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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Even Sem.)**  **Class-B.Sc-2nd semester Paper-Number Theory and Trigonometry** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 21.3.22-26.3.22 | Divisibility-Proper and Improper Divisors, Theorems on divisibility, Division algorithm, G.C.D & L.C.M, Gauss theorem, Theorems on prime numbers, Fundamental theorem of Arithmetic, Canonical form. |
| 2 | 28.3.22-2.4.22 | Congruences- Theorems on congruences, Linear congruence, Linear Diophantine equations and related theorems. |
| 3 | 4.4.22.9.4.22 | Fermat’s, Wilson’s and Chinese Remainder Theorems. Simultaneous Linear Congruences. |
| 4 | 11.4.22-16.4.22 | Euler’s function and Residue systems (mod m)-Multiplicative function, Complete Residue System and Reduced Residue System, Euler’s Generalization of fermat’s Theorem |
| 5 | 18.4.22-23.4.22 | Some Functions of Number theory-Greatest integer function, de-Polignac Formula, Arithmetic functions-Divisor function of n, Sigma function of n, Perfect number, The Mobius function and Mobius Inversion formula, |
| 6 | 25.4.22-30.4.22 | Quadratic Residues and Quadratic Reciprocity Law-Quadratic congruence, Quadratic residues, Euler’s Criterion, Legendre Symbol, Euler’s Criterion using Legendre Symbol, Gauss Leema, Gauss Reciprocity Law. |
| 7 | 2.5.22-7.5.22 | De Moivre’s Theorem and its Applications, Roots of a complex number and its related theorems, Solution of equations, Formation of equations, |
| 8 | 9.5.22-14.5.22 | Circular functions of a complex variable, Exponential functions of a complex variable, Eular’s Theorem, Periodicity of Circular functions. |
| 9 | 16.5.22-21.5.22 | Hyperbolic functions, Separation into real and Imaginary parts of circular and Hyperbolic functions. |
| 10 | 23.5.22-28.5.22 | Logarithm of a complex quantity, general exponential function, General Logarithmic function, |
| 11 | 30.5.22-4.6.22 | Inverse Circular and Inverse Hyperbolic functions-General Value and Principal Value, Gregory’s Series, General Value |
| 12 | 6.6.22-11.6.22 | Summation of Series-Series of Sines and Cosines of angles which are in A.P, Methods of Differences, C+*i*S method of summation, Series depending upon exponential, Sine and Cosine series, Series depending on Logarithmic Series, Summation of Series depending on Hyperbolic series. |
| 13 | 13.6.22-18.6.22 | REVISION OF ALL UNITS OF NUMBER THEORY |
| 14 | 20.6.22-25.6.22 | REVISION OF ALL UNITS OF TRIGONOMETRY |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Even Sem.)**  **Class-B.Sc-2nd semester Paper-Ordinary Differential Equations** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 21.3.22-26.3.22 | Introduction to Differential Equations, it’s types, Order & degree of D.E’s, Solution of a D.E & it’s formation, Geometrical meaning of D.E, Exact Differential equations & it’s Solution with numerical problems, Integrating Factor & rules for finding the Integrating Factor with Numerical Problems. |
| 2 | 28.3.22-2.4.22 | Equations of First Order but Not of First Degree, Equations solvable for ‘p’, solvable for ‘y’, solvable for ‘x’ with Numerical Problems. Lagrange’s Equation with solution, Clairaut’s Equation, Equations reducible to Clairaut’s form, Singular Solution, p-discriminant and c-discriminent |
| 3 | 4.4.22.9.4.22 | Trajectories-oblique & orthogonal, Orthogonal trajectories in Cartesian co-ordinates, polar co-ordinates with all Numerical problems |
| 4 | 11.4.22-16.4.22 | Linear Differential Equations with Constant Coefficients, it’s standard form, Differential operator ‘D’, Complete solution of Linear Differential equation. |
| 5 | 18.4.22-23.4.22 | Auxiliary Equation (A.E) and it’s complete solution with different cases. Solution of Linear Differential Equations with Constant Coefficients-Complementary function, Particular Integral and it’s related theorems |
| 6 | 25.4.22-30.4.22 | Particular Integral in some special cases i.e exponential function, trigonometric function etc. with it’s all related problems. |
| 7 | 2.5.22-7.5.22 | Homogenous Linear Differential equations. Reduction of homogenous linear equation into linear equation with constant coefficients. Solution of Linear Differential Equations reducible to homogenous linear form. |
| 8 | 9.5.22-14.5.22 | Linear Differential Equation of Second Order. Solution of Linear Differential Equation (i) by changing the dependent variable when an integral included in the C.F. is known with problems. (ii) By removing the first derivative and changing the dependent variable with Numerical problems. |
| 9 | 16.5.22-21.5.22 | Solution of Linear Differential Equation (iii) by changing the independent variable with Numerical problems (iv) by the method of variation of parameters with Numerical problems. |
| 10 | 23.5.22-28.5.22 | Solution of Linear Differential Equation (iii) by the methods of undetermined coefficients with Numerical problems. Revision of all above five techniques. |
| 11 | 30.5.22-4.6.22 | Ordinary Simultaneous Differential Equations. Methods of Solving Simultaneous Linear Differential Equations with constant coefficients-(i) Use of operator ‘D’ (ii) Methods of Differentiation. |
| 12 | 6.6.22-11.6.22 | Simultaneous Equations of different forms-methods of solving with Problems. |
| 13 | 13.6.22-18.6.22 | Total differential Equations, Necessary and sufficient Condition for the Integrability. Different methods of solving Total differential Equations |
| 14 | 20.6.22-25.6.22 | REVISION OF ALL UNITS |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Even Sem.)**  **Class-B.Sc-4th semester Paper-Special functions and Integral Transform** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 21.3.22-26.3.22 | Power Series-Convergence of power series, Interval of convergence, Operation on power series, Analytic function, Ordinary and singular points of differential equation, Existence of power series solution with all numerical problems, |
| 2 | 28.3.22-2.4.22 | Frobenius Method-all four cases with complete numerical problems |
| 3 | 4.4.22.9.4.22 | Bessel’s Equation, Solution of Bessel’s equation, Bessel function’s –first kind & second kind. Deduction of Bessel’s function in the form of series. Six recurrence relations for Bessel’s function with complete numerical problems. |
| 4 | 11.4.22-16.4.22 | Generating function for Jn(x), Integral representation of Jn(x), Equation reducible to Bessel’s function Jn(x) with complete numerical problems. |
| 5 | 18.4.22-23.4.22 | Legendre’s Equation, Solution of Legendre’s Equation, Legendre’s Polynomial, Rodrigue’s Formula, Generating function for Pn(x), recurrence relations for Pn(x), Orthogonality of Legendre Polynomial. Laplace Integral representation of Legendre’s Polynomial. |
| 6 | 25.4.22-30.4.22 | Hermite’s Equation, Solution of Hermite’s Equation, Hermite’s Polynomial. Generating function for Hermite’s Polynomial, Rodrigue’s Formula for Hn(x), Recurrence relations. Orthogonal Property of Hermite’s Polynomial with complete numerical problems |
| 7 | 2.5.22-7.5.22 | Laplace Transformation. Laplace transform of some elementary functions. Linear Property. First shifting Property. Change of scale property. Piecewise continuity of a function in an interval. Function of exponential order. |
| 8 | 9.5.22-14.5.22 | Sufficient Condition for the existence of Laplace Transform. Laplace transform of derivatives. Laplace transform of periodic function. Laplace transform of Integrals. Laplace transform of some Important functions. |
| 9 | 16.5.22-21.5.22 | Inverse Laplace Transform. First shifting Property with all derivations. Convolution Theorem with complete numerical problems. |
| 10 | 23.5.22-28.5.22 | Application of Laplace Transformation to Integral Equations with complete numerical problems. |
| 11 | 30.5.22-4.6.22 | Solution of Differential Equation by Laplace Transformation (i) Linear D.E’s with constant coefficients by transform method (ii) Ordinary D.E’s with variable coefficients by transform method. |
| 12 | 6.6.22-11.6.22 | Fourier Transform (or Infinite Fourier Transform). Properties of Fourier Transform. Change of Scale Property. Modulation Property. Examples based on Fourier Sine and Cosine Transforms, based on use of Inverse Transform. |
| 13 | 13.6.22-18.6.22 | Convolution for Fourier Transform. Fourier Transform of the derivative. Relation between Fourier and Laplace Transform. Parseval’s Identity for Fourier Transform. |
| 14 | 20.6.22-25.6.22 | Solution of Differential Equations by Fourier Transform with complete numerical problems. |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics**  **LESSON PLAN SESSION 2021-22 (Even Sem.)**  **Class-B.Sc-6th semester Paper- Linear Algebra** | | |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 21.3.22-26.3.22 | Vector Space-Definition with numerical, General properties of vector spaces. Vector Subspaces-some theorems on vector subspaces, union and Intersection of subspaces with problems, |
| 2 | 28.3.22-2.4.22 | Linear sum and Direct sum of subspaces. Important Theorem on Direct subspaces. Disjoint subspaces with all numerical. |
| 3 | 4.4.22.9.4.22 | Linear combination of vectors. Linear dependence and independence of vectors. Important results and theorems on linearly dependent and independent set of vectors with numerical. Spanning set, Linear span of a set. Finitely generated vector space with numerical. |
| 4 | 11.4.22-16.4.22 | Basis of a vector space. Ordered basis. Existence theorem. Invariance of the number of elements of a basis. Maximal linearly independent set. Dimension of a vector space. Extension Theorem. Dimension of Linear sum and Direct sum. Complementary subspaces. |
| 5 | 18.4.22-23.4.22 | Quotient Spaces-Coset, Dimension of quotient space. Numerical Problems |
| 6 | 25.4.22-30.4.22 | Linear Transformations-properties. Vector space Isomorphism. Equality of Two Linear transformations with two important theorems. |
| 7 | 2.5.22-7.5.22 | Kernel of a Linear Transformation. Range or Image of a Linear Transformation with theorems. Fundamental theorem of vector space Homomorphism.Rank and Nullity of a Linear transformation-Sylvester’s Law. |
| 8 | 9.5.22-14.5.22 | Sum of Linear Transformation. Composition of two Linear transformation. Singular and Non-singular transformation. Invertible Linear transformation. |
| 9 | 16.5.22-21.5.22 | Coordinate Vector. Matrix of a Linear transformation relative to ordered basis, w.r.t. standard basis. Matrices of Identity and Zero transformations. Transition Matrix or Change of Basis Matrix |
| 10 | 23.5.22-28.5.22 | Vector space of all Linear Transformations. Dual spaces. Bidual or Double dual of a vector space. Annihilator. Annihilator of an Annihilator. |
| 11 | 30.5.22-4.6.22 | Eigen Values and Eigen Vector of a Linear Transformation. Eigen Space. Characteristic Polynomial of Linear Transformation. Similar Matrices. Diagonalisation of a Matrix. Minimal Polynomial. |
| 12 | 6.6.22-11.6.22 | Inner Product Spaces. Norm of a Vector. Cauchy Schwarz Inequality. Triangle Inequality. Normed Linear Space. Orthogonal Vectors and Orthogonal Complement. |
| 13 | 13.6.22-18.6.22 | Orthonormal Set. Bessel’s inequality. All theorems and Numerical. Gram-Schmidt Orthogonalization Process. Orthogonal Projection. |
| 14 | 20.6.22-25.6.22 | Linear operators on Inner Product Spaces-Adjoint operator, Self adjoint operator with all related theorems and Numerical |