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| **Teacher’s Name—Satyender Singh Subject-Mathematics****LESSON PLAN SESSION 2020-21 (Odd Sem)****Class-B.Sc-1st semester Paper-Algebra** |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 25.11.20-28.11.20 | Matrices-It’s type and Basic properties, Solutions of system of Linear equations, Symmetric matrix, skew symmetric matrix, Hermition matrix, skew-Hermition matrix |
| 2 | 01.12.20-05.12.20 | 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 | 17.12.20-12.12.20 | Inverse of a matrix by using elementary operations. Linear dependence and independence of row and column matrices and their basic theorems. |
| 4 | 14.12.20-19.12.20 | 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 | 21.12.20-26.12.20 | Application of matrices to a system of linear equations-System of Non-Homogenous Linear equations, Solution of system of Linear Homogenous equations. |
| 6 | 28.12.20-31.12.20 | Orthogonal matrix and it’s properties, Unitary matrix and it’s properties and related theorems. |
|  | 01.01.21-07.01.21 | WINTER VACATION |
| 7 | 11.01.21-16.01.21 | Bilinear and quadratic forms- Linear transformation, Matrix notation of a bilinear form. Canonical form of a bilinear form, Factorizable bilinear form, Quadratic forms, Matrix of quadratic form. |
| 8 | 18.01.21-23.01.21 | Linear transformation of a quadratic form, Diagonalization of a quadratic form, Lagrange’s method of Diagonalization, Factorable quadratic form |
| 9 | 25.01.21-30.01.21 | Relation between the roots and coefficients of an equation- Division algorithm theorem, Remainder theorem, Synthetic division, Fundamental theorem of algebra. Find the condition that roots of the given equation satisfy a given relation. |
| 10 | 01.02.21-06.02.21 | Common roots of two equations, Equal or multiple roots of an equation. Transformation of equations-Roots with sign changed, reciprocal roots, Roots diminished by a given number, Removal of terms in general. |
| 11 | 08.02.21-13.02.21 | Transformation of the Cubic and Bi-quadratic. Transformation in general, equation of squared differences of a cubic. |
| 12 | 15.02.21-20.02.21 | Solution of Cubic and Bi-quadratic equations- Carden’s methods of solving cubic equations. |
| 13 | 22.02.21-27.02.21 |  Descarte’s methods and Ferrari’s methods of solving Bi-quadratic methods. |
| 14 | 01.03.21-06.03.21 | Descarte’s rule of sign- Continuation and variation of sign, Leema, Complex roots |
| 15 | 08.03.21-13.03.21 | REVISION OF ALL UNITS |
| 16 | 15.03.2021 onwards | EXAMINIATION |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics****LESSON PLAN SESSION 2020-21 (Odd Sem)****Class-B.Sc-3rd semester Paper-Advanced Calculus** |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 25.11.20-28.11.20 | Continuous functions-Algebra and boundedness of continuous functions, Open sets, closed sets, Intermediate Value theorem, Uniform Continuity it’s related theorems. |
| 2 | 01.12.20-05.12.20 | Derivative and mean value theorems-Chain rule, Darboux’s theorem, Rolle’s theorem, Lagrange’s mean value theorem, Cauchy’s mean value theorem, Taylor’s theorem with various form of remainder.  |
| 3 | 17.12.20-12.12.20 | Indeterminate forms- L’Hospital rule for evaluation of various types of Indeterminate forms. |
| 4 | 14.12.20-19.12.20 | Limit and Continuity of functions of two variables, Algebra of continuous functions. |
| 5 | 21.12.20-26.12.20 | Partial Differentiation-Partial derivatives of higher order, Homogenous functions, Euler’s theorems on Homogeneous functions,  |
| 6 | 28.12.20-31.12.20 | Total increment and Total Differential, Composite functions, Differentiation of implicit functions, Taylor’s theorem for function of two variables. |
|  | 01.01.21-07.01.21 | WINTER VACATION |
| 7 | 11.01.21-16.01.21 | Differentiability of functions of two variables-Sufficient condition for differentiability, Young’s theorem, Schwartz’s theorem, Implicit function. |
| 8 | 18.01.21-23.01.21 | Maximum and Minimum of function of two variables- Lagrange’s method of Undetermined Multipliers.  |
| 9 | 25.01.21-30.01.21 | Curves in space-Tangent to a curve, Unit vector along the tangent, Equation of a tangent line at a point on a space curve, Cartesian form of equation of tangent line,  |
| 10 | 01.02.21-06.02.21 | Osculating plane or plane of curvature, Analytic function, Order of contact between curve and surface, Equation of tangent plane at any point of the surface f(x,y,z)=0 |
| 11 | 08.02.21-13.02.21 | Normal line at a point-Principal Normal& Bi-normal, Fundamental unit vectors and fundamental planes, Directions of Principal normal and Bi-normal, Curvature, Torsion, Screw Curvature. |
| 12 | 15.02.21-20.02.21 | Circle of curvature and spherical curvature-Osculating circle, Radius and centre of circle of curvature and it’s properties, Osculating sphere or sphere of curvature, Properties of Locus of centre of Spherical curvature. |
| 13 | 22.02.21-27.02.21 | Involutes and Evolutes- Curvature and Torsion of the Involute, Evolute, Bertrand Curves and it’s properties,  |
| 14 | 01.03.21-06.03.21 | Concept of a surface and Envelopes-Implicit representation of a surface, Class of a surface, Singularity of a surface, transformation of parameter, Parametric curves, Tangent plane and normal, Family of surfaces, edge of Regression. |
| 15 | 08.03.21-13.03.21 | REVISION OF ALL UNITS |
| 16 | 15.03.2021 onwards | EXAMINIATION |

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| **Teacher’s Name—Satyender Singh Subject-Mathematics****LESSON PLAN SESSION 2020-21 (Odd Sem)****Class-B.Sc-5th semester Paper-Group & Ring** |
| **S.No** | **WEEK** | **TOPIC** |
| 1 | 25.11.20-28.11.20 | Group & Subgroups-Order of group, Integral power of an element of a group, Order of an element of a group, Subgroup, Union and Intersection of two subgroups,  |
| 2 | 01.12.20-05.12.20 | Criterion for a complex to be a subgroup, Cyclic groups and its theorems, Euler’s function |
| 3 | 17.12.20-12.12.20 | Cosets, Important theorems on cosets, index of a subgroup in a group, Lagrange’s Theorem, Normal subgroups and its theorems, Quotient groups. |
| 4 | 14.12.20-19.12.20 | Homomorphisms, Kernel of Homomorphisms, Fundamental theorem on Homomorphism of groups, Automorphisms of groups,  |
| 5 | 21.12.20-26.12.20 | Inner automorphisms, Group of automorphisms of a cyclic group, Centre of a group, Characteristic subgroups, Normalizer of an element, Commutator subgroup. |
| 6 | 28.12.20-31.12.20 | Permutation Groups, Composition of two permutations, Inverse of a permutation, Cyclic permutation, Even and Odd permutations, Cayley Theorem. |
|  | 01.01.21-07.01.21 | WINTER VACATION |
| 7 | 11.01.21-16.01.21 | Rings and Fields-Ring, types of ring, Integral domain, Division ring or a skew field, Field, Subrings,  |
| 8 | 18.01.21-23.01.21 | Some theorems on subrings, Characteristic of a Ring and its important theorems. Ideals and Quotient Rings, Sum and Product of two ideals, Ideal generated by a set. |
| 9 | 25.01.21-30.01.21 | Simple Ring, Principal Ideal, Principal Ideal Ring & Principal Ideal Domain, Maximal Ideal, Prime Ideal, Nil Ideal, Quotient Ring,  |
| 10 | 01.02.21-06.02.21 | Ring Homomophisms- kernel of Ring Homomophisms, Fundamental theorem of Ring Homomophism, Second and Third theorem of Isomorphis.  |
| 11 | 08.02.21-13.02.21 | Embedding of Ring, Field of Quotients of an Integral Domain, Euclidean Rings, Divisibility in a commutative ring, Gaussian Integer, Proper and Improper divisors.  |
| 12 | 15.02.21-20.02.21 | Greatest common divisor, Least common multiple, Euclidean ring, Principal Ideal domain and its related theorems. |
| 13 | 22.02.21-27.02.21 | Polynomial Rings-Embedding of R into R[x], Polynomials over an integral domain, Polynomials over Field, Ring of Polynomials in ‘n’ variables over an integral domain, Divisibility of polynomials over field, Division algorithm for F[x],  |
| 14 | 01.03.21-06.03.21 | Remainder theorem, Unique factorization domain (UFD), Ascending chain condition for a Principal Ideal Domain (PID), Primitive Polynomial, Gauss Leema, Field of Quotients of a UFD, Eisenstein’s Irreducibility Criterion. |
| 15 | 08.03.21-13.03.21 | REVISION OF ALL UNITS |
| 16 | 15.03.2021 onwards | EXAMINIATION |