

DEPARTMENT OF MATHEMATICS

Programme: B Sc. (Mathematics)

Statement of Programme Specific Outcomes (PSOs)

By the end of the course, the students will be able to:

1. Understand the basic concepts of Algebra and Trigonometric and calculus
2. Define Advanced calculus, sequence and series and differential Equations
3. Prepare for competitive exams like MPSC, UPSC, GATE, NET, CAT.
4. Analyze and grasp abstract ideas to apply them to important practical problems.
5. Develop strong analytical skills and a broad-based background in the mathematical sciences to join Indian industry.

Statement of Course Outcomes (COs)

B.Sc.Course: SEM-IPaper -1 (*Algebra & Trigonometry*)

By the end of this course, Students will be able to:

1. Find Rank & solve the system of linear equations by using Matrices..
2. Understand the concept of Eigen value & Eigen vectors and method to find it.
3. Solve polynomial equation in one variable by using various method such as Cardon& Ferrari.
4. Understand the basic concept of complex analysis.
5. Understand the basic concept of Group Theory.

B.Sc. Course: SEM-I Paper -2 (*Calculus*)

By the end of this course, Students will be able to:

1. Understand the concept of limit, continuity and differentiability of function of onevariable.
2. Successive differentiation and Leibnitz's theorem.
3. Understand the concept series expansions (Maclaurin& Taylor Series).
4. Find limits of indeterminate forms by using L'Hospital Rule.
5. Understand the concept of partial differentiation, Euler's theorem, Jacobians.
6. Solve definite integrals.

B.Sc. Course: SEM-II Paper -1 (*Geometry, Differential & Difference Equations*)

By the end of this course, Students will be able to:

1. Understand the concept of Geometry (line, Plane, Circle, Sphere, cone, cylinder).
2. Solve first order exact differential equation, first order linear differential equation.
3. Study Bernoulli's differential equation.
4. Study higher order linear differential equation.
5. Study Difference equation.

B.Sc. Course: SEM-II Paper -2(*Vector Calculus & Improper Integrals*)

By the end of this course, Students will be able to:

1. Understand the concept of vector calculus (Gradient, Divergence, Curl).
2. Understand the concept of line Integral, work done, conservative vector field.
3. Use double integration to find area.
4. Solve problems on vector Integration (Surface Integral, Volume Integral).
5. Evaluate Improper Integrals.

B.Sc. Course: SEM-III Paper -1 (*Advanced Calculus, Sequence & Series*)

By the end of this course, Students will be able to:

1. Understand Mean Value Theorems, Limit & continuity of functions of two variables.
2. Understand the concept of Minima & maxima of functions of two variables.
3. Understand the concept of sequence.
4. Understand the concept of series.

B.Sc. Course: SEM-III Paper -2 (*Differential Equations & Group Homomorphism*)

By the end of this course, Students will be able to:

1. Understand Bessel's & Legendre's functions with their properties.
2. Understand the concept of Laplace Transform & Inverse Laplace Transform.
3. Solve Ordinary and Partial Differential Equations using Laplace transform
4. Understand the concept of Fourier Transform
5. Understand the concept of Group.

B.Sc. Course: SEM-IV Paper -1 (*Partial Differential Equations & Calculus of Variation*)

By the end of this course, Students will be able to:

1. Solve simultaneous differential equations.
2. Form partial differential equations of first order.
3. Use suitable method to find solution of partial differential equations of first order.
4. Solve linear partial differential equations of higher order.
5. Study calculus of variation.

B.Sc. Course: SEM-IV Paper -2 (*Mechanics*)

By the end of this course, Students will be able to:

1. Understand the concepts of equilibrium of coplanar forces, virtual work, and catenary.
2. Understand the concept of radial & transverse velocity, radial & transverse acceleration.
3. Understand the concept of simple harmonic motion.
4. Understand Mechanics of a system of particles.
5. Study equations of motion.

B.Sc. Course: SEM-V Paper -1 (Analysis)

By the end of this course, Students will be able to:

1. Understand the concept of Fourier series.
2. Understand the concept Riemann-Stieltjes integral.
3. Understand fundamental theorem of calculus.
4. Understand basic concept of analytic functions.
5. Study Mobius transformation.

B.Sc. Course: SEM-V Paper -2 (Metric Spaces, Complex Integration & Algebra)

By the end of this course, Students will be able to:

1. Examine countable and uncountable sets.
2. Understand the concept Metric spaces.
3. Understand the concept of Ring.
4. Study complex integration.

B.Sc. Course: SEM-VI Paper -1 (Abstract Algebra)

By the end of this course, Students will be able to:

1. Understand the concept of Group Automorphism.
2. Give examples of vector spaces.
3. Understand the concept of linear transformation.
4. Link linear transformations with matrices.
5. Study inner product spaces.

B.Sc. Course: SEM-VI Paper -2 (Special Theory of Relativity)

By the end of this course, Students will be able to:

1. Study Newtonian Relativity, Galilean Transformation.
2. Understand failure of Newtonian Relativity.
3. Study Einstein's Theory of Relativity, Lorentz Transformation.
4. Study Tensors, Riemannian metric, metric tensor.
5. Study Maxwell's equations of electromagnetic theory, equivalence of mass and energy
6. $E = mc^2$.

B.Sc. Course: SEM-VI Paper -2 (Optional)(Discrete Mathematics and Elementary Number Theory)

By the end of this course, Students will be able to:

1. Distinguish between equivalence relation and partial order relation.
2. Understand Boolean algebra.
3. Study basic concept of Number Theory.
4. Understand Greatest Integer Function, Quadratic Residues and Reciprocity.
5. Study the Diophantine equations $ax + by = c$, the equations $x^2 + y^2 = z^2 \wedge x^4 + y^4 = z^4$.

B.Sc. Course: SEM-VI Paper -2 (*Optional*) (Differential Geometry)

By the end of this course, Students will be able to:

1. Study curve in space, its parametric representation, curvature of curve.
2. Understand the concept of Envelopes, developable surfaces.
3. Study curves on a surface, normal curvature.
4. Study differential equation of Geodesic, Curvature of Geodesic, Gaussian curvature