Semester* : III
Course Type : DSM
Course Code** : MAT-DSM-201
Name of the Course : Classical Algebra and Trigonometry
Learning level*** : 199
Credits : 4
Contact Hours : 60
Total Marks : 100
End Semester Marks : 70
Internal Marks : 30
Course Objective

The main objective of this course is

1. To provide a first approach to the subject of classical algebra.
2. To introduce the concept of rank of a matrix, solution of a system of linear equations.
3. To familiarize the students with relation between roots and coefficients of a polynomial equation, symmetric function of roots.
4. To introduce the concept of inequalities and its use.
5. To provide basic knowledge of trigonometry, hyperbolic functions.
6. Understanding the summation of trigonometric series, expansions.

Unit-I

Adjoint of Square matrix, Jacobi's Theorem; Inverse of a square matrix, Elementary transformation on matrices, Rank of a matrix, solution of a system of linear equations by matrix inverse and by Gaussian elimination method.

Unit-II

Relation between the roots and coefficients of a polynomial equation of nth degree with special reference to cubic equation, Symmetric function of roots; Transformation of equation; Cardan's Method of solution of cubic equation of the form $ax^3+bx+c=0$ $(a\neq0)$;

Unit- III

Inequalities, properties, inequalities involving arithmetic, geometric and harmonic means, Cauchy-Schwarz's inequality, Minkowski inequality, Holder's inequality.

Unit- IV

De Moivre's theorem, related problems, Expansion of sin nθ and cos nθ, expansion of Sin θ and Cosθ in ascending powers of θ, functions of complex arguments.

Unit- V

Gregory's series; summation of trigonometric series; hyperbolic functions.

Textbooks :

1. J.G. Chakraborty, P.R. Ghosh; Higher Algebra; U.N. Dhur & Sons. (Units I & II)
2. S.K. Mapa; Higher Algebra (Classical); Levant. (Unit III)
3. B.C. Das, B.N.Mukherjee; Higher Trigonometry; U.N.Dhur & Sons. (Units IV & V)

Course Learning Outcome

After completion of this course, the learners will be able to

1. Describe the role of elementary Transformations on matrices.
2. Find the solution of a polynomial equation.
3. Apply the concept of symmetric functions.
4. Understand the importance of De Moivre's theorem.
5. Find expansions of trigonometric functions and related problems.
6. To acquire knowledge of Gregory's series, summation of Trigonometric series and related problems.