BSc MATHEMATICS

PROGRAMME OUTCOME

- Acquires the ability to understand and analyze the problems.
- Develops the skill to think critically on abstract concepts of Mathematics.
- Analyses the situation, make a mathematical problem and find its solution.
- Enhance logical reasoning skills, aptitude skills, communication skills, self-confidence for better employability.
- Provides a systematic understanding of the concepts and theories of mathematics and computing their application in the real world.
- Acquires the ability to critically interpret numerical and graphical data, to read and construct mathematical arguments and proofs.
- Formulates and develops mathematical arguments in a logical manner.

BSc MATHEMATICS

PROGRAMME SPECIFIC OUTCOME

- Develops problem solving skills.
- Understands the basic concepts of advanced mathematics.
- Creates mathematical models.

COURSE OUTCOME

FOUNDATIONS OF MATHEMATICS

- Acquires the ability to formulates and develops mathematical arguments in a logical manner.
- Students will be exposed to the basic concepts and techniques needed to continue with study of logic and set theory.
- Students will have a sound knowledge of set theoretic language and be able to use it to codify mathematical objects.
- Students will be able to calculate the limit of a function at a point numerically and algebraically using appropriate techniques.
- Students will be able to understand the consequences of the intermediate value theorem for continuous functions.

CALCULUS

- Students will be able to interpret the derivative of a function at a point as the slope of the tangent line and estimate its value from the graph of a function.
- Students will be able to show whether a function is differentiable at a point.
- Understands the consequences of Rolle's theorem and Mean value theorem for differentiable functions.
- Interpret the definite integral geometrically as the area under a curve.
- Construct a definite integral as the limit of Riemann sum.
- Interpret differentiation and anti-differentiation as inverse functions.
- Students will be able to evaluate a definite integral using an anti-derivative.
- Students will be able to develop an appropriate integral form to solve a specific applied problem in geometry and physics.

CALCULUS AND ANALYTIC GEOMETRY

- Acquire the knowledge of some simple techniques for testing the convergence of sequences and series, and confidence in applying them.
- Students will have an understanding of how elementary functions can be defined by power series, with an ability to deduce some of their easier properties.
- Acquire the knowledge on solve problems in analytic geometry and able to find appropriate solutions for given problems.
- Students will be able to differentiate exponential, logarithmic, and trigonometric and inverse trigonometric functions.

THEORY OF EQUATIONS, MATRICES AND VECTOR CALCULUS

- Students will be able to manipulate matrices and to do matrix algebra.
- Acquire the ability to solve system of linear equations.
- Acquire the ability to manipulate and compute determinants.
- Acquire the ability to compute Eigen values and Eigen vectors.
- Learn about fundamental theorem of algebra and different methods for solving algebraic equations.
- Acquire the ability to sketch quadratic surfaces.

VECTOR CALCULUS

- Students should be able to evaluate limits
- Students should be able to find partial derivatives, gradients, graphs and extrema of functions with multiple variables.
- Students should be able to evaluate double and triple integrals in Euclidean, cylindrical and spherical coordinate systems.
- Students should be able to evaluate the line integrals.
- Students should be able to evaluate integrals using Green's theorem and Stock's theorem.
- Students should be able to solve line and surface integrals.

ABSTRACT ALGEBRA

- Students is able to demonstrate knowledge and understanding of fundamental concepts including groups, subgroups, normal subgroups, homomorphisms and isomorphisms.
- The students will be able to apply algebraic ways of thinking.
- Learns about different algebraic structures Rings, fields and their properties.

REAL ANALYSIS

- Students will be able to describe fundamental properties of real numbers that lead to the formal development of real analysis.
- Students will be able to demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration.
- Learn Bolzano -Weirstrass theorem and acquire the ability to apply the theorem in a correct mathematical way.
- Students will have a detailed understanding of how the cauchy's criterion for the convergence of rear sequences and series follows from the completeness axioms for R, and the ability to explain the steps in standard mathematical notation.
- Learn the basic topological properties of real numbers.
- Learn Bolzano -Weirstrass theorem and acquire the ability to apply the theorem in a correct mathematical way.

DIFFERENTIAL EQUATIONS

- Students will be able to solve first and second order differential equations and systems using an appropriate method.
- Students will be able to find Laplace transforms and apply these to solve differential equations.
- Students will be able to model real situations using differential equations.
- Students will be able to find Fourier series for periodic functions.

MATHEMATICS FOR NATURAL SCIENCE

- Students will be able to organize and present statistical data and calculate common measures of central tendencies.

COMPLEX ANALYSIS

- Gain the knowledge on complex numbers and their properties and proofs.
- Understand and develop manipulation skills in the use of Roushe's theorem.
- Understand and learn to use Argument principle.
- Understands the principle of Analytic continuation and the concerned results.

NUMBER THEORY AND LINEAR ALGEBRA

- Enable to prove results involving divisibility and greatest common divisors.
- Enable to solve linear congruence and system of linear congruence.
- Enable to find integral solutions to linear Diophantine equations.
- Acquire the ability to apply Euler-Fermat's theorem to prove relations involving prime numbers.
- Enable to apply Wilson's theorem.
- Students will be able to work within Vector spaces and to distill Vector space properties.
- Understand and learn to use linear transformations.

NUMERICAL METHODS

- Demonstrate understanding and implementation of numerical solution algorithms applied to the different classes of problems such as finding roots of equations, solving system of algebraic equations, numerical differentiation of data and functions, numerical integration of data and functions and numerical solutions of ordinary differential equations.

GRAPH THEORY

- The students will have a strong background in graph theory which has diverse applications in Computer science, Physics and Chemistry.