DEPARTMENT OF MATHEMATICS

Courses Outcomes (CO):

First Semester:
On completion of the first semester course, students will be able to
Algebra I & Calculus-I :

- Prove statements about sets and functions
- Understand Ɛ-δ definition of limits and continuity
- Examine continuity and derivability of a function
- Apply derivative tests in optimisation problems
- Evaluate definite and infinite integrals
- Find inverse of a matrix
- Find solution to a system of linear equations
- Solve first order first degree equations and first order higher degree equations

Second Semester:
Geometry and Vector Calculus:
After completing the second semester course, the students should be able to

- Transform co-ordinate axes
- define conics and obtain standard equations
- to find equation of tangents and normals to the conics
- reduce the general quadratic equations to standard form
- convert cartesian coordinates to polar coordinates, spherical coordinates and cylindrical coordinates
- solve the problems on 3D geometry
- represent vectors analytically and geometrically and compute dot and cross products
- Differentiate vector fields and determine gradient, divergence and curl of vector fields

Third Semester:
Statics and Calculus II:
Upon completion of the course, the students should be able to

- Find resultant of coplanar forces, equilibrium of forces
- Define friction and understand the laws of friction
- Test of convergence and divergence of a given sequence or series
- Understand the concept of asymptotes and obtain their equations
- Expand a function using Taylor's and Maclaurin's series

Fourth Semester:
Algebra II and Dynamics:
On completion of this course, students will be able to

- Get an understanding in basic concepts in group theory
- State and prove Lagrange's theorem and its applications
- Prove De-Moivre's theorem and application to finding solution of equation

- Define projectile, Simple Harmonic Motion and understand direct and oblique impact of elastic spheres
- Find tangential and normal acceleration, radial and transverse acceleration on smooth curves

Fifth Semester:

Elementary Number Theory:

In the sixth semester, students will

- Learn properties of set of integers and study various properties on prime. Learn about congruences and number- theoretic functions.
- Learn to find integer solutions to system of equations

Advanced Calculus I:

- learn Riemann Integral and its properties
- Study different tests for solving improper Integrals of 1^{st} and 2^{nd} kind
- learn Surface Integral and Volume Integral

Differential equations:

- be able to solve linear equations of second order with constant and variable co-efficients
- learn methods to solve linear and non-linear first order PDE

Advanced Dynamics:

- be able to find moments and products of inertia of rigid bodies
- discuss and analyse motion in two dimensions

Sixth Semester:

After completing this course in sixth semester , students will be able to

Advanced Calculus II:

- Basic of metric space, open & closed sets, compactness
- Understand the ideas of continuity and inverse images of open and closed sets
- Prove of various fundamental theorems of Real Analysis.
- Various types of derivatives of function of several variables.

Advanced Algebra:

- Define homomorphisms, kernel of a homomorphism, isomorphism
- Prove Cayley's theorem
- Define rings, zero divisors of a ring, integral domain and prove theorems

Operations Research:

- Learn conversion of real life problems into mathematical problems and calculate optimal solution of models
- predict future movement of a random variable based upon the current circumstances surrounding the variable.
- Obtain optimum strategies for dealing with competitive situation