

Lesson Plan (2023-2024, 1st Jan to 30th April)

Name of Assistant Professor	Dr. Deepak Sehrawat
Class and Semester	B.Sc. (Maths Hons) 6th Semester
Subject	Mathematics
Paper	Elementary Topology
January	
Week –1	Definition and examples of topological spaces; Neighbourhoods, Interior point and interior of a set;
Week –2	Closed set as a complement of an open set; Adherent point and limit point of a set
Week –3	Closure of a set, Derived set, Properties of Closure operator, Boundary of a set, Dense subsets, Interior, Exterior and boundary operators.
Week –4	Relative (Induced) topology, Alternative methods of defining a topology in terms of neighbourhood system and Kuratowski closure operator.
Week –5	Base and sub-base for a topology, Neighbourhood system of a point and its properties, Base for Neighbourhood system.
February	
Week –6	Continuous functions, Open and closed functions, Homeomorphism.
Week –7	Connectedness and its characterization, Connected subsets and their properties. Continuity and connectedness.
Week –8	Components and related results; Path connected and locally connected spaces.
Week –9	Compact spaces and subsets, Compactness in terms of finite intersection property.
March	
Week –10	Continuity and compact sets, Basic properties of compactness.
Week –11	Closedness of compact subset and a continuous map from a compact space into a Hausdorff and its consequence.
Week –12	Sequentially and countably compact sets. Local compactness and one point compactification. First countable, second countable and separable spaces.
Week –13	Holi Vacations.
April	
Week –14	Hereditary and topological property. Countability of a collection of disjoint open sets in separable and second countable spaces.
Week –15	Lindelof theorem, T ₀ and T ₁ spaces.

Week –16	T2 (Hausdorff) separation axioms, their characterization.
Week –17	Revision, Problem Discussion, Class Test
Week –18	Assignment and Test

Lesson Plan (2023-2024, 1st Jan to 30th April)

Name of Assistant Professor	Dr. Deepak Sehrawat
Class and Semester	M.Sc. (Math) 2nd Semester
Subject	Mathematics
Paper	PDE

January	
Week –1	Method of separation of variables to solve Boundary Value Problems (B.V.P.) associated with one dimensional heat equation.
Week –2	Steady state temperature in a rectangular plate, Circular disc, Semi-infinite plate. The heat equation in semi-infinite and infinite regions.
Week –3	Solution of three dimensional Laplace equations, Heat Equations, Wave Equations in cartesian, cylindrical and spherical coordinates.
Week –4	Method of separation of variables to solve B.V.P. associated with motion of a vibrating string.
Week –5	Solution of wave equation for semi-infinite and infinite strings.
February	
Week –6	Partial differential equations: Examples of PDE classification.
Week –7	Transport equation – Initial value problem. Non-homogeneous equations. Laplace equation – Fundamental solution.
Week –8	Mean value formula. Class test.
Week –9	Properties of harmonic functions, Green function.
March	
Week –10	Heat Equation – Fundamental solution, Mean value formula.
Week –11	Properties of solutions, Energy methods.
Week –12	Wave Equation – Solution by spherical means, Non-homogeneous equations, Energy methods.
Week –13	Holi Vacations.
April	
Week –14	Non-linear first order PDE – Complete integrals.
Week –15	Envelopes, Characteristics, Hamilton Jacobi equations
Week –16	Calculus of variations, Hamilton ODE, Legendre transform, Hopf-Lax formula, Weak solutions, Uniqueness.
Week –17	Revision, Problem Discussion, Class Test
Week –18	Assignment and Test

Lesson Plan (2023-2024, 1st Jan to 30th April)

Name of Assistant Professor	Dr. Deepak Sehrawat
Class and Semester	B.Sc. (NM) 6th Semester (Sec-B & C)
Subject	Mathematics
Paper	Linear Algebra

January	
Week –1	Vector Spaces, subspaces, sum and direct sum of subspaces.
Week –2	Linear span, Linearly dependent and independent subset of a vector space, Finitely generated vector spaces.
Week –3	Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces.
Week –4	Invariance of the number of elements of basis sets and Dimensions Quotient space and its dimension. Class test.
Week –5	Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces.
February	
Week –6	Vector space of all the linear transformations Dual Spaces, Bidual spaces. Annihilator of subspaces of finite dimensional vector spaces.
Week –7	Null space, Range space of a linear transformation.
Week –8	Rank and Nullity theorem. Class test.
Week –9	Compact spaces and subsets, Compactness in terms of finite intersection property.
March	
Week –10	Algebra of Linear Transformation, Minimal Polynomial of a Linear transformation.
Week –11	Singular and non-singular Linear transformation, Matrix of linear transformation.
Week –12	Change of basis, Eigen Values and Eigen vectors of Linear transformation.
Week –13	Holi Vacations.
April	
Week –14	Inner Product spaces, Cauchy-Schwarz Inequality
Week –15	Orthogonal compliments, Orthogonal sets and basis, Bessel inequality for finite dimensional vector space.
Week –16	Gram-Schmidt, orthogonalization process, Adjoint of linear transformation.
Week –17	Properties of Linear transformation and Unitary linear transformation.
Week –18	Assignment, Revision, and Test

Name of Assistant Professor	Anil Kumar
Class and Semester	B.Sc Maths Hons 2nd semester
Subject	Mathematics
Paper	Discrete Math-II
Week - 1	Some Prerequisite.
Week – 2	Lattices and their properties. Lattice as algebraic system.
Week – 3	Bounded, Complement and distributive lattices.
Week – 4	Boolean algebra, definition and examples, properties, duality.
Week - 5	Distributive and complemented Calculus.
Week – 6	Design and implementation of digital networks.
Week – 7	Switching circuits, Karnaugh map. Class Test.
Week – 8	Graph, definition, exemplary types of graphs, paths and circuits.

Week - 9	Eulerian and Hermitian circuits. Matrix of graph. Class Test.
Week – 10	Seven bridges machine, shortest path traveling salesman problems. Planar graph.
Week – 11	Problem solving and Class Test.
Week – 12	Directed Graphs, Trees, Class Test.
Week - 13	Isomorphism of Trees, Representation of Algebraic Expressions by Binary Trees.
Week – 14	Spanning Tree of a Graph, Shortest Path Problem, Minimal spanning Trees, Cut Sets,
Week – 15	Tree Searching.
Week – 16	Revision and Class test

Name of the Assistant Professor	Anil Kumar
Class and Semester	B.Sc. 4th Semester, B.A.
Subject	Mathematics
Paper	Programming in C and Numerical Methods
Week-1	Some Prerequisite.
Week-2	Programmer's model of a computer, Algorithms, Flow charts.
Week-3	Data types, Operators and expressions.
Week-4	Input / outputs functions. Class Test.
Week-5	Decisions control structure: Decision statements, Logical and conditional statements. Class Test.
Week-6	Implementation of Loops.
Week-7	Switch Statement & Case control structures. Functions.
Week-8	Pre-processors and Arrays. Class Test.
Week-9	Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters

Week-10	Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures.
Week-11	Pointers: Pointers Data type, Pointers and Arrays, Pointer & Functions.
Week-12	Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson's method.
Week-13	Newton's iterative method for finding pth root of a number, Order of convergence of above methods. Class Test.
Week-14	Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Class Test.
Week-15	Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition method.
Week-16	Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.
Week-17	Revision and Class Test.

Lesson Plan (2023-2024, 1st Jan to 30th April)

Name of Assistant Professor	Sunil Kumar
Class and Semester	B.Sc. (NM), Math(H) B.A 6th Semester (Sec-A)
Subject	Mathematics
Paper	Linear Algebra
January	
Week –1	Vector Spaces, subspaces, sum and direct sum of subspaces.
Week –2	Linear span, Linearly dependent and independent subset of a vector space, Finitely generated vector spaces.
Week –3	Existence theorem for basis of a finitely generated vector space, Finite dimensional vector spaces.
Week –4	Invariance of the number of elements of basis sets and Dimensions Quotient space and its dimension. Class test.
Week –5	Homomorphism and isomorphism of vector spaces, Linear transformations and linear forms on vector spaces.
February	
Week –6	Vector space of all the linear transformations Dual Spaces, Bidual spaces. Annihilator of subspaces of finite dimensional vector spaces.
Week –7	Null space, Range space of a linear transformation.
Week –8	Rank and Nullity theorem. Class test.

Week –9	Compact spaces and subsets, Compactness in terms of finite intersection property.
March	
Week –10	Algebra of Linear Transformation, Minimal Polynomial of a Linear transformation.
Week –11	Singular and non-singular Linear transformation, Matrix of linear transformation.
Week –12	Change of basis, Eigen Values and Eigen vectors of Linear transformation.
Week –13	Holi Vacations.
April	
Week –14	Inner Product spaces, Cauchy-Schwarz Inequality
Week –15	Orthogonal compliments, Orthogonal sets and basis, Bessel inequality for finite dimensional vector space.
Week –16	Gram-Schmidt, orthogonalization process, Adjoint of linear transformation.
Week –17	Properties of Linear transformation and Unitary linear transformation.
Week –18	Assignment, Revision, and Test

Name of Assistant/Associate Professor	Sunil kumar
Class and Semester	B.Sc. Non-medical sec-A
Subject	Mathematics
Paper	ODE
January	
Week – 3	Definition of differential equation, order and degree of differential equation, formation of differential equation. Questions based on order and degree of differential equation, formation of differential equation. Que based on formation of differential equation. Geometrical meaning of a differential equation. Solution of an exact differential equation. Solution of an exact differential equation
Week – 4	Definition of integrating factor, Finding integrating factor by inspection. Rule 1,2,3,4 & 5 for finding integrating factor and question based on it.
Week - 5	Doubts on previous topics.
February	

Week - 1	Introduction of equation of first order but not of first degree. Working rule and que for the equation solvable for p. Working rule and que for equation solvable for y. Working rule and que for equation solvable for x. Solution of the equation of the type $y=x\Phi(p)+f(p)$. Solution of the equation reducible to Clairaut's form. Singular solution, p and c-discriminant.
Week - 2	Orthogonal trajectory in cartesian and polar coordinates
Week - 3	Definition of linear differential equation with constant coeff., D operator, definition of auxiliary equation, complete solution for differential equation with constant coeff. Inverse operator, complementary function, particular integral, few theorems & question based on above topic
Week - 4	Evaluate $1/f(D) x^m$, $1/f(D) (xV)$ and que based on it. Method to solve homogeneous linear equation. Explanation of the method of solution of linear differential equation reducible to homogeneous linear form. Question based on linear differential equation reducible to homogeneous linear form
March	
Week - 1	Introduction to linear differential equation of second order. method to find P.I. of $d^2y/dx^2+Pdy/dx+Qy=0$. Question based on P.I. of $d^2y/dx^2+Pdy/dx+Qy=0$.
Week - 2	Solution of a linear differential equation of second order by removing the first derivative and changing the dependent variable. Solution of a linear differential equation of second order by changing the independent variable.
Week - 3	Solution of a linear differential equation of second order by the method of variation of parameters. Solution of a linear differential equation of second order by the method of undetermined coefficient
Week - 4	Doubts and Class Test.
April	
Week - 1	Introduction to ordinary simultaneous differential equation. Solution of simultaneous differential equations involving operators x (d/dx) or t (d/dt) etc. Solution of Simultaneous equation of the form $dx/P = dy/Q = dz/R$.
Week - 2	Concept of Second integral found with the help of first. Introduction to total differential equation and condition for exactness. Method to solve total differential equation. Solution when one variable is constant out of three variable in $Pdx+Qdy+Rdz=0$

Week – 3	Method of solving homogeneous equation. Method of auxiliary equation.
Week – 4	Assignment, Test, Doubts Session

	<i>May</i>
<u>Week 1,2</u>	Revision of some typical topics and doubts clearance . Tests and presentation.

Name of the Assistant/Associate Professor: Dr Rekha
Class: M.Sc. –4th sem
Subject: MATHEMATICS
Paper: Viscous Fluid Dynamics Paper Code: 21MAT24C3 Session: 2023-24
JANUARY
Week 1 Vorticity in two dimensions, Circular and rectilinear vortices, Complex potential of Circular and line vortex
Week 2 Vortex doublet, Images, Motion due to vortices
Week 3 Centroid of Vorticities, Example based on vortex pair
Week 4 Single infinite row of vorticities, Double infinite row of vorticities Karman vortex street
Week 5: Wave motion in a Gas. Speed of sound in a gas.

FEBRUARY
Week 1 Equation of motion of a Gas. Subsonic, sonic and supersonic flows, Isentropic gas flow
Week 2 Flow through a nozzle, Stress components in a real fluid. Relation between Cartesian components of stress
Week 3 Translational motion of fluid element, Rates of strain. Transformation of rates of strains. Relation between stresses and rates of strain
Week 4 The co-efficient of viscosity and laminar flow. Newtonian and non- Newtonian fluids.
MARCH
Week 1 Navier-Stoke equations of motion. Equations of motion in cylindrical and spherical polar coordinates.
Week 2 Diffusion of vorticity. Energy dissipation due to viscosity.
Week 3 Plane Poiseuille and Couette flows between two parallel plates. Theory of lubrication. Hagen Poiseuille flow.
Week 4 Steady flow between co-axial circular cylinders and concentric

rotating cylinders. Flow through tubes of uniform elliptic and equilateral triangular cross-section.

APRIL

Week 1

Unsteady flow over a flat plate. Steady flow past a fixed sphere. Flow in convergent and divergent chennals.

Week 2

Dynamical similarity. Inspection analysis. Non-dimensional numbers. Dimensional analysis. Buckingham -theorem and its application. Physical importance of non-dimensional parameters.

Week 3

Prandtl boundary layer. Boundary layer equation in two-dimensions. The boundary layer on a flat plate (Blasius solution). Characteristic boundary layer parameters.

Week 4

Karman integral conditions. Karman-Pohlhausen method.
Revision and class test
Examples and Exercise

Name of the Assistant Professor	Dr Rekha
Class and Semester	B.Sc. 4th Semester, Section: B, D
Subject	Mathematics
Paper	Programming in C and Numerical Methods

Week-1	Some Prerequisite.
Week-2	Programmer's model of a computer, Algorithms, Flow charts.
Week-3	Data types, Operators and expressions.
Week-4	Input / outputs functions. Class Test.
Week-5	Decisions control structure: Decision statements, Logical and conditional statements. Class Test.
Week-6	Implementation of Loops.
Week-7	Switch Statement & Case control structures. Functions.
Week-8	Preprocessors and Arrays. Class Test.
Week-9	Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters
Week-10	Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures.
Week-11	Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions.
Week-12	Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson's method.
Week-13	Newton's iterative method for finding pth root of a number, Order of convergence of above methods. Class Test.
Week-14	Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Class Test.
Week-15	Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition method.
Week-16	Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.
Week-17	Revision and Class Test.

Name of the Assistant Professor		Mrs. Amita
Class and Semester		B.Sc. 4th Semester(Maths)
Subject		Mathematics
Paper		Special Functions and Int
Week-1	Define Power series method and use it in finding solution of differential equation	
Week-2	Introduce Beta and Gamma Functions and their properties	
Week-3	Define Bessel equation and finding its solution	
Week-4	Define Bessel Function and its properties-Convergence, Recurrence	
Week-5	Define Orthogonality of Bessel functions and solving the problems of the students and discuss about v	
Week-6	Legendre and Hermite differentials equations and their solutions	
Week-7	Legendre and Hermite functions and their properties-Recurrence Relations and generating functions	

Week-8	Orthogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials
Week-9	Laplace Integral Representation of Legendre polynomial and solving the problems of the students and
Week-10	Class test of 1 st and 2 nd sections, Laplace Transforms – Existence theorem for Laplace transforms, Linearity property
Week-11	Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms
Week-12	Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of
Week-13	solution of ordinary differential equations using Laplace transform and solving the problems of the students
Week-14	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem
Week-15	Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform
Week-16	Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms
Week-17	solving the problems of the students and discuss about whole Section-4, solving the problems of the students and discuss about whole Section-4, Class test of 3 rd and 4 th sections
Name of Assistant Professor	Mrs. Amita
Class and Semester	B.Sc 2nd semester (section - A and D)
Subject	Mathematics
Paper	VECTOR CALCULUS
Week - 1	Scalar and vector product of three vectors, product of four vectors.
Week – 2	Reciprocal vectors. Vector differentiation.
Week – 3	Scalar Valued point functions, vector valued point functions, derivative along a curve,
Week – 4	directional derivatives
Week - 5	Gradient of a scalar point function, geometrical interpretation of $\text{grad } \Phi$,
Week – 6	character of gradient as a point function.
Week – 7	Divergence and curl of vector point function, characters of Div f_p and Curl f_p as point function, examples.
Week – 8	Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator
Week - 9	Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors.

Week – 10	Gradient, Divergence, Curl
Week – 11	Laplacian operators in terms of orthogonal curvilinear coordinates,
Week – 12	Cylindrical co-ordinates and Spherical co- ordinates.
Week - 13	Vector integration; Line integral.
Week – 14	Surface integral, Volume integral.
Week – 15	Theorems of Gauss, Green & Stokes and problems based on these theorems.
Week – 16	Revision and Class test

Name of Assistant Professor	Dr. Sheetal Chawla
Class and Semester	B.Com (Semester – 2) Section A
Subject	Mathematics
Paper	Business Mathematics
Week - 1	Definition of matrix, its types and algebra of matrices.
Week – 2	Calculation of values of determinants upto third order.
Week – 3	Adjoint of a matrix, elementary row and column operations, Class Test.
Week – 4	Finding inverse matrix through adjoint matrix and row/ column operations.
Week - 5	Solution of a system of linear equations having unique solution and including not more than three variables, Class Test.

Week - 6	Differentiation.
Week – 7	Differentiation continued, Class Test.
Week – 8	Application of derivatives.
Week – 9	Application of derivatives continued, Class Test.
Week - 10	Different types of interest rates, concepts of present value and amount of a sum.
Week – 11	Type of annuities,
Week – 12	Class Test
Week – 13	Present value and amount of an annuity including the case of continuous compounding.
Week - 14	Ratio, Class Test.
Week – 15	Proportion and percentage.
Week – 16	Profit and loss
Week – 17	Revision and Class Test.

Name of the Assistant/Associate Professor: Dr Sheetal Chawla
Class and Section: B.Sc. Math Hons. (VI semester)
Subject: MATHEMATICS
Paper: Dynamics

Week 1

Velocity and acceleration along radial and transverse velocity

Week 2

Examples and Exercise related to Velocity and acceleration along radial and transverse velocity

Week 3

Acceleration along tangent and normal directions

Week 4

Relative velocity and acceleration

Week 5

Simple Harmonic motion, Examples and Exercise related to S.H.M.

Week 6

Elastic Strings and Examples and Exercise related to Elastic Strings

Week 7

Mass, Momentum and Force and Examples and Exercise related to Mass, Momentum and Force

Week 8

Newton laws of motion Examples and Exercise

Week 9

Work, Power and Energy Examples and Exercise

Week 10

Definition of Conservative forces Examples and Exercise

Week 11

Im

Motion on smooth and rough plane curves

Examples and Exercise

Week 13

Projectile motion of a particle in a plane

Examples and Exercise

Week 14

Vector angular velocity, General motion of a rigid body

Examples and Exercise

Week 15

Central Orbits, Kepler's laws of motion

Examples and Exercise

Week 16

Motion of a particle in three dimension, Acceleration in terms of different coordinate Systems, Examples and Exercise

Week 17

Problem
discussion and
assignment
submission

Week 18

Revision and class test
pulsive forces, Examples and Exercise

Name of the Assistant/Associate Professor: Dr Sheetal Chawla
Class and Section: B.Sc. Math (IV semester)
Subject: MATHEMATICS
Paper: Sequence and Series

Week 1

Some def. Related to Sets, Boundedness of the set of real numbers, Some Theorems on Least Upper Bound of a set, Some Theorems on Greatest Lower Bound of a set, Completeness Axiom, Archimedean Property of Reals, Neighborhood of a point

Week 2

Deleted Nbd, Interior point of a set, Some Theorems on open Sets, Closed sets, their examples, Some Theorems on closed Sets, Limit point of a set, some Important theorems and Revision

Week 3

Examples on limit point, Open sets, their examples, Related Theorems of open sets, Closed sets, Interior of a set, Closure of a set in real numbers and their properties

Week 4

Bolzano- Weierstrass Theorem, Open covers, Compact sets and Heine- Borel Theorem, Revision, Problem Discussion and test of Unit-1

Week 5

Real Sequence and Convergence, Some Theorems on Convergent Sequence, Examples on Convergent Sequence, Some basic Theorems on Limits, Squeeze principle, Cauchy's Theorem on Limits, Related Examples of Cauchy's Theorem, Bounded and Monotonic Sequences, Examples on Monotonic Sequences

Week 6

Limit Point, Cauchy's Sequence, Cauchy's General principle of convergence, Examples on Cauchy's Sequence, Subsequences, Subsequential limits, Infinite Series, Convergence and Divergence of an infinite series

Week 7

Examples on convergence and divergence of the series, Comparison test of positive terms infinite series, Cauchy's general principle of convergence of series, Convergence and divergence of geometric series, Hyper harmonic series or p-series, Revision, Problem discussion and test.

Week 8

Infinite Series: D' Alembert's Ratio Test, Examples on Alembert's Ratio Test, Cauchy's Root Test, Examples on Cauchy's Root Test, Rabbe's Test, Examples on Rabbe's Test

Week 9

Logarithmic Test, Examples on Logarithmic Test, De Morgan and Bertrand's Test, Examples on De Morgan and Bertrand's Test, Cauchy's nth root test, Examples on Cauchy's nth root test

Week 10

Gauss Test, Examples on Gauss Test, Cauchy's Integral Test, Examples on Cauchy's Integral Test, Cauchy's Condensation Test, Examples on Cauchy's Condensation Test, Revision and Problem Discussion and Test

Week 11

Leibnitz's Test for the convergence of alternating series, Examples on above topic, Abel's lemma, Abel's Test, Dirichlet's Test, their examples, Insertion and removal of parenthesis, Re-arrangement of terms in a series, Dirichlet's Theorem

Week 12

Riemann's Re-arrangement Theorem, Pringsheim Theorem and their examples Revision and Multiplication of series

Week 13

Product Theorem, Cauchy's Theorem, Mertin's Theorem their examples Cesaro's Theorem, Abel's Theorem
their examples

Week 14

Infinite Product, Sequence of Partial Product and their examples General Principles of convergence of an Infinite Product

Week 15

Some Theorems for proving the convergence of Infinite Products, Test and submission of assignment

Week 16

Absolute convergence of an infinite product, Problem discussion and test

Week 17

Problem discussion
and assignment
submission

Week 18

Revision and class test

Name of Assistant Professor	Dr.Upma
Class and Semester	B.Sc PHYSICS(Hons) Semester-II
Subject	Mathematics

Paper	Mathematics-II
Week - 1	Functions of a real variable. Limits, continuity and differentiability of functions.
Week – 2	Uniform continuity on (a,b) implying uniform theorem for analytic functions.
Week – 3	Intermediate value theorems and Taylor’s theorem and analytic functions.
Week – 4	Taylor’s and Maclaurin’s series of elementary analytic functions
Week - 5	Functions of two and three reals variables their continuity
Week – 6	Functions of two and three reals variables their differentiability
Week – 7	Schwarz and Young theorem, implicit function theorem
Week – 8	Definition and examples of Riemann integral of a bounded function
Week - 9	Riemann integrability of continuous and monotonic functions.
Week – 10	Riemann integral as the limit of a sum.
Week – 11	The fundamental theorem of integral calculus. Mean-value theorems
Week – 12	Integration of rational and irrational functions.
Week - 13	Integration by partial functions
Week – 14	Properties of definite integral
Week – 15	Reduction formulae
Week – 16	Revision and Class test

Name of Assistant Professor	Dr.Upma
Class and Semester	B.Sc 2nd semester (section - C)
Subject	Mathematics

Paper	VECTOR CALCULUS
Week - 1	Scalar and vector product of three vectors, product of four vectors.
Week – 2	Reciprocal vectors. Vector differentiation.
Week – 3	Scalar Valued point functions, vector valued point functions, derivative along a curve,
Week – 4	directional derivatives
Week - 5	Gradient of a scalar point function, geometrical interpretation of $\text{grad } \Phi$,
Week – 6	character of gradient as a point function.
Week – 7	Divergence and curl of vector point function, characters of $\text{Div } \mathbf{f}_p$ and $\text{Curl } \mathbf{f}_p$ as point function, examples.
Week – 8	Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator
Week - 9	Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors.
Week – 10	Gradient, Divergence, Curl
Week – 11	Laplacian operators in terms of orthogonal curvilinear coordinates,
Week – 12	Cylindrical co-ordinates and Spherical co- ordinates.
Week - 13	Vector integration; Line integral.
Week – 14	Surface integral, Volume integral.
Week – 15	Theorems of Gauss, Green & Stokes and problems based on these theorems.
Week – 16	Revision and Class test

Name of Assistant Professor	Dr.Upma
Class and Semester	B.Sc Maths Hons 2nd semester
Subject	Mathematics
Paper	Regression Analysis and Probability
Week - 1	Linear Regression: Concept of regression, principle of least squares and fitting of straight line
Week – 2	Derivation of two lines of regression, properties of regression coefficients
Week – 3	Standard error of estimate obtained from regression line, correlation coefficient between

	observed and estimated values
Week – 4	Angle between two lines of regression. Difference between correlation and regression.
Week - 5	Curvilinear Regression: Fitting of second degree parabola
Week – 6	Power curve of the type $Y=ax^b$, exponential curves of the types $Y=ab^x$ and $Y=ae^{bx}$.
Week – 7	Concepts in Probability: Random experiment, trial, sample point, sample space, operation of events, exhaustive, equally likely and independent events,
Week – 8	Definition of probability—classical, relative frequency, statistical and axiomatic approach
Week - 9	Addition and multiplication laws of probability, Boole's inequality.
Week – 10	Bayes' theorem and its applications. Random Variable and Probability Functions
Week – 11	Definition and properties of random variables, discrete and continuous random variable
Week – 12	Probability mass and density functions, distribution function.
Week - 13	Concepts of bivariate random variable: joint, marginal and conditional distributions.
Week – 14	Mathematical Expectation: Definition and its properties—moments
Week – 15	Measures of location, dispersion, skewness and kurtosis
Week – 16	Revision and Class test

Name of Assistant Professor	Dr.Upma
Class and Semester	B.Sc PHYSICS(Hons) Semester-IV
Subject	Mathematics
Paper	Mathematics-IV
Week - 1	Discrete and continuous distribution and distributions.
Week – 2	Binomial distribution, Poisson distribution
Week – 3	Geometric distribution, Normal distribution
Week – 4	Exponential distribution
Week - 5	Bivariate distribution, conditional distribution and marginal distribution
Week – 6	Correlation and regression for two variables only

Week – 7	Weak law of large numbers
Week – 8	Central limit theorem for independent and identically distributed random variables.
Week - 9	Definitions of random sample, parameter and statistic.
Week – 10	Concept of sampling distribution
Week – 11	Standard error sampling distribution of mean variance of random sample from a normal population.
Week – 12	Tests of significance based on t
Week - 13	Tests of significance based on f
Week – 14	Chi-square distributions.
Week – 15	Numerical Problems on sampling
Week – 16	Revision and Class test

Name of the Assistant Professor	Suman
Class and Semester	B.Sc. 4th Semester, B.A.
Subject	Mathematics
Paper	Special Functions and Integral Transforms
Week-1	Define Power series method and use it in finding solution of differential equation
Week-2	Introduce Beta and Gamma Functions and their properties
Week-3	Define Bessel equation and finding its solution
Week-4	Define Bessel Function and its properties-Convergence, Recurrence
Week-5	Define Orthogonality of Bessel functions and solving the problems of the students and discuss about whole Section-1
Week-6	Legendre and Hermite differentials equations and their solutions
Week-7	Legendre and Hermite functions and their properties-Recurrence Relations and generating functions
Week-8	Orthogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials,

Week-9	Laplace Integral Representation of Legendre polynomial and solving the problems of the students and discuss about whole Section-2
Week-10	Class test of 1 st and 2 nd sections, Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems
Week-11	Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms
Week-12	Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals
Week-13	solution of ordinary differential equations using Laplace transform and solving the problems of the students and discuss about whole Section-3
Week-14	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem
Week-15	Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform
Week-16	Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms.
Week-17	solving the problems of the students and discuss about whole Section-4, solving the problems of the students and discuss about whole Section-4, Class test of 3 rd and 4 th sections

Name of the Assistant Professor	Suman
Class and Semester	Chem. Hons. 2nd Semester
Subject	Mathematics
Paper	Mathematics-II Optional

Week 1	Matrices. Operations on matrices. Determinants. Adjoint and inverse of a matrix
Week 2	Rank of a matrix. Simultaneous equations: method of substitution and elimination, Consistency and independence. Homogeneous linear equations. Simultaneous equations with more
Week 3	Simultaneous equations with more than two unknowns, Cramer's rule, matrix eigen values and eigenvectors, Diagonalization of a matrix.
Week 4	Definition of a group with example
Week 5	simple properties of groups, Subgroups,
Week 6	Generation of groups, cyclic groups, Cosets, Left and right cosets, Index of a sub-group

Week 7	Coset decomposition, Lagrange's theorem.
Week 8	Normal subgroups, Quotient groups
Week 9	Cartesian Coordinates, Distance between two points,
Week 10	Various forms of the equation of a line.
Week 11	General equation of a line. Circle, Parabola
Week 12	General equation of Ellipse and Hyperbola.
Week 13	Scalars and Vectors. product of two vectors, product of three vectors.
Week 14	Vector differentiation. Gradient of a scalar point function, Divergence and curl of vector point function
Week 15	Gradient, divergence and curl of sums and product and their related vector identities(without proofs). Laplacian operator.
Week 16	Problem discussion
Week 17	Test and submission of Assignment

Name of the Assistant Professor	Suman
Class and Semester	Chem. Hons. 4th Semester
Subject	Mathematics
Paper	Mathematics-IV Optional

Week 1	Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Newton-Raphson's method.
Week 2	Numerical Integration: Trapezoidal rule,
Week 3	Simpson's one-third and three-eighth rule, Gauss Quadrature formula
Week 4	Concepts in Probability: Random experiment, trial, exhaustive, equally likely
Week 5	independent events. Definition of probability- classical ,
Week 6	relative frequency
Week 7	Problems related to relative frequency
Week 8	Statistical and axiomatic approach,
Week 9	Addition and multiplication laws of probability
Week 10	Bayes theorem and its Application
Week 11	Regression: Concept of regression,
Week 12	two lines of regression,
Week 13	Test of significance:t-test for single mean,
Week 14	Chi-square test,ANOVA for one way
Week 15	Chi-square test,ANOVA for two way classified data
Week 16	Test and Submission of Assignment

Week 17	Problem discussion and Test
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Name of the Assistant/Associate Professor: Suman
Class and Section: B.Sc. Math (IV semester) Section C
Subject: MATHEMATICS
Paper: Sequence and Series

Week 1

Some def. Related to Sets, Boundedness of the set of real numbers, Some Theorems on Least Upper Bound of a set, Some Theorems on Greatest Lower Bound of a set, Completeness Axiom, Archimedean Property of Reals, Neighborhood of a point

Week 2

Deleted Nbd, Interior point of a set, Some Theorems on open Sets, Closed sets, their examples, Some Theorems on closed Sets, Limit point of a set, some Important theorems and Revision

Week 3

Examples on limit point, Open sets, their examples, Related Theorems of open sets, Closed sets, Interior of a set, Closure of a set in real numbers and their properties

Week 4

Bolzano- Weierstrass Theorem, Open covers, Compact sets and Heine- Borel Theorem, Revision, Problem Discussion and test of Unit-1

Week 5

Real Sequence and Convergence, Some Theorems on Convergent Sequence, Examples on Convergent Sequence, Some basic Theorems on Limits, Squeeze principle, Cauchy's Theorem on Limits, Related Examples of Cauchy's Theorem, Bounded and Monotonic Sequences, Examples on Monotonic Sequences

Week 6

Limit Point, Cauchy's Sequence, Cauchy's General principle of convergence, Examples on Cauchy's Sequence, Subsequences, Subsequential limits, Infinite Series, Convergence and Divergence of an infinite series

Week 7

Examples on convergence and divergence of the series, Comparison test of positive terms infinite series, Cauchy's general principle of convergence of series, Convergence and divergence of geometric series, Hyper harmonic series or p-series, Revision, Problem discussion and test.

Week 8

Infinite Series: D' Alembert's Ratio Test, Examples on Alembert's Ratio Test, Cauchy's Root Test, Examples on Cauchy's Root Test, Rabbe's Test, Examples on Rabbe's Test

Week 9

Logarithmic Test, Examples on Logarithmic Test, De Morgan and Bertrand's Test, Examples on De Morgan and Bertrand's Test, Cauchy's nth root test, Examples on Cauchy's nth root test

Week 10

Gauss Test, Examples on Gauss Test, Cauchy's Integral Test, Examples on Cauchy's Integral Test, Cauchy's Condensation Test, Examples on Cauchy's Condensation Test, Revision and Problem Discussion and Test

pic, Abel's lemma, Abel's Test, Dirichlet's Test, their examples, Insertion and removal of parenthesis, Re-arrangement of terms in a series, Dirichlet's Theorem

Week 12

Riemann's Re-arrangement Theorem, Pringsheim Theorem and their examples Revision and Multiplication of series

Week 13**Week****11**

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Product Theorem, Cauchy's Theorem, Mertin's Theorem their examples Cesaro's Theorem, Abel's Theorem their examples

Week 14

Infinite Product, Sequence of Partial Product and their examples General Principles of convergence of an Infinite Product

Week 15

Some Theorems for proving the convergence of Infinite Products, Test and submission of assignment

Week 16

Absolute convergence of an infinite product, Problem discussion and test

Week 17

Problem discussion and assignment submission

Week 18

- Revision and class test

Assistant Professor	Asha Rani
Class and Semester	B.Sc. NM (sem 2)
Subject	Mathematics
Paper	ODE
Week 1	Definition of differential equation, order and degree of differential equation, formation of differential equation. Questions based on order and degree of differential equation, formation of differential equation.
Week 2	Questions based on formation of differential equation. Geometrical meaning of a differential equation. Solution of an exact differential equation. Solution of an exact differential equation
Week 3	Definition of integrating factor, Finding integrating factor by inspection. Rule 1,2,3,4 & 5 for finding integrating factor and question based on it.
Week - 4	Doubts on previous topics.
Week - 5	Introduction of equation of first order but not of first degree. Working rule and que for the equation solvable for p. Working rule and que for equation solvable for y. Working rule and que for equation solvable for x. Solution of the equation of the type $y=x\Phi(p)+f(p)$. Solution of the equation reducible to Clairaut's form. Singular solution, p and c-discriminant.
Week – 6	Orthogonal trajectory in cartesian and polar coordinates
Week – 7	Definition of linear differential equation with constant coeff., Doperator, definition of auxiliary equation, complete solution for differential equation with constant coeff. Inverse operator, complementary function, particular integral, few theorems & question based on above topic
Week – 8	Evaluate $1/f(D) x^m$, $1/f(D) (xV)$ and que based on it. Method to solve homogeneous linear equation. Explanation of the method of solution of linear differential equation reducible to homogeneous

	linear form. Question based on linear differential equation reducible to homogeneous linear form
Week– 9	Introduction to linear differential equation of second order. method to find P.I. of $d^2y/dx^2+Pdy/dx+Qy=0$. Que action based on P.I. of $d^2y/dx^2+Pdy/dx+Qy=0$.

Week – 10	Solution of a linear differential equation of second order by removing the first derivative and changing the dependent variable. Solution of a linear differential equation of second order by changing the independent variable.
Week – 11	Solution of a linear differential equation of second order by the method of variation of parameters. Solution of a linear differential equation of second order by the method of undetermined coefficient
Week – 12	Doubts and Class Test.
Week - 13	Introduction to ordinary simultaneous differential equation. Solution of simultaneous differential equations involving operators $x (d/dx)$ or $t (d/dt)$ etc. Solution of Simultaneous equation of the form $dx/P = dy/Q = dz/R$.
Week – 14	Concept of Second integral found with the help of first. Introduction to total differential equation and condition for exactness. Method to solve total differential equation. Solution when one variable is constant out of three variable in $Pdx+Qdy+Rdz=0$
Week – 15	Method of solving homogeneous equation. Method of auxiliary equation
Week -16	Revision of some typical topics and doubts clearance. Tests and presentation.
Week -17,18	Assignment, Test, Doubts Session

Lesson Plan January 2024 to April 2024

Name of the Assistant/Associate Professor: Dr Ravinder
Class and Section: B.Sc. (VI semester)
Subject: MATHEMATICS
Paper: Dynamics
Week 1 Velocity and acceleration along radial and transverse velocity
Week 2 Examples and Exercise related to Velocity and acceleration along radial and transverse velocity
Week 3 Acceleration along tangent and normal directions
Week 4 Relative velocity and acceleration
Week 5 Simple Harmonic motion, Examples and Exercise related to S.H.M.
Week 6 Elastic Strings and Examples and Exercise related to Elastic Strings
Week 7 Mass, Momentum and Force and Examples and Exercise related to Mass, Momentum and Force
Week 8 Newton laws of motion Examples and Exercise
Week 9 Work, Power and Energy Examples and Exercise
Week 10 Definition of Conservative forces Examples and Exercise
Week 11 Impulsive forces, Examples and Exercise

Week 12

Motion on smooth and rough plane curves
Examples and Exercise

Week 13

Projectile motion of a particle in a plane
Examples and Exercise

Week 14

Vector angular velocity , General motion of a rigid body
Examples and Exercise

Week 15

Central Orbits, Kepler's laws of motion
Examples and Exercise

Week 16

Motion of a particle in three dimension, Acceleration in terms of different coordinate
Systems, Examples and Exercise

Week 17

Problem
discussion and

Lesson Plan

Name of Assistant Professor	Ravinder kumar
Class and Semester	B.Com (Semester – 2) Section C
Subject	Mathematics
Paper	Business Mathematics
Week - 1	Definition of matrix, its types and algebra of matrices.
Week – 2	Calculation of values of determinants upto third order.
Week – 3	Adjoint of a matrix, elementary row and column operations, Class Test.
Week – 4	Finding inverse matrix through adjoint matrix and row/ column operations.
Week - 5	Solution of a system of linear equations having unique solution and including not more than three variables, Class Test.
Week - 6	Differentiation.
Week – 7	Differentiation continued, Class Test.
Week – 8	Application of derivatives.
Week – 9	Application of derivatives continued, Class Test.
Week - 10	Different types of interest rates, concepts of present value and amount of a sum.
Week – 11	Type of annuities,
Week – 12	Class Test
Week – 13	Present value and amount of an annuity including the case of continuous compounding.
Week - 14	Ratio, Class Test.
Week – 15	Proportion and percentage.

Week – 16	Profit and loss
Week – 17	Revision and Class Test.

Name of Assistant Professor	Dr Roji
Class and Semester	B.A.
Subject	Mathematics
Paper	VECTOR CALCULUS
Week - 1	Scalar and vector product of three vectors, product of four vectors.
Week – 2	Reciprocal vectors. Vector differentiation.

Week – 3	Scalar Valued point functions, vector valued point functions, derivative along a curve,
Week – 4	directional derivatives
Week - 5	Gradient of a scalar point function, geometrical interpretation of $\text{grad } \Phi$,
Week – 6	character of gradient as a point function.
Week – 7	Divergence and curl of vector point function, characters of $\text{Div } \mathbf{f}$ and $\text{Curl } \mathbf{f}$ as point function, examples.
Week – 8	Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator
Week - 9	Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors.
Week – 10	Gradient, Divergence, Curl
Week – 11	Laplacian operators in terms of orthogonal curvilinear coordinates,
Week – 12	Cylindrical co-ordinates and Spherical co- ordinates.
Week - 13	Vector integration; Line integral.
Week – 14	Surface integral, Volume integral.
Week – 15	Theorems of Gauss, Green & Stokes and problems based on these theorems.
Week – 16	Revision and Class test

Name of the Assistant Professor	Dr. Rozi, Suman
Class and Semester	B.Sc. 4th Semester, B.A.
Subject	Mathematics
Paper	Special Functions and Integral Transforms
Week-1	Define Power series method and use it in finding solution of differential equation
Week-2	Introduce Beta and Gamma Functions and their properties
Week-3	Define Bessel equation and finding its solution
Week-4	Define Bessel Function and its properties-Convergence, Recurrence
Week-5	Define Orthogonality of Bessel functions and solving the problems of the students and discuss about whole Section-1

Week-6	Legendre and Hermite differentials equations and their solutions
Week-7	Legendre and Hermite functions and their properties-Recurrence Relations and generating functions
Week-8	Orthogonality of Legendre and Hermite polynomials. Rodrigues' Formula for Legendre & Hermite Polynomials,
Week-9	Laplace Integral Representation of Legendre polynomial and solving the problems of the students and discuss about whole Section-2
Week-10	Class test of 1 st and 2 nd sections, Laplace Transforms – Existence theorem for Laplace transforms, Linearity of the Laplace transforms, Shifting theorems
Week-11	Laplace transforms of derivatives and integrals, Differentiation and integration of Laplace transforms
Week-12	Convolution theorem, Inverse Laplace transforms, convolution theorem, Inverse Laplace transforms of derivatives and integrals
Week-13	solution of ordinary differential equations using Laplace transform and solving the problems of the students and discuss about whole Section-3
Week-14	Fourier transforms: Linearity property, Shifting, Modulation, Convolution Theorem
Week-15	Fourier Transform of Derivatives, Relations between Fourier transform and Laplace transform
Week-16	Parseval's identity for Fourier transforms, solution of differential Equations using Fourier Transforms.
Week-17	solving the problems of the students and discuss about whole Section-4, solving the problems of the students and discuss about whole Section-4, Class test of 3 rd and 4 th sections

Name of Assistant Professor	Rajesh Mor
Class and Semester	B.A & B.Sc. (NM) 2nd Semester
Subject	Mathematics
Paper	ODE
January	
Week – 3	Definition of differential equation, order and degree of differential equation, formation of differential equation. Questions based on order and degree of differential equation, formation of differential equation. Que based on formation of differential equation. Geometrical meaning of a differential equation. Solution of an exact differential equation. Solution of an exact differential equation
Week – 4	Definition of integrating factor, Finding integrating factor by inspection. Rule 1,2,3,4 & 5 for finding integrating factor and question based on it.
Week - 5	Doubts on previous topics.
February	
Week - 1	Introduction of equation of first order but not of first degree. Working rule and que for the equation solvable for p. Working rule and que for equation solvable for y. Working rule and que for equation solvable for x. Solution of the equation of the type $y=x\Phi(p)+f(p)$. Solution of the equation reducible to Clairaut's form. Singular solution, p and c-discriminant.
Week – 2	Orthogonal trajectory in cartesian and polar coordinates
Week – 3	Definition of linear differential equation with constant Coeff., D operator, definition of auxiliary equation, complete solution for differential equation with constant Coeff. Inverse operator, complementary function, particular integral, few theorems & question based on above topic
Week – 4	Evaluate $1/f(D) x^m$, $1/f(D) (xV)$ and que based on it. Method to solve homogeneous linear equation. Explanation of the method of solution of linear differential equation reducible to homogeneous

	linear form. Question based on linear differential equation reducible to homogeneous linear form
Week March	
Week – 1	Introduction to linear differential equation of second order. method to find P.I. of $d^2y/dx^2+Pdy/dx+Qy=0$. Questions based on P.I. of $d^2y/dx^2+Pdy/dx+Qy=0$.
Week – 2	Solution of a linear differential equation of second order by removing the first derivative and changing the dependent variable. Solution of a linear differential equation of second order by changing the independent variable.
Week – 3	Solution of a linear differential equation of second order by the method of variation of parameters. Solution of a linear differential equation of second order by the method of undetermined coefficient
Week – 4	Doubts and Class Test.
April	
Week - 1	Introduction to ordinary simultaneous differential equation. Solution of simultaneous differential equations involving operators $x (d/dx)$ or $t (d/dt)$ etc. Solution of Simultaneous equation of the form $dx/P = dy/Q = dz/R$.
Week – 2	Concept of Second integral found with the help of first. Introduction to total differential equation and condition for exactness. Method to solve total differential equation. Solution when one variable is constant out of three variables in $Pdx+Qdy+Rdz=0$
Week – 3	Method of solving homogeneous equation. Method of auxiliary equation.
Week – 4	Assignment, Test, Doubts Session
May	
<u>Week 1,2</u>	Revision of some typical topics and doubts clearance . Tests and presentation.

Lesson Plan

Name of College: Pt. Neki Ram Sharma Government College, Rohtak, Academic Session 2023-24

Semester: Even

Name of Asstt./Ass. Prof : Mr. Sanjay

Class: B.Sc(Pass) 4th Semester (Mathematics) Section D

Name of Subject: Sequence and Series

01 st January 2024 to 30 th April 2024	
Month (January)	
Week 1	Some def. Related to Sets, Boundedness of the set of real numbers, Some Theorems on Least Upper Bound of a set, Some Theorems on Greatest Lower Bound of a set, Completeness Axiom, Archimedean Property of Reals, Neighborhood of a point
Week 2	Deleted Nbd, Interior point of a set, Some Theorems on open Sets, Closed sets, their examples, Some Theorems on closed Sets, Limit point of a set, some Important theorems and Revision
Week 3	Examples on limit point, Open sets, their examples, Related Theorems of open sets, Closed sets, Interior of a set, Closure of a set in real numbers and their properties
Week 4	Bolzano- Weierstrass Theorem, Open covers, Compact sets and Heine- Borel Theorem, Revision, Problem Discussion and test of Unit-1
Week 5	Real Sequence and Convergence, Some Theorems on Convergent Sequence, Examples on Convergent Sequence, Some basic Theorems on Limits, Squeeze principle, Cauchy's Theorem on Limits, Related Examples of Cauchy's Theorem, Bounded and Monotonic Sequences, Examples on Monotonic Sequences
Month (February)	
Week 6	Limit Point, Cauchy's Sequence, Cauchy's General principle of convergence, Examples on Cauchy's Sequence, Subsequences, Subsequential limits, Infinite Series, Convergence and Divergence of an infinite series
Week 7	Examples on convergence and divergence of the series, Comparison test of positive terms infinite series, Cauchy's general principle of convergence of series, Convergence and divergence of geometric series, Hyper harmonic series or p-series, Revision, Problem discussion and test.
Week 8	Infinite Series: D' Alembert's Ratio Test, Examples on Alembert's Ratio Test, Cauchy's Root Test, Examples on Cauchy's Root Test, Rabbe's Test, Examples on Rabbe's Test
Week 9	Logarithmic Test, Examples on Logarithmic Test, De Morgan and Bertrand's Test, Examples on De Morgan and Bertrand's Test, Cauchy's nth root test, Examples on Cauchy's nth root test
Month (March)	

Week 10	Gauss Test, Examples on Gauss Test, Cauchy's Integral Test, Examples on Cauchy's Integral Test, Cauchy's Condensation Test, Examples on Cauchy's Condensation Test, Revision and Problem Discussion and Test
Week 11	Leibnitz's Test for the convergence of alternating series, Examples on above topic, Abel's lemma, Abel's Test, Dirichlet's Test, their examples, Insertion and removal of parenthesis, Re-arrangement of terms in a series, Dirichlet's Theorem
Week 12	Riemann's Re-arrangement Theorem, Pringsheim Theorem and their examples Revision and Multiplication of series
Week 13	Vacation Holi
Month (April)	
Week 14	Product Theorem, Cauchy's Theorem, Mertin's Theorem their examples Cesaro's Theorem, Abel's Theorem their examples
Week 15	Infinite Product, Sequence of Partial Product and their examples General Principles of convergence of an Infinite Product
Week 16	Some Theorems for proving the convergence of Infinite Products, Test and submission of assignment
Week 17	Absolute convergence of an infinite product, Problem discussion and test
Week 18 Upto to 30 April	Revision, Assignment and Test

Lesson Plan

B.Sc. (Hons)4 th Semester

Name of Assistant Professor	Sanjay
Class and Semester	B. Sc.Hond(Semester – 4)
Subject	Mathematics
Paper	Elementary Inference
Week - 1	Statements of parameter and statistic,distribution and sampling error.
Week – 2	Point and interwal estimation, Unbiased estimator and their examples.
Week - 3	Efficiency,Consistency
Week - 4	Sufficiency and their examples
Week - 5	Method of maximum likelihood estimator
Week - 6	Examples based on maximum likelihood estimator
Week - 7	Examples based on maximum likelihood estimator
Week - 8	simple and composite hypotheses
Week - 9	Critical region,level of signficance
Week - 10	one tailed and two tailed test.

Week - 11	Types of error
Week – 12	Neymann Pearson lemma and their examples
Week – 13	Testing and interval estimation of a single mean, single proportion and their examples.
Week – 14	Difference between two mean and two proportion. Fisher's Z transformation
Week - 15	Definition of Chi-square statistic, Chi-square tests for goodness of fit and independence of attributes.,
Week – 6	Definition of Student's 't' and Snedcor's F-statistics. Testing for the mean and variance of univariate normal distributions
Week – 17	Testing of equality of two means and two variances of two univariate normal distributions. Related confidence intervals. Analysis of variance (ANOVA) for one-way and two-way classified data.
Week - 18	Revision

Name of Assistant Professor	Vikash
Class and Semester	B.Sc. (MH) 6th Semester
Subject	Mathematics
Paper	Fluid Dynamics
January	
Week – 3	Kinematics - Eulerian and Lagrangian methods. Stream lines, path lines and streak lines.
Week – 4	Velocity potential. Irrotational and rotational motions
Week - 5	Vortex lines. Equation of continuity. Boundary surfaces. Doubts on previous topics.
February	
Week - 1	Acceleration at a point of a fluid. Components of acceleration in cylindrical and spherical polar co-ordinates,
Week – 2	Pressure at a point of a moving fluid. Euler's and Lagrange's equations of motion.
Week – 3	Bernoulli's equation. Impulsive motion.
Week – 4	Stream function and Doubts on previous topics.
Week March	
Week– 1	Acyclic and cyclic irrotational motions. Kinetic energy of irrotational flow.
Week – 2	Kelvin's minimum energy theorem. Axially symmetric flows. Liquid streaming past a fixed sphere.
Week – 3	Motion of a sphere through a liquid at rest at infinity. Equation of motion of a sphere.
Week – 4	Three-dimensional sources, sinks, doublets and their images. Stoke's stream function. Doubts and Class Test.
April	
Week - 1	Irrotational motion in two-dimensions. Complex velocity potential.
Week – 2	Milne-Thomson circle theorem. Two-dimensional sources, sinks, doublets and their images. Blasius theorem.
Week – 3	Two- dimensional irrotational motion produced by motion of circular and coaxial cylinders in an infinite mass of liquid.
Week – 4	Assignment, Test, Doubts Session

Name of Assistant Professor	Vikash
Class and Semester	B.Sc. (MH) 4th Semester
Subject	Mathematics
Paper	HYDROSTATICS
January	
Week – 3	Pressure equation. Condition of equilibrium. Lines of force. Homogeneous and heterogeneous fluids.
Week – 4	Elastic fluids. Surface of equal pressure. Fluid at rest under action of gravity. Rotating fluids
Week - 5	Doubts on previous topics.
February	
Week - 1	Fluid pressure on plane surfaces.
Week – 2	Centre of pressure. Resultant pressure on curved surfaces.
Week – 3	Equilibrium of floating bodies.
Week – 4	Curves of buoyancy. Surface of buoyancy.
Week March	
Week– 1	Stability of equilibrium of floating bodies.
Week – 2	Vessels containing liquid and Metacentre.
Week – 3	Work done in producing a displacement.
Week – 4	Doubts and Class Test.
April	
Week - 1	Gas laws. Mixture of gases.
Week – 2	Internal energy. Adiabatic expansion.
Week – 3	Work done in compressing a gas. Isothermal atmosphere. Connective equilibrium.
Week – 4	Assignment, Test, Doubts Session

Lesson Plan

Name of College: Pt. Neki Ram Sharma Government College, Rohtak, Academic Session 2023-24

Semester: Even

Name of Asstt./Ass. Prof : Dr. Amit Sehgal

Class: B.Sc(Pass) 4th Semester (Mathematics)

Name of Subject: **Programming in C and Numerical Methods**

01 st January 2024 to 30 th April 2024	
Month (January)	
Week 1	Some Prerequisite.
Week 2	Programmer's model of a computer, Algorithms, Flow charts.
Week 3	Data types, Operators and expressions.
Week 4	Input / outputs functions. Class Test.
Week 5	Decisions control structure: Decision statements, Logical and conditional statements. Class Test.
Month (February)	
Week 6	Implementation of Loops.
Week 7	Switch Statement & Case control structures. Functions.
Week 8	Preprocessors and Arrays. Class Test.
Week 9	Strings: Character Data Type, Standard String handling Functions, Arithmetic Operations on Characters
Month (March)	
Week 10	Structures: Definition, using Structures, use of Structures in Arrays and Arrays in Structures.
Week 11	Pointers: Pointers Data type, Pointers and Arrays, Pointers and Functions.
Week 12	Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson's method.
Week 13	Vacation Holi
Month (April)	
Week 14	Newton's iterative method for finding pth root of a number, Order of convergence of above methods. Class Test.

Week 15	Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Class Test.
Week 16	Triangularization method (LU decomposition method). Crout's method, Cholesky Decomposition method.
Week 17	Iterative method, Jacobi's method, Gauss-Seidal's method, Relaxation method.
Week 18 Upto to 30 April	Revision and Class Test.

Lesson Plan

Name of College: Pt. Neki Ram Sharma Government College, Rohtak, Academic Session 2023-24

Semester: Even

Name of Asstt./Ass. Prof : Sunil Dua

Class: B.Sc(H) 4th Semester (Mathematics)

Name of Subject: Sequence and Series

01 st January 2024 to 30 th April 2024	
Month (January)	
Week 1	Some def. Related to Sets, Boundedness of the set of real numbers, Some Theorems on Least Upper Bound of a set, Some Theorems on Greatest Lower Bound of a set, Completeness Axiom, Archimedean Property of Reals, Neighborhood of a point
Week 2	Deleted Nbd, Interior point of a set, Some Theorems on open Sets, Closed sets, their examples, Some Theorems on closed Sets, Limit point of a set, some Important theorems and Revision
Week 3	Examples on limit point, Open sets, their examples, Related Theorems of open sets, Closed sets, Interior of a set, Closure of a set in real numbers and their properties
Week 4	Bolzano- Weierstrass Theorem, Open covers, Compact sets and Heine- Borel Theorem, Revision, Problem Discussion and test of Unit-1
Week 5	Real Sequence and Convergence, Some Theorems on Convergent Sequence, Examples on Convergent Sequence, Some basic Theorems on Limits, Squeeze principle, Cauchy's Theorem on Limits, Related Examples of Cauchy's Theorem, Bounded and Monotonic Sequences, Examples on Monotonic Sequences
Month (February)	
Week 6	Limit Point, Cauchy's Sequence, Cauchy's General principle of convergence, Examples on Cauchy's Sequence, Subsequences, Subsequential limits, Infinite Series, Convergence and Divergence of an infinite series
Week 7	Examples on convergence and divergence of the series, Comparison test of positive terms infinite series, Cauchy's general principle of convergence of series, Convergence and divergence of geometric series, Hyper harmonic series or p-series, Revision, Problem discussion and test.
Week 8	Infinite Series: D' Alembert's Ratio Test, Examples on Alembert's Ratio Test, Cauchy's Root Test, Examples on Cauchy's Root Test, Rabbe's Test, Examples on Rabbe's Test
Week 9	Logarithmic Test, Examples on Logarithmic Test, De Morgan and Bertrand's Test, Examples on De Morgan and Bertrand's Test, Cauchy's nth root test, Examples on Cauchy's nth root test
Month (March)	

Week 10	Gauss Test, Examples on Gauss Test, Cauchy's Integral Test, Examples on Cauchy's Integral Test, Cauchy's Condensation Test, Examples on Cauchy's Condensation Test, Revision and Problem Discussion and Test
Week 11	Leibnitz's Test for the convergence of alternating series, Examples on above topic, Abel's lemma, Abel's Test, Dirichlet's Test, their examples, Insertion and removal of parenthesis, Re-arrangement of terms in a series, Dirichlet's Theorem
Week 12	Riemann's Re-arrangement Theorem, Pringsheim Theorem and their examples Revision and Multiplication of series
Week 13	Vacation Holi
Month (April)	
Week 14	Product Theorem, Cauchy's Theorem, Mertin's Theorem their examples Cesaro's Theorem, Abel's Theorem their examples
Week 15	Infinite Product, Sequence of Partial Product and their examples General Principles of convergence of an Infinite Product
Week 16	Some Theorems for proving the convergence of Infinite Products, Test and submission of assignment
Week 17	Absolute convergence of an infinite product, Problem discussion and test
Week 18 Upto to 30 April	Revision, Assignment and Test

Lesson Plan

Name of College: Pt. Neki Ram Sharma Government College, Rohtak, Academic Session 2023-24

Semester: Even

Name of Asstt./Ass. Prof : Dr. Rajeev Kumar

Class: B.Sc 6th Semester (Mathematics) Section B

Name of Subject: Real and Complex Analysis

01 st January 2024 to 30 th April 2024	
Month (January)	
Week 1	Jacobian:- basic definitions and examples, Chain rule for Jacobians and related examples, Numerical Problems related to Jacobian, Functional Dependence and their examples and its numerical problems, Beta function: definition and its properties, Numerical Problems related to Beta function
Week 2	Gamma function: definition and its recurrence formula, Relationship between Beta and Gamma function and their properties. Illustration with examples.
Week 3	Duplication Formula and their examples, Numerical Problems related to Duplication Formula.
Week 4	Evaluation of Double Integrals, Examples related to Evaluation of Double Integrals and Substitution Method for Double Integrals and its numerical problems, Triple integrals – introduction, Substitution Method for Triple Integrals, Numerical Problems related to Triple Integrals
Week 5	Application of Double and Triple integrals for finding Area and Volume of Surfaces, Numerical Problems related to Application of Double and Triple integrals, Dirichlet's Integral, Liouville's Extension of Dirichlet's integral, Examples related to Dirichlet's Integral.
Month (February)	
Week 6	Numerical Problems related to Dirichlet's Integral and Liouville's Extension of Dirichlet's integral, Change of order of integration in double integrals Article and its examples and its numerical problems.
Week 7	Introduction to Complex Plane and Stereographic projection of complex numbers, Examples related to Stereographic projection of complex numbers, Complex Functions definitions, Limit, continuity, uniform continuity of complex functions, Examples related to Limit, continuity, uniform continuity of complex functions, Differentiability of complex function, Rule of differentiation and geometric interpretation of the derivative, Numerical Problems related to Limit, continuity, Differentiability, uniform continuity of complex functions.
Week 8	Analytic functions and Necessary condition for a function to be analytic, Cauchy-Riemann equations,

	Sufficient condition for a function to be analytic and their examples, Cauchy-Riemann equations in Polar form, Orthogonal System.
Week 9	Harmonic functions and its examples, Construction of Analytic functions by Milne-Thompson's Method, by Exact Differential Method and their examples, Applications of Analytic functions to field and flow problems and numerical problems related to these topics.
Month (March)	
Week 10	Multi-valued Functions, Branch, Branch Cut, Branch Points, Exponential function, properties of exponential functions. Trigonometry functions and its properties, Hyperbolic functions and its properties, The Logarithmic functions and its properties, Inverse trigonometric and hyperbolic functions and its properties.
Week 11	Mappings, Translation mappings, Rotation mappings and their examples, Magnification, Rotation and Magnification, and their examples, Inversion mappings and its examples, Conformal mappings and its properties, Examples of Conformal mappings, Linear transformation, Bilinear transformation.
Week 12	Articles related to Linear transformation, Bilinear transformation and its examples, Critical points and its examples, Fixed points and their examples, Nature of Bilinear transformation and its examples, Some articles based on Bilinear transformation.
Week 13	Vacation Holi
Month (April)	
Week 14	Examples based on Bilinear transformation, Cross Ratio and its articles with examples, Inverse Points and their articles and examples, Exponential Transformations and its examples, Article based on Exponential Transformations, Logarithmic Transformations and its examples.
Week 15	Article based on Logarithmic Transformations, Trigonometric transformations and its examples, Article based on Trigonometric transformations , Linear fractional transformations and its examples, Article based on Linear fractional transformation.
Week 16	Revision, Problem discussion and Test
Week 17	Problem discussion
Week 18 Upto to 30 April	Revision, Assignment and Test

Name of the Assistant/Associate Professor: Dr Ritika
Class and Section: B.Sc. (Pass) 6th Semester (Section – A, B)
Subject: Mathematics
Paper: Real and Complex Analysis
Week 1 Jacobian:- basic definitions and examples, Chain rule for Jacobians and related examples, Numerical Problems related to Jacobian, Functional Dependence and their examples and its numerical problems, Beta function: definition and its properties, Numerical Problems related to Beta function.
Assignments: Quiz/Presentation related to basics of Functions, Real and Complex plane
Week 2 Gamma function: definition and its recurrence formula, Relationship between Beta and Gamma function and their properties. Illustration with examples.
Assignments: Presentation of “Jacobians”
Week 3 Duplication Formula and their examples, Numerical Problems related to Duplication Formula.
Assignments: Presentation of “Beta and Gamma functions”
Week 4 Evaluation of Double Integrals, Examples related to Evaluation of Double Integrals and Substitution Method for Double Integrals and its numerical problems, Triple integrals – introduction, Substitution Method for Triple Integrals, Numerical Problems related to Triple Integrals.
Assignments: Test of “Jacobians” and “Beta and Gamma functions”
Week 5 Application of Double and Triple integrals for finding Area and Volume of Surfaces, Numerical Problems related to Application of Double and Triple integrals, Dirichlet’s Integral, Liouville’s Extension of Dirichlet’s integral, Examples related to Dirichlet’s Integral.
Assignments: Presentation of “Beta and Gamma functions”
Week 6 Numerical Problems related to Dirichlet’s Integral and Liouville’s Extension of Dirichlet’s integral, Change of order of integration in double integrals Article and its examples and its numerical problems.
Assignments: Test of “Double and Triple integrals”
Week 7 Introduction to Complex Plane and Stereographic projection of complex numbers, Examples related to Stereographic projection of complex numbers, Complex Functions definitions, Limit, continuity, uniform continuity of complex functions, Examples related to Limit, continuity, uniform continuity of complex functions, Differentiability of complex function, Rule of differentiation and geometric interpretation of the

<p>derivative, Numerical Problems related to Limit, continuity, Differentiability, uniform continuity of complex functions.</p>
<p>Assignments: Presentation of “Fourier’s series”</p>
<p>Week 8 Analytic functions and Necessary condition for a function to be analytic, Cauchy-Riemann equations, Sufficient condition for a function to be analytic and their examples, Cauchy-Riemann equations in Polar form, Orthogonal System.</p>
<p>Week 9 Harmonic functions and its examples, Construction of Analytic functions by Milne-Thompson’s Method, by Exact Differential Method and their examples, Applications of Analytic functions to field and flow problems and numerical problems related to these topics.</p>
<p>Assignments: Presentation of “Fourier’s series”</p>
<p>Week 10 Multi-valued Functions, Branch, Branch Cut, Branch Points, Exponential function, properties of exponential functions. Trigonometry functions and its properties, Hyperbolic functions and its properties, The Logarithmic functions and its properties, Inverse trigonometric and hyperbolic functions and its properties.</p>
<p>Assignments: Test of “Fourier’s series”</p>
<p>Week 11 Mappings, Translation mappings, Rotation mappings and their examples, Magnification, Rotation and Magnification, and their examples, Inversion mappings and its examples, Conformal mappings and its properties, Examples of Conformal mappings, Linear transformation, Bilinear transformation.</p>
<p>Assignments: Presentation of “Calculus of Complex Functions”</p>
<p>Week 12 Articles related to Linear transformation, Bilinear transformation and its examples, Critical points and its examples, Fixed points and their examples, Nature of Bilinear transformation and its examples, Some articles based on Bilinear transformation.</p>
<p>Assignments: Presentation of “Calculus of Complex Functions”</p>
<p>Week 13 Examples based on Bilinear transformation, Cross Ratio and its articles with examples, Inverse Points and their articles and examples, Exponential Transformations and its examples, Article based on Exponential Transformations, Logarithmic Transformations and its examples.</p>
<p>Week 14 Article based on Logarithmic Transformations,</p>

Trigonometric transformations and its examples, Article based on Trigonometric transformations , Linear fractional transformations and its examples, Article based on Linear fractional transformation.
Assignments: Presentation of “Elementary Functions and Mobius Transformations”
Week 15 Revision and Test
Assignments: Presentation OR Test of “Elementary Functions and Mobius Transformations”
Week 16 Revision and Test
Assignments: Tests of Sections I & II
Week 17 Revision and Test
Assignments: Tests of Sections III & IV

Name of the Assistant/Associate Professor: Dr Ritika
Class and Section: M.Sc. Mathematics 1st Year (Second Semester)
Subject: Mathematics
Paper: Integral Equations and Calculus of Variations
Week 1 Linear Integral equations, Some basic identities. Initial value problems reduced to Volterra integral equations and its related examples.
Assignments: Quiz / Presentation related to Integral Equations
Week 2 Methods of successive substitution and successive approximation to solve Volterra integral equations of second kind and its related examples.
Assignments: Presentation of “Initial value problems reduced to Volterra integral equations”
Week 3 Iterated kernels and Neumann series for Volterra equations and its related examples.
Assignments: Presentation of “Methods of successive substitution and successive approximation to solve Volterra integral equations of second kind”
Week 4 Resolvent kernel as a series and its related examples. Laplace transform method for a difference kernel and its related examples. Solution of a Volterra integral equation of the first kind and its related examples.
Assignments: Test of “Methods of successive substitution and successive approximation to solve Volterra integral equations of second kind”
Week 5 Boundary value problems reduced to Fredholm integral equations and its related examples. Methods of successive approximation to solve Fredholm equations of second kind and its related examples.
Assignments: Presentation of “Iterated kernels and Neumann series solution for Volterra integral

<i>equations”</i>
Week 6 Methods of successive substitution to solve Fredholm equations of second kind and its related examples. Iterated kernels and Neumann series for Fredholm equations and its related examples.
Assignments: Test of “Laplace transform method for a difference kernel”
Week 7 Resolvent kernel as a sum of series and its related examples. Fredholm resolvent kernel as a ratio of two series and its related examples. Fredholm equations with separable kernels.
Assignments: Presentation of “Boundary value problems reduced to Fredholm integral equations”
Week 8 Fredholm equations with separable kernels and its related examples. Approximation of a kernel by a separable kernel and its related examples. Fredholm Alternative, Non-homogenous Fredholm equations with degenerate kernels and its related examples.
Week 9 Green function, Use of method of variation of parameters to construct the Green function for a Non-homogeneous linear second order boundary value problem and its related examples. Basic four properties of the Green function.
Assignments: Presentation of “Methods of successive approximation to solve Fredholm equations of second kind”
Week 10 Alternate procedure for construction of the Green function by using its basic four properties and its related examples. Reduction of a boundary value problem to a Fredholm integral equation with kernel as Green function and its related examples.
Assignments: Test of “Fredholm resolvent kernel method and Fredholm equations solution with separable kernels method”
Week 11 Hilbert-Schmidt theory for symmetric kernels, its related articles and examples.
Assignments: Test of “Green function and its properties”
Week 12 Motivating problems of Calculus of variations, Shortest distance, Minimum surface of resolution, Brachistochrone problem, Isoperimetric problem, Geodesic and its related examples.
Assignments: Presentation of articles “Reduction of a boundary value problem to a Fredholm integral equation with kernel as Green function”
Week 13 Fundamental lemma of calculus of variations, Euler equation for one dependant function and its generalization to 'n' dependant functions and to higher order derivatives and its related examples.
Week 14 Conditional extremum under geometric constraints and under integral constraints and its related examples.
Assignments: Presentation of the concept “Calculus of variations and some of its standard problems”
Week 15 Revision and Test
Assignments: Tests of Sections I & II
Week 16 Revision and Test
Assignments: Tests of Sections III
Week 17 Revision and Test

Name of the Assistant/Associate Professor: Dr Ritika
Class and Section: M.Sc. Mathematics 2nd Year (Fourth Semester)
Subject: Mathematics
Paper: Inner Product Spaces and Measure Theory
Week 1 Hilbert Spaces: Inner product spaces, Hilbert spaces, Schwarz inequality, Hilbert space as normed linear space.
Assignments: Quiz/Presentation related to “Inner Product Spaces”
Week 2 Convex sets in Hilbert spaces, Projection theorem.
Assignments: Presentation of “Results related to Pre-Hilbert Spaces”
Week 3 Orthonormal sets, Separability, Total Orthonormal sets, Bessel inequality.
Assignments: Presentation of “Results related to Hilbert Spaces”
Week 4 Parseval identity, Conjugate of a Hilbert space, Riesz representation theorem in Hilbert spaces.
Assignments: Test of Section I.
Week 5 Adjoint of an operator on a Hilbert space, Reflexivity of Hilbert space.
Assignments: Presentation of “Conjugate of a Hilbert Space”
Week 6 Self-adjoint operators, Positive operators, Product of Positive Operators.
Assignments: Presentation of “Riesz Representation Theorem in Hilbert Spaces”.
Week 7 Projection operators, Product of Projections, Sum and Difference of Projections.
Assignments: Test of Section II.
Week 8 Normal and unitary operators, Projections on Hilbert space, Spectral theorem on finite dimensional space. Convex functions, Jensen inequalities,
Week 9 Measure space, Generalized Fatou lemma, Measure and outer measure, Extension of a measure.
Assignments: Presentation of “Projection Operators”
Week 10 Caratheodory extension theorem, Signed measure.
Assignments: Test of “Projection Operators”
Week 11 Hahn decomposition theorem, Jordan decomposition theorem, Mutually signed measure, Radon – Nikodyn theorem.
Assignments: Presentation of “Normal Operators and Unitary Operators”
Week 12 Lebesgue decomposition, Lebesgue - Stieltjes integral.
Assignments: Presentation of “Spectral theorem on finite dimensional space”
Week 13 Product measures, Fubini theorem, Baire sets, Baire measure.
Week 14 Continuous functions with compact support.

Assignments: Test of Section III

Week 15

Revision and Test

Assignments: Test of Section IV

Week 16

Revision and Test

Assignments: Tests of Sections I & II

Week 17

Revision and Test

Assignments: Tests of Sections III & IV