

Semester III
VSEC (2 Credits)
(For Maths Major subject)
Course Title: Basic Mathematics for Physics

Vector Algebra: Vectors, addition of vectors, unit vector, position vector, product of two vectors, scalar or dot product, workdone, vector product or cross product, area of parallelogram, moment of a force, angular velocity, scalar triple product, vector product of three vectors.

List of Practicals:

- 1) Determination of modulus and unit vector of a given vector
- 2) Determination of position vector of centroid of a triangle
- 3) Determination of projection of a vector on another vector and angle between the vectors
- 4) Determination of workdone by the forces
- 5) Determination of vector product of two vectors
- 6) Determination of area of parallelogram
- 7) Determination of moment of force
- 8) Determination of angular velocity
- 9) Determination of scalar triple product and volume of parallelepiped
- 10) Determination of vector product of three vectors

Reference Book:

Advanced Engineering Mathematics, H.K Dass, S. Chand & Co. Ltd., New Delhi.

SEC (2 Credits)
(For Maths Minor subject)

Course Title: Introduction to Finite Differences and Interpolation

Calculus of finite differences: Introduction, basic properties, difference operators Δ and E , relations between Δ and E operators and their properties, higher order differences, construction of difference table, Factorial polynomials, representation of polynomials in the factorial notation. Interpolation: Interpolation and extrapolation with equal and unequal intervals, Newton's interpolation formula.

References :

1. S. S. Sastri, Introductory methods of Numerical Analysis, EEE
2. B.S. Goel and S.K. Mittal, Numerical Analysis, Pragati Prakashan, Meerut.

3. Bhupendra Singh, Numerical Analysis, Pragati Prakashan, Meerut.

List of Practicals:

- 1) Determination of differences of functions.
- 2) Representations of any polynomial in factorial notation
- 3) Determination of missing terms.
- 4) Interpolation of function for equal interval
- 5) Interpolation of the function for unequal interval.
- 6) Extrapolating the function for equal interval of arguments.

Semester IV

VSEC (2 Credits)

(For Maths Major subject)

Course Title: Applied Mathematics for Physics

Applications of Differential Equations:Electrical circuits problems, Mechanical problems, Elastic string, Simple Harmonic motion, Simple pendulum,Oscillation of a string, Vibrating string, Wave equation, one dimensional heat flow.

List of Practicals

- 1) Determination of current flowing through the given circuit
- 2) Determination of displacement and velocity of body falling from rest
- 3) Determination of displacement of simple pendulum
- 4) Determination of time period of oscillation for simple pendulum
- 5) Determination of equation of vibrating string
- 6) Determination of displacement of vibrating string
- 7) Determination of temperature distribution in the rod

Reference Book:

- 1) Mathematical Physics, H.K Dass,Dr. Rama Verma, S. Chand &Co.Ltd., New Delhi.
- 2) Advanced Engineering Mathematics, H.K Dass,S. Chand &Co.Ltd., New Delhi.

SEC (2 Credits)

(For Maths Minor subject)

Course Title: Introduction to Numerical Methods

Solution of Algebraic and Transcendental equations: Newton-Raphson method, Regula- falsi method.

Solution of system of linear equations: Gauss-elimination method,Gauss-seidel method.

Solution of ordinary differential equations: Picard method, Eulers method, Runge-Kutta method.

References :

1. S. S. Sastri, Introductory methods of Numerical Analysis, EEE
2. H. K. Dass, Advanced Engineering Mathematics, S. Chand, New Delhi.
3. B.S.Goel and S.K. Mittal, Numerical Analysis, Pragati Prakashan, Meerut.
4. Bhupendra Singh,Numerical Analysis, Pragati Prakashan, Meerut.

List of Practicals:

- 1) Determination of solution of algebraic and transcendental equation using Newton-Raphson method
- 2) Determination of solution of algebraic and transcendental equation using Regula- falsi method
- 3) Determination of solution of system of linear equations using Gauss-elimination method
- 4) Determination of solution of system of linear equations using Gauss-seidel method
- 5) Determination of solution of ordinary differential equations using Picard method
- 6) Determination of solution of ordinary differential equations using Eulers method
- 7) Determination of solution of ordinary differential equations using Runge-Kutta method.