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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Odd Sem)**  **Class-B.Sc-1st semester Paper-Algebra** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 04.10.2021-09.10.2021 | Matrices-It’s type and Basic properties, Solutions of system of Linear equations, Symmetric matrix, skew symmetric matrix, Hermition matrix, skew-Hermition matrix |
| 2 | 11.10.2021-16.10.2021 | Rank of a Matrix, Minors & Co factors, Elementary operations, Row-Echelon form, Column-Echelon form, Normal form of a Matrix (Canonical form) Rank of product of two matrices. |
| 3 | 18.10.2021-23.10.2021 | Inverse of a matrix by using elementary operations. Linear dependence and independence of row and column matrices and their basic theorems. |
| 4 | 25.10.2021-30.10.2021 | Characteristic equation of a matrix, Eigen values and Eigen vectors. Scalar polynomial and matrix polynomial, Monic Polynomial, Minimal polynomial and minimal equation of a matrix. |
| 5 | 01.11.2021 - 07.11.2021 | Application of matrices to a system of linear equations-System of Non-Homogenous Linear equations, Solution of system of Linear Homogenous equations. |
| 6 | 08.11.2021-13.11.2021 | Orthogonal matrix and it’s properties, Unitary matrix and it’s properties and related theorems. |
| 7 | 15.11.2021-20.11.2021 | Bilinear and quadratic forms- Linear transformation, Matrix notation of a bilinear form. |
| 8 | 22.11.2021-27.11.2021 | Canonical form of a bilinear form, Factorizable bilinear form, Quadratic forms, Matrix of quadratic form. |
| 9 | 01.12.2021-04.12.2021 | Linear transformation of a quadratic form, Diagonalization of a quadratic form, Lagrange’s method of Diagonalization, Factorable quadratic form |
| 10 | 06.12.2021-11.12.2021 | Relation between the roots and coefficients of an equation- Division algorithm theorem, Remainder theorem, Synthetic division, Fundamental theorem of algebra. |
| 11 | 13.12.2021-18.12.2021 | Find the condition that roots of the given equation satisfy a given relation. |
| 12 | 20.12.2021-25.12.2021 | Common roots of two equations, Equal or multiple roots of an equation. |
| 13 | 27.12.2021-31.12.2021 | Transformation of equations-Roots with sign changed, reciprocal roots, Roots diminished by a given number, Removal of terms in general. |
| 14 | 03.01.2022-08.01.2022 | Transformation of the Cubic and Bi-quadratic. |
| 15 | 10.01.2022-15.01.2022 | Transformation in general, equation of squared differences of a cubic. |
| 16 | 17.01.2022-22.01.2022 | Solution of Cubic and Bi-quadratic equations- Carden’s methods of solvinf cubic equations. |
| 17 | 24.01.2022-29.01.2022 | Descarte’s methods and Ferrari’s methods of solving Bi-quadratic methods. |
| 18 | 01.02.2022-05.02.2022 | Descarte’s rule of sign- Continuation and variation of sign, Leema, Complex roots |
| 19 | 07.02.2022-12.02.2022 | REVISION OF ALL UNITS |
| 20 | 14.02.2022 | Examination |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Odd Sem)**  **Class-B.Sc-1st semester Paper-Calculus** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 04.10.2021-09.10.2021 | Limit of a Function, Left hand & Right hand limit, Uniqueness, Infinite Limits, Squeeze Principle, Continuous and Discontinuous functions, Kinds of Discontinuity all it’s related problems. Derivability at an Interior Point. |
| 2 | 11.10.2021-16.10.2021 | Successive Differentiation, Standard results for nth derivatives. Find nth derivative using Partial fractions. |
| 3 | 18.10.2021-23.10.2021 | Leibnitz’s Theorem and all it’s related problems. Calculation of nth derivative at x=0 and all it’s related problems. |
| 4 | 25.10.2021-30.10.2021 | General theorems on Differentiable functions and expansions- Taylor’s Theorem with Lagrange’s form of remainder after ‘n’ terms. Maclaurin’s Theorem with Lagrange’s form of remainder. Taylor’s Theorem with Cauchy’s form of remainder. |
|  | 01.11.2021 - 07.11.2021 | **DIWALI BREAK** |
| 5 | 08.11.2021-13.11.2021 | Taylor’s Infinite Series and all it’s related problems. Expansion by Differential Equations. Method of Differentiation and Integration. |
| 6 | 15.11.2021-20.11.2021 | Asymptotes-Finite and infinite branches of a curve. Asymptotes, Horizontal and Vertical asymptotes. Asymptotes parallel to Axes of Co-ordinates. Oblique Asymptotes. Oblique asymptotes of the general algebraic curve. |
| 7 | 22.11.2021-27.11.2021 | Alternative methods of finding asymptotes of algebraic curves. Intersection of the curve and its asymptotes. Asymptotes of polar curve. Position of the curve with respect to the asymptotes. |
| 8 | 01.12.2021-04.12.2021 | Curvature-Intrinsic equation of a curve. Curvature in Intrinsic form, Radius of curvature. Curvature of circle. Radius of curvature for Cartesian equations, for Parametric equations, for Polar equations, for Pedal equations. |
| 9 | 06.12.2021-11.12.2021 | Radius of curvature for Polar tangential equations. Radius of curvature at the origin. Centre of curvature, circle of curvature and evolute of a curve. Chord of curvature. |
| 10 | 13.12.2021-18.12.2021 | Singular Points-Multiple Points, Points of inflexion. Types of double points-Node, Cusp, Conjugate or Isolated points. |
| 11 | 20.12.2021-25.12.2021 | Condition for the existence of a double point on a curve. Species of Cusps. Concavity and Convexity. Point of Inflexion. |
| 12 | 27.12.2021-31.12.2021 | Curve Tracing-Tracing of Cartesian Curves,Parametric equations. Tracing of polar curves and all it’s related problems. |
| 13 | 03.01.2022-08.01.2022 | Reduction Formule- for different trigonometric functions, Exponential functions. |
| 14 | 10.01.2022-15.01.2022 | Rectification-Fundamental Theorem about Rectification. Length of the Parametric curves and all it’s related problems. |
| 15 | 17.01.2022-22.01.2022 | Length of Polar Curves and all it’s related problems. Intrinsic equation of a curve. |
| 16 | 24.01.2022-29.01.2022 | Quadrature, Area between two curves. Area Formula for Parametric Curves. Area between two polar curves. |
| 17 | 01.02.2022-05.02.2022 | Volumes and Surfaces of Solids of Revolution. Volume of a solid of revolution. Any Axis of Revolution. Volume formula for two solids. |
| 18 | 07.02.2022-12.02.2022 | Volume formula for parametric curves. Volume formula for polar curves. Area of a surface of revolution. Centroid. |
| 19 | 14.02.2022 | Examination |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Odd Sem)**  **Class-B.Sc-3rd semester Paper-Partial Differential Equations** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 04.10.2021-09.10.2021 | Partial Differential Equations-Order and degree of P.D.E’s, Linear and Non-Linear P.D.E, Formation of equation by the elimination of Arbitrary Constants with numerical problems. Formation of equation by the elimination of Arbitrary Functions with numerical problems. |
| 2 | 11.10.2021-16.10.2021 | First Order Linear P.D.E’s, Classification of the Solution of P.D.E’s, Solution of Linear P.D.E’s by direct integration. Solution of Lagrange’s Linear Equation with numerical problems. |
| 3 | 18.10.2021-23.10.2021 | First Order Non Linear P.D.E’s-Compatible system of P.D.E’s of order one. General Methods of Solution-(i) Charpit’s Method with some standard forms. |
| 4 | 25.10.2021-30.10.2021 | General Methods of Solution –(ii) Jacobi’s Method with numerical problems. |
|  | 01.11.2021 - 07.11.2021 | **DIWALI BREAK** |
| 5 | 08.11.2021-13.11.2021 | Linear Partial Differential Equations of Second and Higher Order- Linear Homogenous P.D.E of order n, Solution of Homogenous Linear P.D.E’s with constant coefficients. |
| 6 | 15.11.2021-20.11.2021 | Solution of Non Homogenous Linear P.D.E’s with constant coefficients with all Numerical Problems. |
| 7 | 22.11.2021-27.11.2021 | Partial Differential Equations with Variable Coefficients Reducible to Equations with Constant Coefficientswith all Numerical Problems. |
| 8 | 01.12.2021-04.12.2021 | Classification of Second Order Linear Partial Differential Equations. Canonical Forms (Normal Forms). Reduction of second order Linear P.D.E’s to Canonical forms- |
| 9 | 06.12.2021-11.12.2021 | (i) Reduction of Hyperbolic Equation to its Canonical Form -(ii) Reduction of Parabolic Equation to its Canonical Form with all Numerical Problems. |
| 10 | 13.12.2021-18.12.2021 | (iii) Reduction of Elliptic Equation to its Canonical Form. Solution of Linear Hyperbolic Equations-Riemann’s Method with all Numerical Problems. |
| 11 | 20.12.2021-25.12.2021 | Monge’s Methods for Partial Differential Equations of Second Order. Method (i) To solve equation of the type Rr+Ss+Tt=V, where r,s,t have usual meaning. |
| 12 | 27.12.2021-31.12.2021 | Monge’s Method (ii) To solve equation of the type Rr+Ss+Tt+U9rt-S2 =V, where r,s,t have usual meaning. |
| 13 | 03.01.2022-08.01.2022 | Characteristics of Second Order Partial Differential Equations-Characteristic Equations and Characteristic Curves. Cauchy’s Problems with all Numerical |
| 14 | 10.01.2022-15.01.2022 | Method of Separation of Variables: Wave, Heat and Laplace Equations. Method of Separation of Variables-One Dimensional Wave Equation” |
| 15 | 17.01.2022-22.01.2022 | Solution by Method of Separation of Variables. Solution of Two Dimensional Wave Equation. |
| 16 | 24.01.2022-29.01.2022 | Solution of One Dimensional& Two Dimensional Heat ( Diffusion) Equation. |
| 17 | 01.02.2022-05.02.2022 | Solution of Two Dimensional Laplace Equation. |
| 18 | 07.02.2022-12.02.2022 | Solution of Laplace Equation satisfying given Initial and Boundary Conditions. |
| 19 | 14.02.2022 | Examination |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Odd Sem)**  **Class-B.Sc-5th semester Paper- Real Analysis** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 04.10.2021-09.10.2021 | Riemann Integral-Partition of a closed interval, Norm & Refinement of a Partition, Upper & Lower Sums, Oscillatory Sum & all related theorems. Riemann Integral, Darboux’s Theorem. Conditions of Integrability, Integrability of Continuous functions and all related theorems. |
| 2 | 11.10.2021-16.10.2021 | Integrability of Monotonic functions. Integral as a limit of Sum. Riemann Sum. Second definition of Integrability and all related theorems and Numerical Problems. Properties of Riemann Integral and all related theorems and Numerical Problems. |
| 3 | 18.10.2021-23.10.2021 | First Mean Value Theorem, Theorems on Continuity and Differentiability of Integrable Functions. Primitive of a Function. Fundamental Theorem of Integral Calculus. Mean value Theorems of Integral Calculus. Second mean value theorem and all related Numerical Problems. |
| 4 | 25.10.2021-30.10.2021 | Impropal Integral-Types of Impropal Integral. Convergence of Improper Integral of First kind and Second Kind. Comparison Tests for Convergence of Integral. Comparison test I & II. |
|  | 01.11.2021 - 07.11.2021 | **DIWALI BREAK** |
| 5 | 08.11.2021-13.11.2021 | An Important Comparison Integral. Discussion of convergence of important function i.e. Beta function and all related problems. General test for Convergence of Integral- Cauchy’s Test. Absolute Convergence. |
| 6 | 15.11.2021-20.11.2021 | Comparison test for Convergence at Infinity, An Important Comparison Integral. Convergence of Gamma Integral. |
| 7 | 22.11.2021-27.11.2021 | General test for convergence at Infinity-Cauchy’s Test. Abel’s test for Convergence. Dirichlet’s test for convergence. Frullani’s Integral. |  |
| 8 | 01.12.2021-04.12.2021 | Integral as a function of a Parameter-Continuity of the Integral, Derivability of the Integral. Integrability of an Integral of a function of Parameter and all related problems. |  |
| 9 | 06.12.2021-11.12.2021 | Metric and Metric Spaces-it’s all related examples and questions. Bounded Sequence and Bounded Functions. |  |
| 10 | 13.12.2021-18.12.2021 | Induced Metric. Semi Metric Space. Diameter of a Subset. Bounded and unbounded Metric Spaces. |  |
| 11 | 20.12.2021-25.12.2021 | Open and Closed Sets in Metric Spaces-Open Sphere and Closed Sphere. Interior Point and Neighbourhood of a point. Interior of a Set. Open Set and it’s all related theorems. |  |
| 12 | 27.12.2021-31.12.2021 | Adherent Point, Limit Point, Isolated point, Derived Set, Closure of a Set. Closed Set and it’s all related theorems. Exterior Points and Exterior of a set. Boundary points and Boundary of a set |  |
| 13 | 03.01.2022-08.01.2022 | Completeness in Metric Space-Sequences in Metric Spaces. Convergence in a Metric Space. Cauchy Sequence. Complete Metric Space. Subsequence and all it’s related theorems. |  |
| 14 | 10.01.2022-15.01.2022 | Cantor’s Intersection Theorem and it’s Inverse. Nowhere Dense set. First Category Space. Baire’s Category Theorem. Contraction Principle in a Metric Space. Banach’s Fixed Point Theorem. |  |
| 15 | 17.01.2022-22.01.2022 | Continuity and uniform Continuity in Metric Spaces- Continuous function and it’s all related theorems. Uniform Continuity and it’s all related theorems. Isometry. |  |
| 16 | 24.01.2022-29.01.2022 | Compactness in Metric Spaces- Covers, Compact set and Compact Metric Space. Bolzano Weierstrass Property (BWP), Sequentially Compact Metric Space. |
| 17 | 01.02.2022-05.02.2022 | Countably Compact Spaces and it’s all related theorems.Finite Intersection Property (FIP), Total Boundedness, Continuity and Compactness. |
| 18 | 07.02.2022-12.02.2022 | Connectedness in Metric Spaces- Separated Sets, Connected and Disconnected Sets and it’s all related theorems. Component, Continuity and connectedness. Totally Disconnected Spaces. |
| 19 | 14.02.2022 | Examination |