B.Sc. Mathematics

Programme Outcomes

PO1. It bridges the gap between the plus two and post graduate levels of Mathematics by providing a more complete and logic frame work in almost all areas of basic Mathematics

PO2. The students attain a foundation in basic Mathematics and other relevant subjects to complement the core for their future courses.

PO3. Introduces powerful tools for tackling a wide range of topics in Calculus, Theory of Equations and Geometry.

PO4. Familiarise with additional relevant mathematical techniques and other relevant subjects to complement the core.

PO5. Cover a range of topics in almost all areas of Mathematics.

Programme Specific Outcomes

PSO1. Understand and apply the basic concepts and techniques logic, set theory, calculus in other areas of Mathematics

PSO2. Relate real life situations with Mathematics and solve them logically

PSO3. Familiarise with abstract structures and analysis which are relevant in other disciplines of Mathematics

PSO4. Develop logical thinking and problem solving skill

PSO5. Understand Mathematics of nature and create positive attitude about the environment

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Course Outcomes

Core Course 1:

FOUNDATION OF MATHEMATICS

CO1. Prove statements about sets and functions;

CO2. Familiarise basic concepts of logic

CO3. Analyze statements using truth tables;

CO4. Construct simple proofs.

CO5. Familiarize mathematical Symbols and standard methods of proofs.

Core Course 2:

ANALYTIC GEOMETRY, TRIGONOMETRY AND DIFFERENTIAL CALCULUS

CO1. Find the equation to tangent, normal at a point on a conic

CO2. Find the polar equation of a line, circle , tangent and normal to conics

CO3. Familiarize real and imaginary parts of a circular and hyperbolic functions of a complex variable

CO4. Find the higher order derivative of the product of two functions

CO5. Find limits of indeterminate forms

Core Course 3:

CALCULUS

CO1. Expand a function using Taylor's and Maclaurin's series.

CO2. Conceive the concept of asymptotes and obtain their equations.

CO3. Learn about partial derivatives and its applications.

CO4. Find the area under a given curve, length of an arc of a curve when the equations are given in   parametric and polar form.

CO5. Find the area and volume by applying the techniques of double and triple integrals

Core Course 4 :

VECTOR CALCULUS, THEORY OF NUMBERS AND LAPLACE TRANSFORM

CO1. Parametrize lines planes in space and surfaces

CO2. Differentiate vector valued functions

CO3. Find arc length and unit tangent vector, curvature and the unit normal vector, tangential and normal components of acceleration

CO4. Find directional derivatives, gradient vectors, tangent planes and normal lines

CO5. Familiarize line integrals and surface integrals

CO6. Find work, circulation and flux, conservative fields and potential functions

CO7. Apply Green's theorem, Stokes' theorem and Divergence theorem

CO8. Familiarize with congruence and its properties

CO9. Familiarize Laplace transform and its properties

CO10. Apply Laplace transforms for solving differential equations

Core Course 5 :

MATHEMATICAL ANALYSIS

CO1. Familiarize with the algebraic and order properties of R, The Completeness Property of R

CO2. Familiarize with sequences and their Limits

CO3. Familiarize with series and get used to tests for convergence and absolute convergence

CO4. Find limits of functions

Core Course 6 :

DIFFERENTIAL EQUATIONS

CO1. Obtain an integrating factor which may reduce a given differential equation into an exact one and eventually provide its solution.

CO2. Identify and obtain the solution of Clairaut's equation.

CO3. Fine the complementary function and particular integrals of linear differential equation.

CO4. Familiarize the orthogonal trajectory of the system of curves on a given surface.

CO5. Method of solution of the differential equation $\dfrac{dx}{P} = \dfrac{dy}{Q} = \dfrac{dz}{R}$

CO6. Describe the origin of partial differential equation and distinguish the integrals of first order linear partial differential equation into complete, general and singular integrals.

CO7. Use Lagrange's method for solving the first order linear partial differential equation

Core Course 7:

ABSTRACT ALGEBRA

CO1. Familiarize with Groups and subgroups, Isomorphic binary structures, elementary properties of groups, finite groups and group tables

CO2. Understand the concepts of Homomorphism and Isomorphism.

CO3. Identify different types of groups- normal subgroup, simple group, cyclic group,

CO4. Study Cayley's Theorem, Theorem of Lagrange, Fundamental homomorphism Theorem.

CO5. Construct group tables and subgroup diagrams.

CO6. Familiarize with permutations and its properties

CO7. Conceive the concepts of Rings, fields, Integral domains

Core Course 8:

HUMAN RIGHTS AND MATHEMATICS FOR ENVIORNMENTAL STUDIES

CO1. Encourage students to research, investigate how and why things happen, and make their own decisions about complex environmental issues. By developing and enhancing critical and creative thinking skills, it helps to foster a new generation of informed consumers, workers, as well as policy or decision makers.

CO2. Understand how their decisions and actions affect the environment, builds knowledge and skills necessary to address complex environmental issues, as well as ways we can take action to keep our environment healthy and sustainable for the future, encourage character building, and develop positive attitudes and values.

CO3. Develop the sense of awareness among the students about the environment and its various problems and to help the students in realizing the inter-relationship between man and environment for protecting the nature and natural resources.

CO4. Acquire the basic knowledge about environment and to inform the students about the social norms that provide unity with environmental characteristics and create positive attitude about the environment

Core Course 9:

MM6CRT01 : REAL ANALYSIS

CO1. Familiarize with Continuous Functions and Uniform continuityof functions

CO2. Apply Mean Value Theorem, L' Hospital Rule and Taylor's Theorem

CO3. Understand the Riemann Integral and Riemann Integrable Functions

CO4. Familiarize with sequence and series of functions

CO5. Understand Point wise and Uniform Convergence, Interchange of Limits.

Core Course 10:

MM6CRT02 : GRAPH THEORY AND METRIC SPACES

CO1. Familiarize with graphs, sub graphs, paths and cycles

CO2. Represent graphs in matrix form

CO3. Conceive the ideas of trees, Bridges, Spanning trees, Cut vertices and Connectivity.

CO4. Familiarize with Euler graphs and Hamiltonian graphs

CO5. Conceive the concepts of Metric Spaces, Open sets, Closed Sets

CO6. Understand convergence in metric spaces and will be familiar with completeness

Core Course 11:

MM6CRT03 : COMPLEX ANALYSIS

CO1. Conceive the concept of analytic functions

CO2. Familiar with the elementary complex functions and their properties

CO3. Familiar with the theory and techniques of complex integration

CO4. Familiar with the theory and application of the power series expansion of analytic functions

Core Course 12:

MM6CRT04 : LINEAR ALGEBRA

CO1. Solve systems of linear equations using matrices

CO2. Understand the theory and concepts of matrices in a broader sense

CO3. Familiarise with vector spaces, subspaces, linear combination of vectors, spanning set, linear independence and basis.

CO4. Conceive the concepts of Linear transformations and Linear isomorphism.

CO5. Understand the application of matrices in vector spaces

CO6. Familiarise with Eigen values, Eigenvectors and Eigen space.

Core Course 13(Choice Based Course):

MM6CBT01 : OPERATIONS RESEARCH

CO1. Define a Euclidean space, a vector space and its basis.

CO2. Write a given LPP in standard form and in a canonical form

CO3. Identify a feasible solution, a basic feasible solution, and an optimal solution using simplex method.

CO4. Identify the Transportation Problem and formulate it as an LPP and hence solve the problem

CO5. Determine that an Assignment problem is a special case of LPP and hence solve by Hungarian method.

CO5. Identify the queueing models.

Open Course:

MM5GET02 : APPLICABLE MATHEMATICS

CO1. Prepare students of all streams, particularly those with arts and commerce back ground for their higher studies.

CO2. Solve logical problems for competitive examinations

CO3. Familiarise with the theories of basic Mathematics and their simple applications

CO4. Understand the basic concepts of trigonometry and calculus

Complementary Courses (to B.Sc. Physics/Chemistry)

MM1CMT01: PARTIAL DIFFERENTIATION, MATRICES, TRIGONOMETRY AND NUMERICALMETHODS

CO1. Familiarise functions of several variables

CO2. Apply chain rule to find partial derivatives

CO3 Conceive the basic concepts of matrices such as rankof a matrix, Characteristic equation, Characteristic roots, and characteristic vectors of a square matrix

CO4. Solve system of Linear equations using Matrices

CO5. Find the sum of infinite series

CO6. Familiarize real and imaginary parts of a circular and hyperbolic functions of a complex variable

CO7. Use numerical methods to solve higher order algebraic equations and transcendental equations

MM2CMT01: INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS

CO1. Use the tools of integration to find volume ,arc length ,area of surface of revolution

CO2. Find the area and volume by applying the techniques of double and triple integrals

CO3. Find solutions to Ordinary Differential Equations like variable separable, Linear and Bernoulli equations

CO4. Generate Partial Differential Equations

CO5. Solve the differential equation $\dfrac{dx}{P} = \dfrac{dy}{Q} = \dfrac{dz}{R}$

CO6. Use Lagrange's method for solving the first order linear partial differential equation

MM3CMT01: VECTOR CALCULUS, ANALYTIC GEOMETRY AND ABSTRACT ALGEBRA

CO1. Differentiate vector valued functions

 CO2. Find arc length and unit tangent vector, curvature and the unit normal vector, tangential and normal components of acceleration

 CO3.   Find directional derivatives, gradient vectors, tangent planes and normal lines

 CO4. Familiarize line integrals and surface integrals

 CO5. Find work, circulation and flux, conservative fields and potential functions

CO6. Apply Green's theorem, Stokes' theorem and Divergence theorem

CO7. Sketch conics and solve problems in conic sections

CO8. Familiarize basic concepts of Abstract Algebra like Groups , Subgroups and Homomorphism

MM4CMT01 : FOURIER SERIES, LAPLACE TRANSFORM AND COMPLEX ANALYSIS

CO1. Find Fourier series of functions

CO2. Solve problems involving Fourier Series and Legendre polynomials

CO3. Apply Power series method to solve differential equations

CO4. Familiarize Laplace transform and its properties

 CO5. Apply Laplace transforms to solve differential equations

CO6. Conceive the concept of analytic functions

CO7. Familiar with the theory and techniques of complex integration

Complementary Courses (to B.A. Economics)

MM1CMT04 : GRAPHING FUNCTIONS, EQUATIONS,DIFFERENTIAL CALCULUS AND LOGARTHIMIC AND EXPONENTIAL FUNCTION

CO1. Familiarise linear equations, functions and graphing fuctions.

CO2. Find solutions to quadratic equations and system of linear equations

CO3. Understand the basic concepts of differential calculus and its applications

CO4. Familiarise exponential and logarithmic functions

CO5. Compute simple and compound interest

CO6. Apply the above theories in business and economics

MM2CMT04 MATRIX, LINEAR PROGRAMMING AND INTEGRAL CALCULUS

CO1. Familiarise Matrices and basic operations on Matrices

CO2. Use matrix method to solve linear equations

CO3. Solve Linear Programming Problems

CO4. Familiarize the basic concept of Integral Calculus

CO5. Apply integration to find area under a curve and area between curves

CO6. Understand functions of several variables

CO7. Apply the above theories in business and economics

Complementary Courses (to B.Sc. Computer Science)

MM1CMT03 : DISCRETE MATHEMATICS(I)

CO1. Understand basic concepts of sets and functions

CO2. Familiarise basic concepts of logic

CO3. Analyze statements using truth tables

CO4. Familiarize with congruence and its properties

MM2CMT03 : DISCRETE MATHEMATICS (II)

CO1. Familiarize with graphs, sub graphs, paths and cycles

CO2. Represent graphs in matrix form

CO3. Conceive the ideas of trees, Bridges, Spanning trees

CO4. Understand Boolean Function

CO5. Represent Boolean Functions and Logic Gates

CO6. Conceive the basic concepts of matrices such as rank of a matrix, Characteristic equation, Characteristic roots, and characteristic vectors of a square matrix