

Department of Mathematics

Programme Outcomes, Course Outcomes and Programme Specific Outcomes

M.Sc. in Pure Mathematics

Programme Outcome

P01 Critical Thinking

Acquired the knowledge with facts and figures related to mathematics. Demonstrate mathematical thinking, skills, progressing from a procedural and computational understanding of mathematics to logical reasoning, abstraction, generalization, formal proof and pattern recognition.

P02 Effective Communication

Improve communication with precision, clarity, organization, proper terminology and notation. Develop the ability of mathematics to communicate scientific information and research results in written and oral formats.

P03 Social Interaction

Provide knowledge about mathematical properties and its application for developing technology to ease the problems related to the society. Learn professionally including the ability to work in teams and apply basic ethical principles in society.

P04 Ethics

Imbued of mathematical knowledge and skills appropriately it gives us professional activities and demonstrate highest standard of ethical issues in mathematics.

P05 Environment and Sustainability

Understood the basic concepts, fundamental principles, and the scientific theories related to various mathematical phenomena and their relevancies in the day-to-day life automatically enhance our awareness about social evils, blind faith etc.

P06 Self directed and Lifelong Learning

Continue to increase the knowledge of mathematics we realized that pursuit of knowledge is a lifelong activity and in combination with untiring efforts and positive attitude and other necessary qualities leads towards a successful life

Course Outcome

CO1 (PM1/01):

Discussion on Group Theory to solve algebraic/ transcendental equation and Ring Theory as an application in Number Theory

CO 2 (PM1/02):

a) Metric space

b) Lebesgue Integration in the light of Measure Theory on real line
(Discussion on Lebesgue measurable sets, Lebesgue measurable functions, Lebesgue integration etc.)

CO 3 (PM1/03):

a) Complex analysis –Analytic function and complex integration

b) Existence and uniqueness of initial value problem

c) nth order homogeneous and non homogeneous linear differential equation. Sturm-Liouville's problem and some results related to it.

d) Qualitative study of system of linear and non-linear differential equation

CO 4 (PM1/04):

a) Topological space as generalization of open sets in real line.

b) Differential geometry on curve and surfaces.

CO 5 (PM1/05):

a) i) Directed and undirected graph.

ii) Transportation problem.

iii) Algorithms to find minimal spanning trees.

iv) Chromatic number, Graph coloring.

v) Planar graphs.

b) Differential Calculus from $\mathbb{R}^n$ to $\mathbb{R}^m$.

CO 6 (PM2/06):

i) Linear Algebra---Eigen value, eigen vectors.

ii) Linear transformation on a finite dimensional inner product space.

iii) Module theory

CO 7 (PM2/07):

a) Real Analysis—Cardinal numbers.

b) i) Various kinds of singularities---finding singularities of complex valued function using some classical results.

ii) Analytical continuation.

iii) Meromorphic functions.

CO 8 (PM2/08):

General topology--- Compactness, Connectedness, Nets and Filters, Paracompactness, Product topology.

CO 9 (PM2/09):

Functional Analysis—Banach spaces and Hilbert spaces—Operator theory.

CO 10 (PM2/10):

a) i) Partial order relation—Lattice Theory

ii) Recurrence relation—Generating function.

b) Differentiable manifold—Tangent space, cotangent space—Differential forms.

CO 11 (PM3/11):

a) Field extension—Splitting field.

b) Algebraic topology—Homotopy theory—Fundamental group of S^1 , Torus.

CO 12 (PM3/E1/105):

Advanced Riemannian Manifold I—Vector field, Tensor field-Connections-Bundle theory.

CO 13 (PM3/E1/207):

Advanced general topology II—Uniformity—Compactness and uniformity—Proximity-Ordinal numbers and ordinal spaces.

CO 14 (CBCC-A):

Applied Mathematics

i) Ordinary differential equation-Its existence and uniqueness. Qualitative study of ordinary differential equation.

ii) Partial differential equation

iii) Numerical analysis--Solution of system of linear equations using numerical methods. Numerical solution of transcendental equation using Newton raphson method. Numerical Integration. Numerical solution of ordinary and partial differential equation using finite difference method.

iv) Computer number system.

CO 15 (CBCC-B):

Statistical Method

i) Graphical Representation of data

ii) Probability—Basic concepts-Random variable (Discrete and Continuous)

iii) Hypothesis testing.

CO 16 (PM4/12):

a) Algebraic Topology—Homology theory

b) Partial differential equation (PDE)

i) Solving Nonlinear first order and second order PDE

ii) Solving Heat equation and Wave equation

CO 17 (PM4/13):

a) Computational Mathematics—Programming in C.

CO 18 (PM4/E1/105):

Advanced Riemannian manifold II—General and special theory of Relativity.

Advanced Topology II—Paracompactness—Function space—Metrization-
Elements of dimension theory.

CO 19 (PM4/13) Computational Mathematics

CO 20 PM4/15 Dissertation & Seminar on a topic assigned to the students.

Programme Specific Outcome

PSO1 : Mathematics will help us to apply critical thinking skills to solve problems that can be modeled mathematically, to critically interpret numerical and graphical data.

PSO2 : The Department of Mathematics offers excellent opportunities for analyze complex mathematical problem in both pure and applied mathematics.

PSO3 : Propose new mathematical questions, to read and construct mathematical arguments and proofs, to use computer technology appropriately to solve problems and to promote understanding, to apply mathematical knowledge to a career related to mathematical sciences or in post-baccalaureate studies.

PSO4 : It has been a continuous effort from the department to develop the research skills among the students by providing them different projects not in the syllabi and to think in different way. The students have to submit the Dissertation and demonstrate the same in front of the experts at the end of the last semester.