Lesson Plan

Session: 2024-25

Name of the Assistant Professor: Bharat Kumar

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

Subject: Mathemactics **Paper:** Algebra and Number Theory

Dates	Week	Topics
11.01.2025 to 17.01.25	1	Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices, Elementary operations on matrices,
20.01.25 To 25.01.25	2	Rank of a matrix, Inverse of a matrix, Linear dependence and independence of rows and columns of matrix **1st Assignment**
20.01.25 To 25.01.25	3	Row rank and column rank of a matrix, Eigen values, Eigen vectors and characteristic equation of a matrix, Minimal polynomial of a matrix
03.02.25 To 08.02.25	4	Cayley-Hamilton theorem and its use in finding the inverse of a matrix, Unitary and orthogonal matrices.
27.01.25 To 01.02.25	5	Relations between the roots and coefficients of general polynomial equation in one variable,
17.02.25 To 22.02.25	6	Solutions of polynomial equations having conditions on roots,
03.02.25 To 08.02.25	7	Common roots and multiple roots, Transformation of equations,

Dates	Week	Topics
03.03.25 To 08.03.25	8	Nature of the roots of an equation, Descarte's rule of signs. **2nd Assignment**
17.03.25 To 22.03.25	9	Solutions of cubic equations (Cardon's method), Biquadratic equations and their solutions.
17.03.25 To 22.03.25	10	Divisibility, Greatest common divisor (gcd), **MID TERM EXAM**
31.03.25 To 05.04.25	11	Least common multiple (lcm), Prime numbers, Fundamental theorem of arithmetic.
24.03.25 To 29.03.25	12	Linear congruences, Fermat's theorem, Euler's theorem, **3rd Assignment**
14.04.25 To 19.04.25	13	Wilson's theorem and its converse.
31.03.25 To 05.04.25	14	Chinese Remainder theorem, Linear Diophantine equations in two variables.
28.04.25 To 30.04.25	15	Revision and Tests

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Lesson Plan

Session: 2024-25

Name of the Assistant Professor: Bharat Kumar

Class: B.A. /B.Sc. 4th Semester

Subject: Mathematics **Paper:** Special functions and Integral Transformations

Dates	Week	Topics
11.01.2025 to 17.01.25	1	Convergence of power series, operation on power series analytic function ,
20.01.25 To 25.01.25	2	Ordinary and singular points of differential equation ,existence of power series solution
20.01.25 To 25.01.25	3	Previous method of power series, discuss different cases of solution of power series examples and exercises **1st Assignment**
03.02.25 To 08.02.25	4	Bessel's equation (definition), solution of bessel's equation,
27.01.25 To 01.02.25	5	Bessel's function,
17.02.25 To 22.02.25	6	Reductions of bessel's function in the form of series
03.02.25 To 08.02.25	7	Recurrence relation for bessel's function.

Dates	Week	Topics
03.03.25 To 08.03.25	8	Generating function for Jn(x), representation of Jn(x) in integral,
17.03.25 To 22.03.25	9	Jacobi series, equations reducible to bessel equation,
17.03.25 To 22.03.25	10	Orthogonality relation of Bessel function. Legende's equation (definition), solution of legendre's equation, **MID TERM EXAM**
31.03.25 To 05.04.25	11	Rodrigue's formula, derivation of Legendre polynomial from Rodrigues formula, recurrence relation,
24.03.25 To 29.03.25	12	Orthogonality of legendre polynomial. Hermite's equation (definition), hermite polynomial,
14.04.25 To 19.04.25	13	Generating function for Hermite's polynomial Rodrigue's formula for Hn(x),
31.03.25 To 05.04.25	14	Recurrence relation, orthogonal property of Hermite's polynomial.
28.04.25 To 30.04.25	15	Revision and test

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Lesson Plan

Session: 2024-25

Name of the Assistant Professor: Bharat Kumar

Class: B.A. /B.Sc. 4th Semester

Subject: Mathemactics **Paper:** Sequence and Series

Dates	Week	Topics
11.01.2025 to 17.01.25	1	chapter1 topology of real numbers ,various definitions sets ,finite set ,infinite set ,interval ,subset, bounded above set ,and bounded above set ,bounded below set, unbounded below set, bounded set ,unbounded set, greatest element, least element ,least upper bound ,some theorems on supremum of a set, greatest lower bound or infimum, some theorems on infimum of a set
20.01.25 To 25.01.25	2	completeness axiom, archimedean property of reals, examples and exercise 1.1, neighbourhood of a point, deleted neighbourhood ,interior of a set ,open set, some theorems on open set, theorems on interior of a set, closed set, some theorems on closed sets ,examples and exercise 1.2. **Assignment 1**
20.01.25 To 25.01.25	3	limit point of a set ,isolated point ,adherent point ,closure of a set ,bolzano weierstrass theorem, some theorems on closure of a set, examples and exercise 1.3 ,compact set, Heine borel property, Heine borel theorem ,Converse of Heine borel theorem, example and exercise 1.4
03.02.25 To 08.02.25	4	chapter 2 sequences, definition of sequence, representation of a sequence ,methods to describe a sequence, range of a sequence,constant sequence convergent sequence, some theorems on convergent sequences, divergent sequence, oscillatory sequence ,null sequence ,examples and exercise 2.1 ,some basic theorems on limits ,Cauchy"s first theorem on limits.
27.01.25 To 01.02.25	5	Cauchy's second theorem on limits, examples and exercise 2.2 , monotonic sequence, monotone convergence theorem, nested sequence examples and exercise 2.3 ,limit point or cluster point ,some theorems on limit point, bolzano theorem, cauchy's sequence. **Class Test**
17.02.25 To 22.02.25	6	cauchy's general principle of convergence examples and exercise 2.4 subsequence ,theorems on subsequence.
03.02.25 To 08.02.25	7	chapter 3infinite series, definition of infinite series convergence and divergence of an infinite series ,oscillate finitely or infinite ,examples and theorems exercise 3.1 **Assignment 2**

Dates	Week	Topics
03.03.25 To 08.03.25	8	cauchy's general principle of convergence ,convergence or divergence of geometric series, general test for the convergence of positive term series, comparison test, hyper harmonic series or p-test series, class test of chapter 2
17.03.25 To 22.03.25	9	examples and exercise 3.2., chapter 4 infinite series continued, D'Alembert Ratio test, examples and exercise 4.1, cauchy's root test. examples and exercise 4.2 class test of chapter 3.
17.03.25 To 22.03.25	10	logarithmic test for the convergence of a series examples and exercise 4.3. De morgan's and Bertrand"s test. examples and exercise 4.4. gauss test exercise and examples, cauchy's integral test for the convergence of a series, Cauchy's condensation test. examples and exercise **MID TERM EXAM**
31.03.25 To 05.04.25	11	chapter 5, alternating series, Leibnitz 's test for the convergence of alternating series. examples, absolute convergence ,conditional convergence, exercise 5.1, assignment 2
24.03.25 To 29.03.25	12	chapter 6 arbitrary series, Abel test, Dirichlet"s test, exercise and its examples of 6.1, insertion and removal of parenthesis, example and exercise 6.2, multiplication of series ,Cauchy's product, Mertin"s theorem, Cesaro's theorem. **Assignment 3**
14.04.25 To 19.04.25	13	Abel's theorem, infinite product, absolute convergence of an infinite product theorems and examples
31.03.25 To 05.04.25	14	exercise 7.1 and 7.2 class test of chapter 4
28.04.25 To 30.04.25	15	Revision

Bharat Kumar

Lesson Plan

Session: 2024-25

Name of the Assistant Professor: Bharat Kumar

Class: B.A. /B.Sc. 6th Semester

Subject: Mathemactics **Paper:** Linear Algebra

Dates	Week	Topics
11.01.2025 to 17.01.25	1	Chapter 1: Vector spaces and subspaces, properties of vector spaces, subspaces, Exercise.
20.01.25 To 25.01.25	2	Chapter 1: Theorems on vector-subspaces, Examples, Linear sum of subspaces, Direct sum, Disjoint subspaces, Examples and Exercise. **1st Assignment**
20.01.25 To 25.01.25	3	Chapter 2: Linear combination of vectors, linear dependence and independence of vectors, Spanning sets, Basis of vector space, Ordered basis, Minimal generating set, Maximal linearly, Independent set.
03.02.25 To 08.02.25	4	Chapter 2: Dimensions of a vector space, Identical spaces complementary subspaces
27.01.25 To 01.02.25	5	Chapter 3: Quotient space, Dimension of quotient spaces, Test, Assignments-I
17.02.25 To 22.02.25	6	Chapter 4: Linear transformations, Properties of L.T. vector space isomorphism, Find L.T. **2nd Assignment**
03.02.25 To 08.02.25	7	Chapter 5: Null space, Range or Image of L.T., Fundamental theorem of vector space homomorphism, Rank and nullity of a L.T.

Dates	Week	Topics
03.03.25 To 08.03.25	8	Chapter 6: Algebra of L.T.,Sum of L.T., Composition of two L.T., Singular and non-singular L.T., Invertible L.T.
17.03.25 To 22.03.25	9	Chapter 7: Matrix of a L.T. relative to ordered basis, Matrices of identity and zero transformations change of basis
17.03.25 To 22.03.25	10	Chapter 8: Dual space, Vector space of all L.T., Bidual of a Vector space, Test and assignment- II **MID TERM EXAM**
31.03.25 To 05.04.25	11	Chapter 9: Eigen values and eigen vectors of a L.T., Eigen space, Simplar matrices, Diagonalisation, Minimal polynomial **3rd Assignment**
24.03.25 To 29.03.25	12	Chapter 10: Inner product spaces, Normal of a vector, Triangle inequality, Schwarz inequality, Normal linear space, Examples and theorms.
14.04.25 To 19.04.25	13	Chapter 10: Orthonormal set, Bessel's inequality, Gram-schmidt orthogonalization process, Theorems and Exercise.
31.03.25 To 05.04.25	14	Chapter 11: Linear operations on inner product spaces, Adjoint operator , Same theorems on linear operators
28.04.25 To 30.04.25	15	Revision and Test

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Lesson Plan

Session: 2024-25

Name of the Assistant Professor: Bharat Kumar

Class: B.A. /B.Sc. 6th Semester

Subject: Mathematics **Paper:** Real and Complex Analysis

Dates	Week	Topics
11.01.2025 to 17.01.25	1	Jacobian, chain rule for Jacobian, examples, functional dependence and exercises
20.01.25 To 25.01.25	2	Properties of Beta function, gamma function, recurrence formula for gamma function,
20.01.25 To 25.01.25	3	examples related to beta and gamma function. Relation between beta and gamma function, duplication formula, examples and exercises
03.02.25 To 08.02.25	4	Double and triple integral, evolution of double integral substitution method for double integral,
27.01.25 To 01.02.25	5	triple integral substitution method for triple integral Application of double and triple integrals for finding area and volume of surfaces,
17.02.25 To 22.02.25	6	Dirichlet's integral Liouville's extension of Dirichlet's integral, change of order of integration
03.02.25 To 08.02.25	7	Fourier series (Definition), determination of Fourier coefficients **Assignment**

Dates	Week	Topics
03.03.25 To 08.03.25	8	Fourier series for even and odd function,
17.03.25 To 22.03.25	9	Dirichlet's conditions,
17.03.25 To 22.03.25	10	**MID TERM EXAM**
31.03.25 To 05.04.25	11	Fourier expansion of piecewise monotonic continuous function Fourier expansion of functions having points of discontinuity,
24.03.25 To 29.03.25	12	examples and exercise Change of interval,
14.04.25 To 19.04.25	13	Half range series Parseval's identity for Fourier series.
31.03.25 To 05.04.25	14	Revision
28.04.25 To 30.04.25	15	Test

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