

<b>PROGRAMME NAME : B.A.(Programme)</b>
<b>COURSE NAME : Algebra</b>
<b>SEMESTER DURATION : January-May</b>

Week	Topic(s)	Teaching Methodology Adopted/ Continuous Internal Evaluation
1	Fundamental Theorem of Algebra (statement only), Relation between roots and coefficients of nth degree equation	Lectures
2	Remainder and Factor Theorem, Solutions of cubic and biquadratic equations, when some conditions on roots of the equation are given	Lectures/Discussion
3	Symmetric functions of the roots for cubic and biquadratic equations	Assignments/Quizzes
4	De Moivre's theorem (both integral and rational index), Solutions of equations using trigonometry and De Moivre's theorem	Presentations
5	Expansion for $\cos nx$ , $\sin nx$ in terms of powers of $\cos x$ , $\sin x$ and $\cos nx$ , $\sin nx$ in terms of cosine and sine of multiples of $x$ .	Case Study
6	Matrices, Types of matrices, Introduction elementary transformations	Demonstration

7	Rank of a matrix. Invariance of rank under elementary transformations	Lectures
8	Reduction to normal (Echelon) form, Solutions of linear homogeneous and non-homogeneous equations with number of equations and unknowns up to four	Discussion/Seminars
9	Cayley-Hamilton theorem, Characteristic roots and vectors.	Tutorials
10	Integers modulo $n$ , Permutations.	Discussion
11	Groups, subgroups, Examples of groups, subgroups and simple theorems	Lectures/Practicals
12	Lagrange's Theorem, Euler's Theorem, Symmetry Groups of a segment of a line, and regular $n$ -gons for $n = 3, 4, 5$ and $6$ ; Rings and subrings in the context of $C[0,1]$ and	Practicals
13	Definition and examples of vector space, Subspace and its properties	Case Study
14	Linear independence, Basis and dimension of a vector space	Case Study

**Course Objectives:** Students will get conceptual understanding and the applicability of the subject matter. helps students to see how linear algebra can be applied to real-life situations. Modern concepts and notation are used

to introduce the various aspects of linear equations, leading readers easily to numerical computations and applications.

**Course Learning Outcomes:** The course will enable the students to understand: i) Solving higher order algebraic equations. ii) Solving simultaneous linear equations with at most four unknowns. iii) Overview of abstract algebra, which is useful in their higher studies.