Department of Mathematics

Programme outcome

M.Sc. Mathematics

After awarding Master degree M.Sc. With Mathematics students will be able to:

PO1- Mathematical knowledge- Various branches of mathematics are so selected and designed for M.Sc. Mathematics course aiming at mathematical reasoning sophistication in thing and acquaintance with enough number of objects including application-oriented ones to suit the present needs of various allied branches in Engineering and Science as well as provision of opportunities to pursue research in higher mathematics.

PO2- Problem solving skills - This programme also offers training in problem solving skills.

PO3- analytical and logical thinking - The student will be able to develop logical reasoning techniques and techniques for analyzing the situation .

PO4-Advanced algebra - The students shall appreciate the necessity of various algebraic structures with binary operations.

PO5- Numerical techniques - The student will be able to learn some useful approximation and interpolation techniques in mathematics

PO6- Advanced discrete mathematics - The student will learn concepts like finite state machines, Boolean Algebra, lattice which develop more useful logic in the developments of theories of networks, switching circuits that are applicable in Physics.

PO7- Understanding ability - Student will develop ability for generation of mathematical model to a given real life situation as well as learning new areas of mathematics in future either for teaching or for research .

PO8 - Getting abilities - Demonstrate the ability to conduct research independently and pursue higher studies towards Ph.D. degree in mathematics.

PO9 - Evaluating capability - The students will acquire capability to evaluate hypothesis ,method and evidence a within their proper contexts in any situation .

PO10 - Application of knowledge - The students will be able to apply the knowledge acquired in mathematics in science , technology as well as Research and its extensions.

Programme Specific outcomes

M.Sc. Mathematics

PSO1- Create a hypothesis and appreciate how it relates to broader theories .

PSO2-.Evaluate hypothesis, theories, methods and evidence within their proper contexts.

PSO3-Solve complex problems by critical understanding, analysis and synthesis.

PSO4- Demonstrate engagement with current development in the subject.

PSO5- Develop proficiency in the analysis of complex physical problems and the use of mathematical or other appropriate techniques to solve them.

PSO6- Provide a systematic understanding of the concepts and theories of mathematics and their application in the real world to an advanced level and enhance career prospects in a huge array of fields.

PSO7- Criticize mathematical arguments developed by themselves and others.

PSO8- Communicate effectively by oral, written, computing and graphical means.

PSO9- Recognise the need to engage in lifelong learning through continuing education in mathematics department.

Course outcome

M.Sc. Mathematics

MSc Semester - I, II

ADVANCED ABSTRACT ALGEBRA (Paper 01)

Student will able to

CO1- Define- group and subgroup, normal subgroup ,quotient group, permutation groups, nilpotent group ,direct product, cyclic modules, simple modules, homomorphism of modules, canonical forms, smith normal forms, extension fields, separable and inseparable extensions, Galios field and extension generalized Jordan forms over any field.

CO2- Prove- Jordan Holder theorem, primary decomposition theorem, fundamental structure theorem for finitely generated module, hillbert basis theorem, Noether-lasker theorem, fundamental theorem of galios theory.

MSc Semester - I,II

REAL ANALYSIS (Paper-02)

Student will able to

CO1- **Define-** riemann stieltjes integral, pointwise and uniform convergence ,linear transformation, chain rule, derivative of higher order ,measure and Outer measure, lebesgue outer measure, regulatory, measurable set, borel set, lebesgue sum ,integral bounded and unbounded function, integral of non-negative function, differentiation of monotonic function.

CO2-Prove- Fundamental theorem of Calculus, weierstrass approximation theorem , able and tauber's theorem ,riemann's theorem ,Taylor's theorem, inverse function theorem, implicit function theorem, egoroff's theorem, riesz theorem, lusin theorem

MSc Semester - I, II

TOPOLOGY (Paper-03)

Students will able to

CO1-Define- Topological space, product topology, product space, the continuous functions ,connected space, compact space, compact subspace, complete metric space, Closed sets ,open set, neighbourhood, neighbourhood systems, limit points and components.

CO2-Prove- Urysohn's metrization theorem, urysohn's metrization theorem, nagata metrization theorem, tychonoff theorem , The smirnov theorem,fundamental theorem of algebra, cantor's theorem.

MSc Semester - I, II

RESEARCH METHODOLOGY & COMPUTER APPLICATION (Paper-04)

Students will able to

Describe-Meaning and characteristics of research ,steps in the research process, types of research, applied and action research ,quantitative and qualitative research, tools of research method of research, treatment of data and computer fundamentals.

MSc Semester - I, II

ADVANCED DISCRETE MATHEMATICS (Paper-05)

Students will able to

CO1-Define-Illustrate different types of graph theory, TF statement, connectives, atomic and compound statements, Tautology, truth table, quantifiers, predicate, interpret lattice, Boolean Algebra, karnaugh map, switching circuits.

CO2-Prove-Drive Euler's theorem, automata, finite automation and NDFA, kleene's theorem, Pumping Lemma Theorem , Euler's theorem, dijkstra theorem, kruskal theorem, warshall theorem, finite state machines, moore and mealy machines.

MSc Semester - III, IV

INTEGRATION THEORY AND FUNCTIONAL ANALYSIS (Paper-01)

Students will able to

CO1-Define- signed measure , mutually similar measure, differentiation and integration bair set bair measure, continuous function, normed linear space, banach space, reflexive space ,compact operators,

inner product spaces, hilbert space, orthonormal sets, bessel's inequality self-adjoint operator, projection, normal and unitary operators.

CO2-Prove-Hahn decomposition theorem, radon nikodym theorem, riesz representation theorem, extension theorem, riesz Markoff theorem, uniform boundedness theorem, open mapping and closed graph theorem, hahn banach theorem for real and complex linear space, riesz representation theorem, the generalized LAX milgram theorem.

MSc Semester - III, IV

Partial differential equation and mechanics (Paper-02)

Students will able to

CO1-Define-Illustrate a partial differential equation with example, classification, Higher-order partial differential equation with example, transport equation, min value formula, poisson bracket, Generalized coordinates, holonomic and non holonomic system, rheonomic and non rheonomic system ,generalized potential.

CO2-Prove-Drive transport equation, mean value formula, euler lagrange equation ,Wave Equation, heat fundamental solution, holf lax formula, laxoienik formula ,attraction and potential of rod, disc, spherical shells, sphere ,poisson bracket, holf cole transform ,language equation, calculus of variation, Hamilton canonical equation, donkin's theorem, Routh equation, jacobi poisson theorem, hamiltons principle, lagrange bracket,Two dimensional motion of rigid bodies.

MSc Semester - III, IV

Operation research (Paper-03)

Students will able to

CO1-Define-Define operation research and its scope, convex set, convex and concave function ,integer programming non-linear programming, convex and non-convex programming ,quadratic programming.

CO2-Derive-Graphical solution of linear programing problem, Simplex method, two phase method, Big M method, dual simplex method, linear goal programming, transportation and assignment problem, dynamic programming, minimum spanning tree problem ,maximum flow problem, minimum cost flow problem, Game Theory, two person zero Sum game, games with mixed strategy, Kuhn tucker condition for constrained optimization, wolf method, Beal method, non-convex programming.

MSc Semester - III, IV

Intellectual property, Human rights & Environment (Paper-04)

Students will able to

CO1-Define-Meaning of copyright, meaning of patent, kinds of patents, development of law of patents ,TRIPS agreement, dramatic work and musical work for copyright, rights of performers and broadcasters assignment of copyrights, author's special rights, human-rights meaning and Essentials, human-rights kinds rights related to life, liberty ,equals and disabled, national human right Commission, State Human Right Commission, High Court, regional Court ,procedure and functions of high and regional court ,right to environment as human right, international humanitarian law and environment.

CO2-Dissertation works- skill development in students increases their mental ability, Express their opinion and thoughts, enhancing writing skills and knowledge.

MSc Semester - III, IV

Numerical analysis (Paper-05)

Students will able to

CO1-Define-Define forward and backward difference, the operator E, properties of E and del operator are distributive, to express any value of the function in leading terms and the leading differences of difference table, difference equations. homogeneous linear difference equations, homogeneous linear differential equation with constant coefficient ,existence and uniqueness theorem ,different methods for finding for particular solution in case of non-homogeneous linear equation.

CO2-Derive-Derive interpolation with equal intervals and with unequal intervals, by Newton's formula, sheppard rule, lagrange formula, hermitet's formula, Central difference Gauss Sterling, Bessel's formula for interpolation, numerical differentiation and integration by trapezoidal, Simpson one third rule, 3-8 rule, weddle's rule, cotes method, numerical solution of ordinary differential equations of first order-picard , euler's improved modified, Euler's method, Milne's method, runge kutta method ,simultaneous Linear algebraic Equations by gauss Jordan Jacobi iterative method, gauss seidel method .