

Department of Mathematics

Programme Outcomes

UG

1. To provide knowledge and insight in Mathematics to students, so that they are able to work as mathematical professionals.
2. To prepare students to pursue higher studies and conduct research.
3. To introduce the fundamentals of mathematics to students and strengthen the students' logical and analytical ability.
4. To develop teaching skills, subject knowledge in the course of their study which will help them to excel in various fields.
5. Demonstrate and understand the concepts in mathematics and their importance in solving real world problems.
6. Learn, select and apply appropriate methods and procedures, resources and computing tools such as MATLAB, MAPLE, MATHEMATICA, SageMath, etc., and learn different programming languages such as C, C++, FORTRAN, etc..
7. Apply knowledge and understanding of principles of mathematics effectively in managing projects in multidisciplinary environment.
8. Solve discipline based and/or cross-discipline based problems using different strategies.

PG

1. To prepare students to pursue higher studies and conduct research.
2. Analyze relevant academic, professional and research ethical problems and commit to professional ethics and responsibilities.
3. Effectively communicate about their field of expertise in their activities, with their peer and society at large.
4. Define, design and deliver a significant piece of research work that is clear and concise. Demonstrate the necessary skills and knowledge of deeper understanding in research areas.
5. Apply discipline-based and/or cross-discipline-based knowledge to design a problem solving strategy.

PhD

1. To facilitate scholars who wish to do research in fluid dynamics.

Programme Specific Outcome

UG

1. Understand the mathematical concepts and applications in the field of Algebra, Analysis, Statistics, Manifolds, Relativity, etc.
2. To apply knowledge of Mathematics in all the fields of learning including higher research and extensions.
3. Students will communicate Mathematics to others in both oral and written form with precision, clarity and organization.
4. Students will acquire sufficient knowledge and proficiency in the use of appropriate technology to assist in the learning and investigation of Mathematics.
5. Students will study core topics of Mathematics, drawing on ideas and tools from previous courses to enhance their understanding.

PG

1. Students will have experience working with the ideas representing the breath of the mathematical sciences. Students should see a number of contrasting but complementary points of view in the topics, techniques and approaches to Mathematics.
2. Students will develop mathematical thinking, progressing from a procedural/computational understanding of mathematics to a broad understanding encompassing logical reasoning, generalization, abstraction and formal proof.
3. Students will acquire sufficient knowledge and proficiency in the use of appropriate technology to assist in the learning and investigation of Mathematics.
4. Students will study core topics of Mathematics, drawing on ideas and tools from previous courses to enhance their understanding.

PhD

1. To do quality research in Newtonian viscous fluids.

Course Outcome

UG: A student on completion of the course will be able to

1. Handle differential equations and make simple mathematical models for real life situations (Eg: Epidemic model, growth-decay model, etc..).
2. Understand the concepts of limits, continuity, sequences, series, convergence of complex valued functions, calculus of complex valued functions.
3. Learn different methods for solving Initial and Boundary value problems
4. Study the errors in numerical calculation, understand different algorithms and their convergence
5. Understand different concepts of finding roots of equations analytically, solving system of linear algebraic equations numerically, methods for finding eigenvalues and eigenvectors
6. Study different types of interpolation, differentiation and integration techniques
7. Learn different numerical solution techniques of Ordinary Differential Equations
8. Understand the working system of different finite state machines, equivalence of Finite Automata, design Turing machine to solve problems and explain the decidability and intractability of computational problems
9. Learn concepts of groups, rings, fields and vector spaces in detail and their role in modern mathematics and applied contexts.
10. Understand concepts of divisibility, primes, congruences, various arithmetic functions and cryptography.
11. Describe the relation between roots and coefficients, analyse the location and describe the nature of the roots of an equation.
12. Demonstrate capacity for mathematical reasoning through analysing, proving and explaining concepts from algebra.
13. Trace different curves, calculate volumes and surface areas, handle basic geometric figures, apply calculus to study/solve problems in business, economics, motion of objects.
14. Learn properties of real numbers, sequences and series in the field of real numbers, behavior of real functions, sequence of functions.
15. Learn basics of complex numbers, analytic functions, ways to integrate complex valued functions, expansion of functions into series.

PG: A student on completion of the course will be able to

1. Understand the generalization of various properties of real numbers or metric spaces to more general spaces, broaden the concepts of length and continuity by extending the idea of integrals to widen the class of functions.
2. Evaluate integral of complex valued function using residue theorems, expansion of functions in to series.

3. Understand various ideas and concepts of classical dynamics, such as D'Alembert's principles, Gauge invariance of the Lagrangian, Galilean transformation.
4. Understand the concept of moment of inertia and product of inertia radius of gyration etc. along with some techniques of finding such quantities for various well known objects.
5. Study the two dimensional motion of various rigid bodies under various restrictions and constraints.
6. Learn the concepts of Ordinary and Partial Differential Equations and different methods for finding solutions analytically and practically.
7. Develop the concepts of programming languages and computer programming skill.
8. Understand the different transforms and its applications such as solving ODEs & PDEs
9. Study different types of Integral equations and methods of finding their solutions
10. Using mathematical softwares to find and compare the solutions of different transforms, find solution of differential equations, integral equations, integro-differential equations, boundary value problem, Sturm Liouville eigenvalue problems
11. Understand the basic concepts of fluid and fluid pressure and their elementary properties.
12. Analyze the stability and equilibrium of a fluid flow under various conditions
13. Learn Finite Abelian groups, Sylow's theorems, applications and consequences.
14. Understand Modules: Artinian, Noetherian, Injective, Projective; interpret their properties and some of their basic characterizations.
15. Apply appropriate Number Theory knowledge and Cryptography to use in real life problems.
16. Learn concepts of Riemannian metric, connection, curvature tensor, Bianchi identities, Ricci tensor, scalar curvature space time of constant curvature, projective transformation, conformal transformation.
17. Learn that Einstein manifolds in Riemannian Geometry (e.g. Space time is a semi-Riemannian manifold, geodesics, Curvature of the different curves)

PhD: A scholar on completion of the course will be able to apply knowledge in

1. Aerospace engineering, hydroelectric power plants, hydraulic machines, automobiles, thermal power plants, renewable energy source, petroleum technology, heat engines, construction of bridges, cooling of nuclear reactors and rocket launchers, meteorology, etc.
2. Physics to study the flow of extremely high temperature gases through magnetic fields.
3. Medical sciences for blood transfusions and design of mechanical heart valves.