**LESSION PLAN**

**(Under NEP)**

**SEMESTER -1 Year : 2023- 2024**

**Course type: Minor Course code : MA-1**

**NAME OF THE COURSE-Algebra**

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| **Sl.No** | **Topic** | **No.of class** |
|  | **Teacher-Sushobhana Pal** |  |
| 1 | Matrix of real and complex, Algebra of matrices | 1 |
| 2 | Symmetric and skew symmetric matrices and problems | 1 |
| 3 | Hermitian and skew Hermitian matrices, orthogonal and Unitary matrices | 1 |
| 4 | Determinants | 1 |
| 5 | Cofactor, adjoint, inverse of matrix | 1 |
| 6 | Cramer’s rules | 1 |
| 7 | Vector space | 1 |
| 8 | Linearly dependent ,independent, basic and dimention | 1 |
| 9 | Linear transformation and their elementary properties and example | 2 |
| 10 | Matrix representation of linear transformation | 1 |
| 11 | Rank of a matrix ,determination of rank | 1 |
| 12 | System of linear equation in matrix form AX=B; Consistency and inconsistency; type of determination of solution, solving linear systems using Gaussian elimination | 2 |
| 13 | Eigen value, eigen vector ,eigen space | 2 |
| 14 | Charecteristic polynomial of a matrix, Cayley Hamilton theorem and it’s application for determining inverse of square matrix | 2 |
| 15 | Diagonalization of matrices | 1 |
| 16 | Bilinear form, real quadratic forms Sylvesters low of inertia, positive definite | 2 |
| 17 | De-Moivre’s theorem for integer and rational indices and their properties | 2 |
| 18 | The nth root of unity | 1 |
| 19 | Definition of exponential and trigonometrical functions of a complex variable, | 2 |
| 20 | Logarithm of a complex number and it’s properties | 1 |
| 21 | Definition of a^z, Inverse circular function, hyperbolic function | 1 |
| 22. | Total | 28 |
| 23 | Reletion between roots and co-efficient,transformation of equation | 1 |
| 24 | Equation of squared difference of a cubic,reciprocal equation,binomial equations and their properties1 | 1 |
| 25 | Decartes’ rule of signs,upper bounds for the real roots | 1 |
| 26 | Cardon’s solution of the cubic and the nature of the roots of the cubic | 1 |
| 27 | Ferraris’s methods of solution of biquadratic equations | 1 |
| 28 | The inequality involving AM>GM>HM | 1 |
| 29 | Extreme values of sum and product,theory of weighted means | 1 |
| 30 | Cauchy’s inequalities, m-th power theorem | 1 |
| 31 | Equvalence relation and partitions | 1 |
| 32 | Functions,composition of functions,invertible functions,one to one correspondence and cardinality of a set | 1 |
| 33 | Permutations,inversions,cycles and transpositions | 2 |
| 34 | Defination and example of group | 1 |
| 35 | Example of abelian and non abelian groups | 1 |
| 36 | The group Zn of integers under addition modulo n and the group U(n) of units under multiplication modulo n,groups of symmetries of an equilateral triangle | 2 |
| 37 | The permutation group S3,the general linear group GL(n.R),n<3 | 1 |
| 38 | Subgroup | 1 |
| 39 | Cyclic subgroup | 1 |
| 40 | The concept of a subgroup generated by a subset,cosets | 1 |
| 41 | Index of a subgroup,Lagrange’s theorem and its converse,order of an element | 1 |
| 42 | Normal subgroups,their definition,example and characterizations | 2 |
| 43 | Definition and example of ring,example of commutative non com. rings | 1 |
| 44 | Zn the ring of integers modulo n,polynomial ring | 1 |
| 45 | Definition of subrings,integral domains | 1 |
| 46 | Skew fields,fields and subfields,their properties and example | 2 |
| 47. | Total | 28 |
| 48. | Tutorial class | 9 |
| 49. | Class test | 10 |
| 50. | Total | 75 |