and Q_n .	16/09/2024 to 21/09/2024	
Diophantine equations $ax+ by = c$, $x^2 + y^2 = z^2$ and $x^4 + y^4 = z^4$	23/09/2024 to 28/09/2024	
, The representation of number by two or four squares	30/09/24 to 05/10/24	
Waring problem, Four square theorem.	07/10/24 to 12/10/24	
The numbers $g(k)$ and $G(k)$, Lower bounds for $g(k)$ and $G(k)$.	14/10/24 to	

	19/10/24	
Definitions, examples and simple properties.	21/10/24 to 26/10/24	
Perfect numbers, Mobius inversion formula, The Mobius function $\mu(n)$,	04/11/24 to 09/11/24	
The order and average order of the function $\varphi(n)$, $\tau(n)$ and $\sigma(n)$. The Mobius function $\mu(n)$,	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

DEPARTMENT OF MATHEMATICS

Subject – Advanced Topology

Name of Teacher- Dr. Raman

CLASS- M.Sc.(Final)

SESSION – 2024-25

TOPICS	DATE	REMARKS
Regular and Normal Space, T_3 and T_4 separation axioms, their characterization and basic properties	22/07/24 to 29/07/24	
Urysohn's lemma , Tietze extension theorem, Regularity and normality of a compact Hausdorff space	30/07/2024 to 07/08/2024	
Complete regularity, Complete normality, $T_{3\frac{1}{2}}$ and T_5 spaces, Their characterization and basic properties	08/08/2024 to 16/08/2024	
Product topological spaces, Projection mappings, Tychonof product topology in terms of standard subbases and its characterization	17/08/24 to 24/08/24	
Separation axioms and product spaces, Connectedness, Locally connectedness, Compactness of product spaces, Product space as first axiom space	27/08/2024 to 03/09/2024	
Tychonoff product theorem, Embedding and Metrization : Embedding lemma and Tychonof embedding theorem, Metrizable spaces	04/09/2024 to 11/09/2024	
Urysohn metrization theorem, Nets : Nets in topological spaces, Convergence of nets, Hausdorffness and nets	12/09/2024 to 19/09/2024	
Subnet and cluster points, Compactness and nets, Filters : Definition and examples, Collection of all filters on a set as a poset	20/09/24 to 27/09/24	
Methods of generating filters and finer filters,	28/09/2024 to 05/10/2024	
Ultra filter and its characterizations, Ultra filter principle, Image of filter under a function	07/10/2024 to 16/10/2024	
Limit point and limit of a filter, Continuity in terms of convergence of filters, Hausdorffness and filters	18/10/2024 to 25/10/2024	
Test	26/10/2024	
Canonical way of converting nets to filters and vice versa, Stone-Cech compactification, Covering of a space, Local finiteness	04/11/2024 to 11/11/2024	
Paracompact spaces, Michael theorem on characterization of paracompactness,	12/11/2024 to 16/11/2024	
Paracompactness as regular as well as normal space, A. H. Stone theorem, Nagata- Smirnov Metrization theorem and Revision	18/11/2024 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- CALCULUS

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC-I (A)

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Definition of the limit of a function. Basic properties of limits, Continuous functions and classification of discontinuities. Differentiability.	22/07/24 to 24/07/24	
Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.	29/07/24 to 31/07/24	
Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, asymptotes in polar coordinates.	05/08/24 to 07/08/24	
Curvature, radius of curvature for Cartesian curves, parametric curves	12/08/24 to 14/08/24	
Curvature, radius of curvature for Cartesian curves, parametric curves	19/08/24 to 21/08/24	
parametric curves, polar curves.	26/08/2024 to 28/08/2024	
Newton's method. Radius of curvature for pedal curves. Tangential polar equations	02/09/24 to 04/09/24	
convexity. Points of inflexion.	09/09/24 to 11/09/24	
Multiple points. Cusps, nodes	16/09/2024 to 18/09/2024	
conjugate points. Type of cusps.	23/09/2024 to 25/09/2024	
Tracing of curves in Cartesian, parametric and polar coordinates.	30/09/24 to 02/10/24	
Reduction formulae. Rectification, intrinsic equations of curve.	07/10/24 to 09/10/24	

quadrature (area) Sectorial area. Area bounded by closed curves.	14/10/24 to 16/10/24	
Area bounded by closed curves.	21/10/24 to 23/10/24	
Volumes and surfaces of solids of revolution.	04/11/24 to 06/11/24	
Theorems of Pappu's and Guilden.	11/11/24 to 13/11/24	
Revision and Test	18/11/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- CALCULUS

Name of Teacher- Dr. Manisha Garg

CLASS- B.SC-I (B) & B.A.

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Definition of the limit of a function. Basic properties of limits, Continuous functions and classification of discontinuities. Differentiability.	22/07/24 to 24/07/24	
Successive differentiation. Leibnitz theorem. Maclaurin and Taylor series expansions.	29/07/24 to 31/07/24	
Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, asymptotes in polar coordinates.	05/08/24 to 07/08/24	
Curvature, radius of curvature for Cartesian curves, parametric curves	12/08/24 to 14/08/24	
Curvature, radius of curvature for Cartesian curves, parametric curves	19/08/24 to 21/08/24	
parametric curves, polar curves.	26/08/2024 to 28/08/2024	
Newton's method. Radius of curvature for pedal curves. Tangential polar equations	02/09/24 to 04/09/24	
convexity. Points of inflexion.	09/09/24 to 11/09/24	
Multiple points. Cusps, nodes	16/09/2024 to 18/09/2024	
conjugate points. Type of cusps.	23/09/2024 to 25/09/2024	
Tracing of curves in Cartesian, parametric and polar coordinates.	30/09/24 to 02/10/24	
Reduction formulae. Rectification, intrinsic equations of curve.	07/10/24 to 09/10/24	
Quadrature (area) Sectorial area. Area bounded by closed curves.	14/10/24 to 16/10/24	
Area bounded by closed curves.	21/10/24 to 23/10/24	
Volumes and surfaces of solids of revolution.	04/11/24 to	

	06/11/24	
Theorems of Pappu's and Guilden.	11/11/24 to 13/11/24	
Revision and Test	18/11/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- FLUID DYNAMICS

Name of Teacher- Dr. Manisha Garg

CLASS- M.Sc (F)

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Kinematics - Velocity at a point of a fluid. Eulerian and Lagrangian methods.	22/07/24 to 27/07/24	
Stream lines, path lines and streak lines. Velocity potential.	29/07/24 to 03/08/24	
Irrotational and rotational motions. Vorticity and circulation. Equation of continuity. Boundary surfaces.	05/08/24 to 10/08/24	
Acceleration at a point of a fluid. Components of acceleration in cylindrical and spherical polar co-ordinates.	12/08/24 to 17/08/24	
Pressure at a point of a moving fluid Euler equation of motion. Equations of motion in cylindrical	20/08/24 to 24/08/24	
spherical polar co-ordinates. Bernoulli equation. Impulsive motion.	27/08/2024 to 31/08/2024	
Kelvin circulation theorem. Vorticity equation. Energy equation for incompressible flow.	02/09/24 to 07/09/24	
Kinetic energy of irrotational flow. Kelvin minimum energy theorem	09/09/24 to 14/09/24	
Kinetic energy of infinite fluid. Uniqueness theorems. Axially symmetric flows. Liquid streaming past a fixed sphere.	16/09/2024 to 21/09/2024	
Motion of a sphere through a liquid at rest at infinity. Equation of motion of a sphere.	23/09/2024 to 28/09/2024	
Kinetic energy generated by impulsive motion. Motion of two concentric spheres.	30/09/24 to 05/10/24	
Three-dimensional sources, sinks and doublets. Images of sources	07/10/24 to 12/10/24	
sinks and doublets in rigid impermeable infinite plane and in impermeable spherical surface.	14/10/24 to 19/10/24	
Two dimensional motion; Use of cylindrical polar co-ordinates. Stream function.	21/10/24 to 26/10/24	
Axisymmetric flow. Stoke stream function. Stoke stream	04/11/24 to	

function of basic flows.	09/11/24	
Irrotational motion in two-dimensions. Complex velocity potential. Milne-Thomson circle theorem. Two-dimensional sources, sinks, doublets and their images. Blasius theorem.	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

Subject - Groups and Rings

Name of Teacher- Dr. Raman

CLASS- B.SC-III (B)+BA III

SESSION – 2024-25

TOPICS	DATE	REMARKS
Definition of a group with example and simple properties of groups, Subgroups and Subgroup criteria, Generation of groups, cyclic groups	22/07/24 to 29/07/24	
Cosets, Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem and its consequences	30/07/24 to 06/08/24	
Normal subgroups, Quotient groups and related theorems	07/08/24 to 14/08/24	
Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group. Automorphisms of cyclic groups	16/08/24 to 23/08/24	
Permutations groups. Even and odd permutations. Alternating groups,	24/08/24 to 31/08/24	
Cayley's theorem, Centre of a group and derived group of a group.	02/09/24 to 09/09/24	
Introduction to rings, subrings, integral domains and fields, Characteristics of a ring. Ring homomorphisms,	10/09/24 to 17/09/24	
ideals (principle, prime and Maximal) and Quotient rings	18/09/24 to 25/09/24	
Unit tests	26/09/24 to 28/09/24	
Field of quotients of an integral domain, Euclidean rings	30/09/24 to 07/10/24	
Polynomial rings, Polynomials over the rational field,	08/10/24 to 15/10/24	
The Eisenstein's criterion and related theorems	16/10/24 to 23/10/24	
Polynomial rings over commutative rings	24/10/24 to 26/10/24	
Unique factorization domain, R unique factorization domain implies so is $R[X_1, X_2, \dots, X_n]$	04/11/24 to 11/11/24	
Revision and Test	12/11/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- Groups & Rings

Name of Teacher- Dr. Poonam Kumari

CLASS- B.SC-III(B)+B.A-III

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Definition of a group with example and simple properties of groups	22/07/24 to 27/07/24	
Subgroups and Subgroup criteria, Generation of groups, cyclic groups, Cosets	29/07/24 to 03/08/24	
Left and right cosets, Index of a sub-group Coset decomposition, Lagrange's theorem	05/08/24 to 10/08/24	
Lagrange's theorem and its consequences, Normal subgroups, Quotient groups	12/08/24 to 17/08/24	
Homomorphisms, isomorphisms, automorphisms	20/08/24 to 24/08/24	
inner automorphisms of a group. Automorphisms of cyclic groups	27/08/2024 to 31/08/2024	
Permutations groups. Even and odd permutations. Alternating groups, Cayley's theorem	02/09/24 to 07/09/24	
Center of a group and derived group of a group.	09/09/24 to 14/09/24	
Introduction to rings, subrings	16/09/2024 to 21/09/2024	
integral domains and fields, Characteristics of a ring	23/09/2024 to 28/09/2024	
Ring homomorphisms, ideals (prime, maximal) and Quotient rings	30/09/24 to 05/10/24	
Field of quotients of an integral domain.	07/10/24 to 12/10/24	
Euclidean rings, Polynomial rings, Polynomials over the rational field	14/10/24 to 19/10/24	
The Eisenstein's criterion, Polynomial rings over commutative rings	21/10/24 to 26/10/24	

Unique factorization domain	04/11/24 to 09/11/24	
R unique factorization domain implies so is $R[X_1, X_2, \dots, X_n]$	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

LESSON PLAN

NAME: - Dr.MAMTA YADAV

CLASS: - M.SC PRE Session-2024-25

SEMESTER: - 1ST

SUBJECT: - COMPLEX ANALYSIS

DATE	CONTENT
06-08-2024 TO 11-08-2024	Function of a Complex variable , continuity , Differentiability , Analytic function and their properties
12-08-2024 TO 18-08-2024	Cauchy-Riemann equations in Cartesian and Polar Co-ordinates, Power series, Radius of Convergence
19-08-2024 TO 25-08-2024	Differentiability of sum function of a Power Series, Branches of Many Valued function
26-08-2024 TO 01-09-2024	Revision, Test.
02-09-2024 TO 08-09-2024	Path in a region, Contour, Complex Integration Cauchy theorem , Cauchy Integral formula.
09-09-2024 TO 15-09-2024	Extension of Cauchy integral formula for multiple connected domain.
16-09-2024 To 22-09-2024	Poisson integral formula, Higher order derivatives, Liouville theorem, Taylor theorem.
23-09-2024 To 29-09-2024	Morera theorem, Cauchy inequality, revision test.
30-09-2024 To 06-10-2024	Zeros of an analytic function, Laurent series. Isolated singularities, Casorati-Weierstrass theorem, limit points of zeros.
07-10-2024 To 13-10-2024	Limit point of poles, maximum modulus principle, Schwarz lemma, meromorphic functions.

14-10-2024 To 20-10-2024	Arguments principle, Rouché theorem, fundamental theorem of algebra.
21-10-2024 To 27-10-2024	Inverse function theorem, Revision, Test.
28-10-2024 To 03-11-2024	Diwali Vacation.
04-11-2024 To 10-11-2024	Calculus of residue, Cauchy residue theorem, Evaluation of integrals, conformal mapping.
11-11-2024 To 17-11-2024	Space of analytic function and their completeness, Hurwitz theorem, Montel theorem.
18-11-2024 To 23-11-2024	Riemann mapping theorem, Revision Test .

Lesson 2024-25

Subject :- P.D.E. /Advance calculus

Class B.A. /B.Sc. 2nd

Name :- Dr. Usha Yadav/Dr.Mamta Yadav

Month	Week	Date	Topic
July	4	22-25 26-27	Introduction, elimination of arbitrary constant with example – 1,2,3 Example- 4,5,6,7,8 Elimination of arbitrary function with example 1,2,3 Exercise – 4,5,6,7 Article – 2.1, 2.2 with example 1 to 7 Article – 2.4,2.5 ex. – 8,9
	5	29-30	Classification of the solution with P.D.E. with ex. 1,2 Lagrange's equation ex. 1,2,3
August	1	1- 2-3	Ex. – 4,5,6 Article - 2.6, 2.7, 2.8 with example - 1,2,3 Ex. – 4 to 10
	2	5-8 9-10	Ex. – 7,8,9,10,11 Ex. – 12,13,14,15 Definition of compatible & condition of compatible Ex. – 1,2,3,4 Article – 2.9,2.10, ex. – 1,2,3 Ex. – 4 to 10
	3	12-14	Charpits method with ex. – 1,2,3 Ex. 4,5,6 3.5.1 with ex. 1,2,3,4,5,6
		16-17	Article 2.11, 2.13 , & example 1,2 Article 2.12, 2.13 , & example 1,2,3
	4	20-22	Ex. 7 to 13 Jacobi Method with ex. 1 to 5 Doubt of Ch – 1,2,3
		23-24	Ex. 4 to 7 Article 3.1, 3.2 with ex. 1,2,3,4
	5	27-29	Test of Ch – 1,2,3 Linear homogenous partial diff. equation with ex. 1 to 4 Ex. 5 to 9
		30-31	Ex. 5 to 8 Article 3.3 with ex. 9
Sept.	1	2-5	Solution of Non – Homegenous Linear partial diff. equation with ex. 1,2,3 Ex. 4 to 7 PDE with variable coefficient with ex. 1,2 Ex. 3 to 7
		6-7	Article 3.4 with ex. 1,2

			Article 3.5 with ex. 3,4	
	2	9-12	Classification of 2 nd order L.P.K.E with ex. 1,2 Canonical Form Reduce Hyperbolic equation into canonical form Ex. 3,4,5	
		13-14	Article 3.6 with ex. 5,6,7 Article 3.7 with ex. 1,2,3	
	3	16-19	Reduce parabolic equation into canonical form ex. 1,2 Ex. 3 with doubt Test 4,5 Reduce elliptic equation into canonical form with ex. 1,2	
		20-21	Ex. 4,5,6 Doubt of ch – 2,3	
	4	24-26	Solution of linear Homogenous Equation with ex. 1,2 Moonge's Method with ex. 1,2,3 Ex. 4,5,6,7,8	
		27-28	Test of ch. 2,3 Article of 5.1, 5.2, 5.3, with ex. 1,2	
	5	30-1	Mooge's Method for quadratic equation with ex. 1 Ex. 2,3,4,5	
Oct.	1	4-5	Ex. 3,4,5,6 Ex. 7,8,9,10,11,12	
	2	7-10	Doubt of ch. 6,7 Test of ch. 6,7 Charactric equation & cure with ex. 1,2 Th of 5.4, 5.5, 5.6	
		11	Th of 5.7 with ex. 1,2,3	
	3	14-16	Ex. 3,4,5,6 Cauchy problem with ex 1 Wave equation of 1-dim by method of sapration	
		18-19	Ex. 4 to 7 Article 5.8,5.9,5.10, 5.11	
	4	21-24	Solution of wave equation by the given boundary & initial condition Ex. 1,2 Solution of 2 dim wave equation by sapration of variable Solution of 2 dim wave equation by sapration of boundary & initial co.	
		25-26	Ex. 1,2,3,4 Ex. 5,6,7,8,9	
Nov.	2	4-7	Ex. 1,2 Solution of one dimension Heat equation by the separation of variable	

			Solution of one dimension Heat equation by given condition Ex. 1,2	
		8-9	Article 5.12 with ex. 10,11,12 Article 5.12 with ex. 12,13,14,15	
	3	11-14	Solution of 2 dim Heat equation by sapration method with ex. 1,2,3. Solution of 2 dim Heat equation by given method with ex. 4 Solution of laplace equation by sapration method Solution of laplace equation by satisfield given method	
		16	Article 5.13 with ex. 1,2,3	
	4	18-21	Ex. 3,4	
		22-23	Doubt of Ch. 5 Test of ch 5	

Lesson Plan

Department of Mathematics

Name –Dr mamta yadav

subject -calculus

Date	Content	
26-07-2024	Limit	
2-08-2024	Continuity	
9-08-2024	Derivability	
16-08-2024	Independent form $(0/0)$, ∞/∞	
23-08-2024	Independent form $(0*\infty)$, $(\infty-\infty)$	
30-08-2024	Independent form $(0',1$	
6-09-2024	Successive Differentiation (some standard results for 'nth' derivations)	
13-09-2024	Some more typical 'nth' derivations Leibnitz's Theorem	
20-09-2024	Asymptotes (oblique Asymptotes)	
27-09-2024	Intersection of the curve and TS Asymptotes Asymptotes of polar curves	
9-10-2024	Reduction formulae introduction and some examples	
16-10-2024	Reduction formulae with some examples.	
23-10-2024	Taylor's theorem and Maclaurin's theorem	
6-11-2024	Taylor's infinite series, application of Taylor's theorem	
13-11-2024	Revision	
20-11-2024	Test	

DEPARTMENT OF MATHEMATICS

SUBJECT- Mathematical Analysis

Name of Teacher- Dr. Poonam Kumari

CLASS- M.SC(P)

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Riemann-Stieltjes integral, Existence and properties	06/08/24 to 10/08/24	
Integration and differentiation	12/08/24 to 17/08/24	
The fundamental theorem of calculus	20/08/24 to 24/08/24	
Integration of vector-valued functions, Rectifiable curves.	27/08/2024 to 31/08/2024	
Sequence and series of functions, Pointwise and uniform convergence	02/09/24 to 07/09/24	
Cauchy criterion for uniform convergence, Mn-test for uniform convergence, Weierstrass M-test	09/09/24 to 14/09/24	
Abel's and Dirichlet's tests for uniform convergence, Uniform convergence and continuity, Uniform convergence and Integration,	16/09/2024 to 21/09/2024	
Uniform convergence and differentiation, Weierstrass approximation theorem.	23/09/2024 to 28/09/2024	
Power series, uniform convergence and uniqueness theorem	30/09/24 to 05/10/24	
Abel's theorem, Tauber's theorem. Functions of several variables, Linear Transformations	07/10/24 to 12/10/24	
Euclidean space R^n , Derivatives in an open subset of R^n , Chain Rule, Partial derivatives	14/10/24 to 19/10/24	
Continuously Differentiable Mapping, Young and Schwarz theorems	21/10/24 to 26/10/24	
Taylor theorem, Higher order differentials	04/11/24 to 09/11/24	

Explicit and implicit functions, Implicit function theorem, Inverse function theorem, Change of variables	11/11/24 to 16/11/24	
Extreme values of explicit functions, Stationary values of implicit functions	18/11/24 to 23/11/24	
Lagrange multipliers method, Jacobian and its properties.	25/11/24 to 30/11/24	
Revision and Test	02/12/24 to onwards	

Signature

DEPARTMENT OF MATHEMATICS

SUBJECT- Mathematical Statistics

Name of Teacher- Dr. Manisha Garg

CLASS- M.SC(P)

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Probability: Definition and various approaches of probability	06/08/24 to 10/08/24	
Addition theorem, Boole's inequality, Conditional probability and multiplication theorem	12/08/24 to 17/08/24	
Independent events, Mutual and pairwise independence of events	20/08/24 to 24/08/24	
Bayes' theorem and its applications.	27/08/2024 to 31/08/2024	
Random variable and probability functions: Definition and properties of random variables	02/09/24 to 07/09/24	
Discrete and continuous random variables, Probability mass and density functions, Distribution function	09/09/24 to 14/09/24	
Concepts of bivariate random variable: joint, marginal and conditional distributions. Mathematical expectation	16/09/2024 to 21/09/2024	
Definition and its properties, Variance, Covariance, Moment generating function- Definitions and their properties.	23/09/2024 to 28/09/2024	
Discrete distributions: Uniform	30/09/24 to 05/10/24	
Bernoulli, Binomial, Poisson and Geometric distributions with their properties	07/10/24 to 12/10/24	
Continuous distributions: Uniform	14/10/24 to 19/10/24	
Exponential and Normal distributions with their properties.	21/10/24 to 26/10/24	
Testing of hypothesis: Parameter and statistic, Sampling distribution and standard error of estimate, Null and alternative hypotheses	04/11/24 to 09/11/24	
Simple and composite hypotheses, Critical region, Level of	11/11/24 to	

significance, One tailed and two tailed tests	16/11/24	
Two types of errors. Tests of significance: Large sample tests for single mean	18/11/24 to 23/11/24	
Single proportion, Difference between two means and two proportions.	25/11/24 to 30/11/24	
Revision and Test	02/12/24 to onwards	

Signature

Month	Weak	Date	Topic
July	4	22-27	Satatement, Symbolic Representation & Tautologies, Quantifiers, Predicates and Validity, Prepositional Logic.
July-	5	29-30	Tutorial.
August	1	1-3	Semigroup & Monoids – Defh and Example of Semigroup & Monoids.
	2	5-10	Homomorphism of semigroup and monoids Congruence relation and quotient Semigroup Subsemigroup and Sub monids .
	3	12-17	Direct Products, Basic Hemomorphism theorem Pigeonhole Principal, Principal of inclusion & Exclusion, derangements and Tutorial.
	4	20-24	Lattices- hhattices as partially ordered sets their properties, lattices as Algebraic System.
	5	27-31	Sub Lattices, Direct products and Homorphism and Tutorial.
Septembe r	2	2-7	Some Special Lattice e.g. Complete, Complimented and Distributive Lattices Join- irreducible elements.
	3	9-14	Atom & Minterms Toutorial Doubts and Test of Unit-2
	4	16-21	Boolean Algebras- Boolean Algebra as Lattices Various Boolean Identities The Switching Algebra Example- Subalgebras
	5	24-28	Direct Produocts and Homorphism, Boolean Forms and their Equivalence, Minterm Boolean Form
	6	30	Sum of Product Form
October	1	1-5	Cabonical Forms Minimization of Boolean Function
	2	7-11	Switching Theory (using and, or, Not, Gates) The nkarnaugh Method Tutorial
	3	14-15	Unit-3 Dooubt & Test
	3	21-26	Reduced Machins, Homomorphism, Finite automata, Acceptoors, Non- eterminstic finite automata
	4		
November	2	4-9	Equivalence of its power to that of determinstic finite automata, Moore and Mealy Machine.
	3	11-16	Grammars and Language:- Phase- Structure Grammers, Rewriting rules, Derivation Sentential Poem, Languagwe generated by a gammar, Regular Contex free and Context Sensitive grammers & Language
	4	18-23	Regular sets, Regular Expression and the Pumping Lamma Kleen’s them Toutorial Doubt of unit -4

DEPARTMENT OF MATHEMATICS**SUBJECT- Numerical Analysis****Name of Teacher- Dr. RAMAN****CLAS -B.SC-III(A)****SESSION – 2024-2025**

TOPICS	DATE	REMARKS
Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values,	22/07/24 to 27/07/24	
Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae.	29/07/24 to 03/08/24	
Interpolation with unequal intervals: Newton's divided difference	05/08/24 to 10/08/24	
Lagrange's Interpolation formulae, Hermite Formula.	12/08/24 to 17/08/24	
Central Differences: Gauss forward	20/08/24 to 24/08/24	
Gauss's backward interpolation formulae, Sterling, Bessel Formula.	27/08/2024 to 31/08/2024	
Probability distribution of random variables, Binomial distribution	02/09/24 to 07/09/24	
Poisson's distribution, Normal distribution: Mean, Variance and Fitting.	09/09/24 to 14/09/24	
Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II.	16/09/2024 to 21/09/2024	
Eigen Value Problems: Power method, Jacobi's method	23/09/2024 to 28/09/2024	
Given's method, House-Holder's method, QR method, Lanczos method	30/09/24 to 05/10/24	
Numerical Integration: Newton-Cote's Quadrature formula	07/10/24 to 12/10/24	

Trapezoidal rule, Simpson's one- third and three-eighth rule, Chebychev formula, Gauss Quadrature formula.	14/10/24 to 19/10/24	
Numerical solution of ordinary differential equations	21/10/24 to 26/10/24	
Single step methods-Picard's method. Taylor's series method, Euler's method, Runge-Kutta Methods	04/11/24 to 09/11/24	
Multiple step methods; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

DEPARTMENT OF MATHEMATICS**SUBJECT- Numerical Analysis****Name of Teacher- Dr. Poonam Kumari****CLASS- B.SC-III(B)+B.A-III****SESSION – 2024-2025**

TOPICS	DATE	REMARKS
Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values,	22/07/24 to 27/07/24	
Interpolation with equal intervals: Newton's forward and Newton's backward interpolation formulae.	29/07/24 to 03/08/24	
Interpolation with unequal intervals: Newton's divided difference	05/08/24 to 10/08/24	
Lagrange's Interpolation formulae, Hermite Formula.	12/08/24 to 17/08/24	
Central Differences: Gauss forward	20/08/24 to 24/08/24	
Gauss's backward interpolation formulae, Sterling, Bessel Formula.	27/08/2024 to 31/08/2024	
Probability distribution of random variables, Binomial distribution	02/09/24 to 07/09/24	
Poisson's distribution, Normal distribution: Mean, Variance and Fitting.	09/09/24 to 14/09/24	
Numerical Differentiation: Derivative of a function using interpolation formulae as studied in Sections –I & II.	16/09/2024 to 21/09/2024	
Eigen Value Problems: Power method, Jacobi's method	23/09/2024 to 28/09/2024	
Given's method, House-Holder's method, QR method, Lanczos method	30/09/24 to 05/10/24	
Numerical Integration: Newton-Cote's Quadrature formula	07/10/24 to 12/10/24	
Trapezoidal rule, Simpson's one- third and three-eighth rule, Chebychev formula, Gauss Quadrature formula.	14/10/24 to 19/10/24	
Numerical solution of ordinary differential equations	21/10/24 to 26/10/24	

Single step methods-Picard's method. Taylor's series method, Euler's method, Runge-Kutta Methods	04/11/24 to 09/11/24	
Multiple step methods; Predictor-corrector method, Modified Euler's method, Milne-Simpson's method.	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

Month	Week	Date	Topic	Remarks
august	1	05-08	Initial Value Problem & Theorem Based on I.V. Problem Picard's Method & Example -1,2 Ex 3,4,5,6 Ex- 7,8,9,10	
	3	12-14	E- Approximation Solution & Equicontinuous of Function State & Prove Ascoli Lemma Cauchy peano existence thm	
	4	20-22	Uniqueness thm and its example Lipschitz condition and its example Cauchy euler construction for approximation Doubt of unit 1	
	5	27-29	Test of unit 1 Linear 2 nd order differential equation Thm- 2,3,4 Thm-5,6 Sturm –Separation Thm Example -1,2 on the basis of Sturm	
Sept.	1	2-5	Sturm Fundamental Comparison Ex-1 & Thm -1,2 Some definition & Prüfer tran	
	2	09-11	Lagrange's Identify & its Exam Self Adjoint Equation of 2 nd order Legendre Equation of Self adjoint Linear system and Principle of Superposition	
	3	16-19	Liouville's Formula Thm based on Liouville's Formula Eigen Value of S.I.B.V.P	
		24-26	Normalized eigen function Test of Unit-2 Autonomous system & Critical point Ex 1,2,3,	
		30-01	Ex 5,6,7 Ex 8,9,10,11 Ex 12,13,14	
Oct.		07-10	Non Linear Autonomous System Ex 1,2,3,4	
		14-16	Miscellaneous Ex-1,2,3,4 Trajectory of Critical Point Linear Plane Autonomous System Ex-1,2,3	
		21-24	Ex-3,4 Nature Of Stability at (0,0) Nature Of Stability at (3/4,-3/16) Ex 5,6 Ex 7,8 Nature of Stability Node, Spiral Point	
Nov.	2	4-7	Doubt of unit -3 Test of Unit -3 Liapunov's Direct Method	
	3	11-14	Bendixon Non Existence Thm Ex- 1,2 Index of Critical Point Limit Cycle & its Ex-	
	4	18-19	Dependence of parameter & Its Ex- Representation Thm	

DEPARTMENT OF MATHEMATICS

SUBJECT- Partial Differential Equations

Name of Teacher- Dr. Poonam Kumari

CLASS- B.A-II

SESSION – 2024-25

TOPICS	DATE	REMARKS
Partial differential equations: Formation, order and degree	22/07/24 to 27/07/24	
Linear and Non-Linear Partial differential equations of the first order	29/07/24 to 03/08/24	
Complete solution, singular solution, General solution, Solution of Lagrange's linear equations	05/08/24 to 10/08/24	
Charpit's general method of solution. Compatible systems of first order equations, Jacobi's method.	12/08/24 to 17/08/24	
Linear partial differential equations of second and higher orders	20/08/24 to 24/08/24	
Linear and non-linear homogenous and non-homogenous equations with constant co-efficients,	27/08/2024 to 31/08/2024	
Partial differential equation with variable co-efficients reducible to equations with constant coefficients, their complimentary functions	02/09/24 to 07/09/24	
particular Integrals ,Equations reducible to linear equations with constant co-efficients.	09/09/24 to 14/09/24	
Classification of linear partial differential equations of second order, Hyperbolic	16/09/2024 to 21/09/2024	
parabolic and elliptic types	23/09/2024 to 28/09/2024	
Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions	30/09/24 to 05/10/24	
Solution of linear hyperbolic equations, Monge's method for partial differential equations of second order.	07/10/24 to 12/10/24	
Cauchy's problem for second order partial differential equations,	14/10/24 to 19/10/24	

Characteristic equations and characteristic curves of second order partial differential equation	21/10/24 to 26/10/24	
Method of separation of variables: Solution of Laplace's equation, Wave equation (one and two dimensions)	04/11/24 to 09/11/24	
Diffusion (Heat) equation (one and two dimension) in Cartesian Co-ordinate system.	11/11/24 to 16/11/24	
Revision and Test	18/11/24 to onwards	

LESSON PLAN

Name: - Dr.Samta

Class: - M.Sc Final Session-2024-25

SEMESTER: - 3rd

SUBJECT: Functional Analysis

DATE	CONTENT
22/07/2024 To 28/07/2024	Normal Linear Spaces with example Metric on Normal Linear spaces Completion of a Normal Space, Tutorial.
29/07/2024 To 04/08/2024	Branch spaces, Sub- Space of a Branch Space. Holder's and Minkowski Inequality.
05/08/2024 To 11/08/2024	Completeness of Quotient Spaces of normed linear spaces. Completeness of Tutorial.
12/08/2024 To 18/08/2024	Completeness of $C[a,b]$ Revision, Tutorial.
19/08/2024 To 25/08/2024	Finite Dimensional Normed Linear spaces and Sub-spaces, bounded linear transformation, Tutorial.
26/08/2024 To 01/09/2024	Equivalent formulation of Continuity, Space of Bounded Linear Transformation, Tutorial.
02/09/2024 To 08/09/2024	Continuous Linear functional, Conjugate Spaces Revision, Tutorial.
09/09/2024 To 15/09/2024	Hahn-Banach extension theorem (Real or Complex form) Revision, Tutorial.
16/09/2024 To 22/09/2024	Riesz-Representation theorem for Bounded Linear Functionals on L_p and $C[a,b]$ Tutorial.

23/09/2024 To 29/09/2024	Second Conjugate Spaces, Reflexive Spaces, Revision, Tutorial.
30/09/2024 To 06/10/2024	Uniform Boundedness Principle and It's Consequence, Tutorial.
07/10/2024 To 13/10/2024	Open mapping theorem and it's application, Tutorial.
14/10/2024 To 20/10/2024	Projection, Closed graph theorem Tutorial.
21/10/2024 To 27/10/2024	Equivalent Norms, Weak and Strong Convergence, Tutorial.
28/10/2024 To 03/11/2024	Diwali Vacation.
04/11/2024 To 10/11/2024	Equivalence in finite dimensional space Compact operator and it's Relation with Continuous Operators, Tutorial.
11/11/2024 To 17/11/2024	Compactness, Properties of Compact operators, Tutorial.
18/11/2024 To 23/11/2024	Compactness of the limit of the sequence Of compact operators, Tutorial.

LESSON PLAN

Name: - Dr.Samta

Class: - B.Sc/B.A Session-2024-25

SEMESTER: - 5th

SUBJECT: Real Analysis & Groups and Rings

DATE	CONTENT
22/07/2024 To 28/07/2024	Introduction, definition: Partition, Refinement, upper and lower sums, oscillatory sum and theorems.
29/07/2024 To 04/08/2024	Theorems: 1:11 to 1:14:3 And examples and Theorem:- 1:15 to 1:21.
05/08/2024 To 11/08/2024	Examples: 4 to 11 Theorem:-1:22:1 to 1:26:2 With Examples.
12/08/2024 To 18/08/2024	Introduction, Definition: Improper Integral and type of Improper Integral Example:- 1 to 8, Comparison and Limit test with examples.
19/08/2024 To 25/08/2024	General Test For Convergence, Absolute Convergence Example:-3 to 7, Abel's Test, Dirichlet's Test With Examples.
26/08/2024 To 01/09/2024	Frullani's Integral And Doubt's.
02/09/2024 To 08/09/2024	Metric space with examples, Bounded function Include Metric.
09/09/2024 To 15/09/2024	Distance between Point and Sub-set Diameter of a sub-set, Bounded Metric Space with examples.

16/09/2024 To 22/09/2024	Open Sphere, Closed Sphere, Interior Point and set, Adherent Point, Derived Set.
23/09/2024 To 29/09/2024	Closed Set, Exterior Point and Exterior of a Set, Frontier Point and Set, Boundary Point and Set.
30/09/2024 To 06/10/2024	Sequences In Metric Spaces, Convergent, Cauchy Sequence, Complete Metric Space Sub-Sequence Cantor's Intersection theorem, Nowhere dense set, Baire's Category Theorem.
07/10/2024 To 13/10/2024	Fixed Point, Banach Fixed Point. Revision.
14/10/2024 To 20/10/2024	Ring, Field, Integral Domain, Skew-Field with examples, sub-ring, Centre of a ring with examples.
21/10/2024 To 27/10/2024	Introduction: Ideal, Principal Ideal, Maximal Ideal, Prime Ideal, with examples.
28/10/2024 To 03/11/2024	Diwali Vacation.
04/11/2024 To 10/11/2024	Ring Homomorphism, Kernel of a Ring Homomorphism, Field of Quotient with theorems.
11/11/2024 To 17/11/2024	Euclidean Ring, Principal Ideal Domain.
18/11/2024 To 23/11/2024	Polynomial rings, Unique Factorization Domain Primitive Polynomial.

DEPARTMENT OF MATHEMATICS

SUBJECT- STATICS

Name of Teacher- Dr. Poonam Bai

CLASS- B.SC-II(A)

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Composition and resolution of forces	22/07/24 to 29/07/24	
Parallel forces. Moments and Couples	30/07/24 to 08/08/24	
Analytical conditions of equilibrium of coplanar forces	09/08/24 to 17/08/24	
Friction	19/08/24 to 28/08/24	
Centre of Gravity.	29/08/24 to 07/09/24	
Virtual work.	09/09/24 to 18/09/24	
Forces in three dimensions.	19/09/24 to 28/09/24	
Poinsots central axis.	30/09/24 to 08/10/24	
Wrenches	09/10/24 to 18/10/24	
Null lines and planes.	19/10/24 to 26/10/24	
Stable and unstable equilibrium	04/11/24 to 17/11/24	
Revision and Test	18/11/24 to onwards	

DEPARTMENT OF MATHEMATICS

SUBJECT- STATICS

Name of Teacher- Dr. Usha Yadav

CLASS- B.SC-II(B), B.A-II

SESSION – 2024-2025

TOPICS	DATE	REMARKS
Composition and resolution of forces	22/07/24 to 29/07/24	
Parallel forces. Moments and Couples	30/07/24 to 08/08/24	
Analytical conditions of equilibrium of coplanar forces	09/08/24 to 17/08/24	
Friction	19/08/24 to 28/08/24	
Centre of Gravity.	29/08/24 to 07/09/24	
Virtual work.	09/09/24 to 18/09/24	
Forces in three dimensions.	19/09/24 to 28/09/24	
Poinsots central axis.	30/09/24 to 08/10/24	
Wrenches	09/10/24 to 18/10/24	
Null lines and planes.	19/10/24 to 26/10/24	
Stable and unstable equilibrium	04/11/24 to 17/11/24	
Revision and Test	18/11/24 to onwards	