BACHELLOR OF ARTS / SCIENCE
6th SEMESTER

GENERIC ELECTIVE COURSES -II (GE-II)

MM620G: MATHEMATICS / APPLIED MATHEMATICS: MATHEMATICS - II

CREDITS THEORY-4, TUTORIAL: 2

THEORY (6 CREDITS: 60 HOURS)   MAXIMUM MARKS: 60, MINIMUM MARKS: 24

Objectives: i).To study/extend the complex analogues of plane trigonometry.

ii). To learn techniques for solving equations of degree upto four.

iii). To use matrix methods for solving equations.

iv). To study different sections of a cone.

UNIT-1 (15 HOURS)

Review of complex number system, triangle inequality, geometrical representations of sum, difference, product and quotient of the complex numbers, equation of a circle, Cross-ration, De Moivere's theorem and its applications, expansion of $\sin n\theta$, $\cos n\theta$ etc. in terms of powers of $\sin \theta$, $\cos \theta$ and expansion of $\sin^n \theta$ and $\text{sos}^n \theta$ in terms of multiples of $\cos\theta$ and $\sin \theta$, $n\epsilon N$. Functions of a complex variable, exponential, circular, hyperbolic, inverse hyperbolic and logarithmic functions of a complex variable and their properties, summation of trigonometric series, difference and C + iS methods.

UNIT-2 (15 HOURS)

General properties of polynomials, Remainder and Factor Theorem, relation between the roots and the coefficients of a polynomial equations, transformation of equation, symmetric function and their applications, solutions of the cubic and biquadratic equations, Descarte's rule of signs, upper bounds for positive and negative root of an equation.

UNIT-3 (15 HOURS)

Types of matrices, inverse of a square matrix, matrix polynomials, matrix and characteristics polynomial, eigen values and eigen vectors of matrix and their determination, rank of a matrix, invariance of rank through elementary transformation, reduction of matrix to normal form, elementary matrices, linear dependence and linear independence of row (column) vectors, conditions for columns of a matrix to be linearly dependant, A matrix has rank r iff it has r linearly independent columns, analogous results for rows, linear homogenous and non-homogenous equations, orthogonal and unitary matrices.

UNIT-4 (15 HOURS)

Pair of equations, joint equation of two straight lines, equations of angle bisectors, condition for general equation of 2nd degree to represents two straight lines, circle equation of tangent and normal to the circle, chord of contact, orthogonality of circles, parabola equation of parabola, tangent and normal, parametric equations,

ellipse, tangent and normal, pole and polar, Parametric equations of an ellipse, conjugate diameters and their properties, Hyperbola, equation of tangent and normal, equation of asymptotes axes, rectangular hyperbola, conjugate diameters and their properties.

TUTORIALS (2 CREDITS: 30 HOURS)   **Maximum Marks: 30 Minimum Marks: 12**
23. Tutorials based on Unit I & II - **1 credit**
24. Tutorials based on Unit III & IV – **1 credit**.

Books recommended

1. W.S.Burnside and A.W.Panton, The Theory of Equations, Dublin University Press, 1954.
2. C.C.MacDuffee, Theory of Equations, John Wiley and Sons Inc., 1954.
3. A..Aziz and N.A.Rather, Complex Trigonometry, KBS.
4. A. Aziz, Nissar A. Rather and B. A. Zargar, Elementary Matrix Algebra, KBD.
5. Coordinate Geometry, KBD.