**Lesson Plan**

Name of Teacher: Richa Kumari Class: B.A. 1st Year 1st Semester Paper: Algebra Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
| 1. | August | Last Week | 1. Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. Elementary Operations on Matrices. Rank of matrices, Inverse of a matrix.
 |
| 2. | September | 1st Week 2nd Week3rd Week Last Week | 1. 1.Linear dependence and independence of rows and columns of matrices. Row rank and column rank of a matrix.
2. Eigenvalues, Eigenvectors and the characteristic equation of a matrix. Minimal polynomial of a matrix.
3. Cayley Hamilton Theorem and its use in finding the inverse of a matrix.
4. Applications of matrices to a system of linear (homogeneous and non– homogeneous) equations. Theorems on consistency of a system of linear equations.
 |
| 3. | October | 1st Week2nd Week3rd Week Last Week | 1. Unitary and Orthogonal Matrices, Bilinear and Quadratic forms. Canonical Form of a bilinear form. Matrix notation of Bilinear and Quadratic Form
2. Linear Transformation of a Quadratic form. Lagrange’s method of Diagonalization. Factorable Quadratic Form. Sylvester’s Criterion
3. Relations between roots and coefficients of general polynomial equation in one variable. Synthetic Division.
4. Remainder Theorem and factor Theorem. Solutions of polynomial equations having conditions on roots.
 |
| 4. | November | 1st Week2nd Week3rd Week Last Week | 1. Common roots and multiple roots. Transformation of equations.
2. Nature of the roots of an equation, Solutions of cubic equations (Cardan’s Method)
3. Solution of Biquadratic equations (Descarte’s Method, Ferrari’s Method)
4. Descarte’s rule of signs for Polynomial. Location of roots in an interval.
 |

Incharge

**Lesson Plan**

Name of Teacher: Dr. Vinod Gill Class: B.A. 1st Year/1st Sem

Paper: Calculus (BAMH-112) Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
|  | August  | Last Week | 1. $ϵ-δ$ Definitions of continuity of a function. Basic properties of limits, continuous functions and classification of discontinuities.
 |
|  2. | September | 1st Week 2nd Week3rd WeekLast Week | 1. Successive differentiation, Leibnitz Theorem. Maclaurin and Taylor series expansions.
2. Asymptotes in Cartesian coordinates, intersection of curve and its asymptotes, Asymptotes in polar coordinates.
3. Curvature, radius of curvature for Cartesian curve, parametric curves, polar curves.
4. Newton’s Method. Radius of curvature for pedal curves. Tangential polar equations. Centre of curvature Circle of curvature. Chord of curvature, Evolutes.
 |
|  3. | October | 1st Week  2nd Week3rd Week Last Week | 1. Test for concavity and convexity. Singular points. Points of inflexion. Multiple points. Cusps, nodes & conjugate points. Species of cusps
2. Tracing of curves in Cartesian, parametric and polar co-ordinates.
3. Reduction formulae. Derivation of reduction formulae by connecting with other integral.
4. Rectification, length of curves in Cartesian, parametric and polar curves.
 |
|  4. | November  | 1st Week2nd Week3rd WeekLast Week | 1. Intrinsic equations of curves from Cartesian, parametric and polar curves.
2. Quadrature and Sectorial Area.
3. Area bounded by closed curves. Area enclosed by curves in polar form. Volumes and Area of solids of revolution.
4. Volume bounded between two solids. Volume formula for parametric curves. Theorems of Pappu’s and Guilden and revision
 |

 Incharge

**Lesson Plan**

Name of Teacher: Mrs. Richa Kumari Class: B.A. 2nd Year/Semester 3th Paper: Advanced Calculus Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
| 1. | August |  3rd Week Last Week | 1. Continuity, Sequential Continuity, properties of continuous functions.
2. Uniform continuity, chain rule of differentiability,
	1. Mean value theorems, Rolle’s Theorem.
 |
| 2. | September | 1st Week 2nd Week 3rd Week Last Week | 1. Lagrange’s mean value theorem and their geometrical interpretation.
2. Taylor’s Theorem with various forms of remainders
3. Darboux intermediate value theorem for derivatives.
4. Indeterminate forms, Limit and continuity of real valued functions of two variables.
 |
| 3. | October | 1st Week2nd Week3rd WeekLast Week | 1. Partial differentiation,Total Differentials
2. Composite functions & implicit functions.
3. Change of variables. Homogenous functions & Euler’s theorem on homogeneous functions.
4. Taylor’s theorem for functions of two variables.
 |
| 4. | November | 1st Week2nd Week3rd WeekLast Week  | 1. Differentiability of real valued functions of two variables, Implicit function theorem.
2. Maxima, Minima and saddle point variables Lagrange’s method of multipliers
3. Jacobians, Beta,Gama functions
4. Double and Triple integrals, Dirichlets integrals, change of order of integration in double integrals.
 |

 Incharge

**Lesson Plan**

Name of Teacher: Dr. Vinod Gill Class: B.A./B.Sc. 2nd Year/3rd Sem.

Paper: Numerical Analysis (BAMH-202/CML 307) Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| S.N | Months | Weeks | Topics |
| 1. | August | 3rd Week Last Week  | 1. Finite Difference operators and their relations, difference table, finding the missing terms and effect of error in a difference tabular values.
2. Interpolation with equal intervals: derivations of Newton’s forward interpolation formulae and their applications, Interpolation with equal intervals: derivations of Newton’s backward interpolation formulae and their applications.
 |
| 2. | September | 1st Week  2nd Week 3rd Week   Last Week | 1. Interpolation with unequal intervals: derivations of Newton’s divided difference & Lagrange’s Interpolation formulae and their applications.
2. Central Difference interpolation formulae: derivations of Gauss’s forward and Gauss’s backward interpolation formulae.
3. Sterling,Bessel formulae and their applications. Numerical Differentiation: Relation between difference operator and derivative operator.
4. Derivative of a function using interpolation formulae (as studied in Sections – I & II). Numerical Integration: Newton-Cote’s Quadrature formula.
 |
| 3. | October | 1st Week  2nd Week3rd WeekLast Week | 1. Trapezoidal rule, Simpson’s one- third rule and Simpson’s three-eighth rule, Chebychev formula, Gauss Quadrature formula.
2. Solution of Algebraic and Transcendental equations: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson’s method, Newton’s iterative method for finding pth root of a number.
3. Simultaneous linear algebraic equations: Gauss-elimination method, Gauss-Jordan method, Triangularization method (LU decomposition method). Iterative method.
4. Jacobi’s method, Gauss-Seidal’s method, Relaxation method Eigen Value Problems: Power method, Jacobi’s method.
 |
| 4. | November | 1st Week  2nd Week3rd WeekLast Week  | 1. Given’s method, House-Holder’s method. Numerical solution of ordinary differential equations: Single step methods
2. Picard’s method.Taylor’s series method, Euler’s method,
3. Modified Euler’s method, Runge-Kutta Methods. Multiple step methods;
4. Predictorcorrector method, Milne-Simpson’s method and revision
 |

 Incharge

**Lesson Plan**

Name of Teacher: Mrs. Richa Kumari Class: B.A. 3rd Year/Semester 5th Paper: Groups and Rings Session: 2021-2022

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
| 1. | August | 3rd Week Last Week | 1. Definition of a group. Examples of abelian and non abelian groups.
2. The group 𝑍𝑛 of integers under addition modulo 𝑛 and the group of (𝑛) of units under multiplication modulo 𝑛, Generator of a group, Cyclic groups.
 |
| 2. | September | 1st Week 2nd Week3rd Week Last Week | 1. Permutations groups, Alternating groups, Cayley’s theorem.
2. Subgroups, Subgroup criteria, cosets, Left and right cosets, properties of cosets.Index of a sub-group, coset decomposition, Lagrange’s theorem on groups and its consequences.
3. Normal subgroups, Quotient groups, Homomorphisms, isomorphisms, automorphisms on group.
4. Center of a group and class equation of a group and derived group of a group.
 |
| 3. | October | 1st Week2nd Week3rd Week Last Week | 1. Introduction to Rings, subrings.
2. Integral domains and Fields, Characteristics of a ring.Ring homomorphisms.
3. Theorems on Ring homomorphisms,Ideals (Principle, Prime and Maximal).
4. Quotient rings, Field of quotients of an integral domain.
 |
| 4. | November | 1st Week2nd Week3rd WeekLast Week | 1. Euclidean rings, Polynomial rings, Polynomials over the rational field.
2. The Eisenstein’s criterion of irreducibility of polynomials over the field of rational numbers.
3. Polynomial rings over commutative rings.
4. Principal ideal domain, unique factorization domain
 |

 Incharge

**Lesson Plan**

Name of Teacher: Dr. Vinod Gill Class: B.A./B.Sc.3rd Year/5th Sem

Paper: Sequence and Series (BAMH-302(i)/CML-507(i)) Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
| 1. | August | 3rd Week Last Week  | 1. Boundedness of the set of real numbers; least upper bound, greatest lower bound of a set
2. Neighborhoods, interior points, isolated points, limit points, Open sets, closed set, interior of a set, closure of a set in real numbers and their properties.
 |
| 2. | September | 1st Week 2nd Week 3rd Week Last Week | 1. Sequence: Real sequences and their convergence, theorem on limits of sequence, bounded and monotonic sequences.
2. Cauchy’s sequence, Cauchy general principle of convergence, subsequences, subs sequential limits.
3. Infinite series: Convergence and divergence of Infinite Series, Comparison Tests of positive terms Infinite series ,Cauchy’s general principle of Convergence of series.
4. Convergence and divergence of geometric series, Hyper Harmonic series or p-series. D-Alembert’s ratio test.
 |
| 3. | October | 1st Week  2ndWeek 3rd Week  Last Week  | 1. Fourier’s series: Fourier expansion of piecewise monotonic functions, Properties of Fourier Coefficients, Dirichlet’s conditions.
2. Parseval’s identity for Fourier series, Fourier series for even and odd functions, Half range series,
3. Change of Intervals. Riemann integral: Definition and examples.
4. Darboux’s Theorem and condition of existence of Riemann’s integral.
 |
| 4. | November  | 1st Week  2ndWeek 3rd Week Last Week | 1. Integrabililty of continuous, monotonic functions and discontinuous functions.
2. Properties of integrable functions. Continuity and differentiability of integrable functions.
3. Primitive. The Fundamental theorem of integral calculus, Mean value theorems of integral calculu.
4. Revision
 |

 Incharge

 **Lesson Plan**

Name of Teacher: Sh. Ravinder Class: B.A./B.Sc. 3rd Year/Semester 5th Paper: Number Theory & Trigonometry Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
| 1. | August | 3rd Week Last Week | 1. Linear Diophantine equation, prime counting function, Statement of prime number theorem, Goldbach conjecture.
2. linear congruences, complete set of residues,

 Chinese remainder theorem.  |
| 2. | September | 1st Week 2ndWeek 3rd Week Last Week  | 1. The Fermat’s little theorem, Wilson’s theorem, Number, theoretic functions
2. Sum and number of divisors, totally multiplicative functions.
3. Möbius inversion formula, the greatest integer function.
4. Euler’s phi-function, Euler’s theorem, reduced set of residues, some properties of Euler’s phi-function.
 |
| 3. | October | 1st Week 2ndWeek 3rd Week Last Week  | 1. Order of an integer modulo n, primitive roots for primes, Composite numbers having primitive roots
2. Euler’s criterion, the Legendre symbol and its properties, Quadratic reciprocity, quadratic congruences with composite moduli.
3. Exponential, Logarithmic, Circular functions; sin(nx), cos(nx), tan(nx).
4. Circular functions; sinn x , cosn x, tann x.
 |
| 4. | November  | 1st Week 2ndWeek 3rd Week Last Week  | 1. Hyperbolic and inverse hyperbolic functions - simple problems
2. Gregory’s series,
3. Summation of Trigonometric series,
4. Trigonometric expansions of sine and cosine as infinite products (without proof )
 |

 Incharge

 **Lesson Plan**

Name of Teacher: Sh. Ravinder Class: B.Com. 1st Year/Semester 1st Paper: Business Mathematics Session: 2022-2023

|  |  |  |  |
| --- | --- | --- | --- |
| Sr.No. | Months | Weeks | Topics |
| 1. | September | 1st Week 2ndWeek 3rd Week Last Week  | 1. Matrices and Determinants: Concept of matrix, types, and Algebra of matrices;
2. Properties of determinants; calculation of values of determinants;
3. Adjoint of a matrix, Elementary row and column operations;
4. Finding inverse of a matrix through adjoint and elementary row and column operations;
 |
| 3. | October | 1st Week 2ndWeek 3rd Week Last Week  | 1. Solution of a system of linear equations having unique solution and involving not more than three variables;
2. Linear inequalities: graphical solution of linear equalities in two variables,
3. solution of system of linear inequalities in two variables.
4. Linear programming-formulation of equation: graphical method of solution.
 |
| 4. | November  | 1st Week 2ndWeek 3rd Week Last Week  | 1. Pproblem relating to two variables including the case of mixed constraints; cases having no solution, multiple solutions, unbounded solution and redundant constraints;
2. Logarithms and Anti-logarithms;
3. Permutations;
4. Combinations.
 |

* Faculty engaged in B.A. 1st year Admission Committee (including physical counselings) till 05 Sept, 2022.

 Incharge