DEPARTMENT OF MATHEMATICS P.G.

DEPARTMENT OF MATHEMATICS

Programme Code: PM   **Programme Name: M.Sc. Mathematics**

Programme Outcomes

1. After completing 2 years of M.Sc., program, students obtain knowledge in pure and allied Mathematics. (Global)
2. The Mathematical curriculum offers number of practical exposures which equips the students to face the modern challenges in Mathematics. (Global)
3. The PG students after the completion of the course will gain knowledge in preparing themselves for CSIR-NET / SET examination. (National)

Programme Specific Outcomes

1. Students enable to apply the concept of statistics, Operation Research and Numerical Analysis in real life problems. (Global)
2. Number theory, Fuzzy sets and Fuzzy logic enable the students to face the real time applications. (Global)
3. To assimilate complex mathematical idea and arguments. (Global)
4. To improve own learning and performance. (Global)

Course Outcomes

Subject Code: 17PM11
Course Name: ALGEBRA (Global)

Upon the Completion of the course, the students will be able to

1. Understand & Develop a basic concept of Groups, sylow's theorem, Illustrate the finite abelian group.
2. Analyse Groups and its properties, Jordan Holder theorem.
3. Describe the Characteristics of a ring and Understand the concepts of Dual space and modules.

Subject Code: 17PM12
Course Name: ANALYSIS (Global)

Upon the completion of the course, the students will be able to,

1. Learn the basic ideas of real and study the properties of functions, uniform convergence with continuity, integration and differentiation.
2. Appreciate how abstract ideas and rigorous methods in exponential and logarithmic   functions can be applied to important practical problems.
3. Calculate an insight into Mean value theorem, L' Hospitals rule, Taylors theorem, Stone weierstrass theorem and stokes theorem.

Subject Code: 17PM13
Course Name: DIFFERENTIAL EQUATION (Global)

Upon   the completion of the course, the students will be able to

1. Analyse and Evaluate the Homogenous equation, Non-Homogenous equation and Legendre equation.
2. Describe the Euler equation, Bessel equation and The Lipschitz condition.
3. Formulate the partial differential equations and find cauchy's problem for first order equation, cauchy's method of characteristics, Charpit's method and The jacobi's method

Subject Code: 17PM14
Course Name: DIFFERENTIAL GEOMETRY(Global)
Upon   the completion of the course, the students will be able to

1. Describe the behavior related to space curves ,tangent , normal ,and binormal of a Curve.
2. Classify the   metric space and local intrinsic properties of a surface
3. Understand and write mathematical proofs using formal mathematical reasoning.

Subject Code: 17PME1A
Course Name: NUMBER THEORY (Global)

Upon   the completion of the course, the students will be able to

1. Gain knowledge and critical understanding of the well-established principles within Number Theory.
2. Demonstrate the capability to use a range of established techniques and a reasonable level of skill in calculation and manipulation of the material to solve problems in the following areas: integers, prime numbers, congruence, arithmetic functions, quadratic residues, Diophantine, Equations.
3. Apply the concepts and principles in Number Theory in well-defined contexts beyond those in which they were first studied, showing the ability to evaluate critically the appropriateness of different tools and techniques.

Subject Code: 17PME1B
Course Name: VISUAL BASIC (Global)

Upon the completion of the course, the students will be able to

1. Explain the concepts of Windows programming.
2. Develop program using Visual Basic and develop program using VC++.
3. Develop real time applications using VB and VC++

SEMESTER - II

Subject Code: 17PM21
Course Name: ADVANCED ALGEBRA (Global)

Upon the completion of the course, the students will be able to

1. Gain knowledge on basic concepts of expansion fields and polynomials and Describe roots, the elements of Galois theory and solvability by radicals.
2. Determine linear transformations and classify the canonical forms.
3. Gain knowledge on Trace and Transpose, Determinants and Hermition.

Subject Code: 17PM22
Course Name: MEASURE AND INTEGRATION (Global)

Upon the completion of the course, the students will be able to

1. Gain knowledge on definition of basic concept in Measurable sets.
2. Understand the Construction of Product Measures and the properties of L^p Space.
3. Construct the inequalities of Holder's and Radon – Nikodym theorem.

Subject Code: 17PM23

Course Name: GRAPH THEORY WITH APPLICATIONS   (Global)

Upon the completion of the course, the students will be able to,

1. Classify precise and accurate mathematical definition of objects in graph theory.
2. Describe connectivity, blocks, Euler Tours – Hamiltonian cycles.
3. Illustrate fundamentals of Directed graphs, cuts, network flows & graphs.

Subject Code: 17PM24

Course Name: STATISTICS (Global)

Upon   the completion of the course, the students will be able to

1. Analyze discrete and continuous probability distribution.
2. Understand Binomial outcome and compute probability of getting X successes in N trials
3. Apply different distribution to simple practical problems

Subject Code: 17PME2A

Course Name: NUMERICAL METHODS (Global)

Upon the completion of the course, the students will be able to

1. Learn the difference between Accuracy and Precision and types of errors and Finding Roots using Graphical method, Bisection method and False position method.
2. Solve a fixed point iteration method to obtained true roots and evaluate the True roots using open method: Newton's Rapson method, secant method and multiple Newton Rapson method.
3. Understand the pitfalls of Gauss Elimination Method and Solve a Linear System of equation using Gauss Jordan and Gauss Seidel method.

Subject Code: 17PME2B

Course Name: AUTOMATA THEORY AND FORMAL LANGUAGES (Global)

Upon the completion of the course, the students will be able to

1. Explain and manipulate the different concepts in automata theory and formal languages such as formal proofs, (non-)deterministic automata, regular expressions, regular languages, context-free grammars, context-free languages, Turing machines.
2. Explain the power and the limitations of regular languages and context-free languages.
3. Prove properties of languages, grammars and automata with rigorously formal Mathematical methods; Design automata, regular expressions and context-free grammars accepting or generating a certain language.

Subject Code: 17PM31
Course Name: ADVANCED STATISTICS (Global)

Upon the completion of the course, the students will be able to

1. Recognize the binomial, Poisson, geometric, hyper geometric probability distribution   and apply it appropriately.
2. Classify discrete, continuous word problems by their distributions.
3. Recognize and understand continuous, uniform, exponential probability density functions in general and central limit theorem problems normal probability distribution and apply it appropriately.

Subject Code: 17PM32
Course Name: COMPLEX ANALYSIS   (Global)

Upon   the completion of the course, the students will be able to

1. Analyze Power series to construct the function.

2. Apply Cauchy integral theorem and also Laurent's series about isolated singularities.

3. Understand a sequence of analytic function and its application.

Subject Code: 17PM33
Course Name: MECHANICS   (Global)

Upon the completion of the course, the students will to able to

1. Describe behavior related to D'Alembert's Principle, Lagrange's equation and Hamilton's Principle
2. Apply the extension of Hamilton's principle conservation theorem and symmetry properties.
3. Solve reduction to the equivalent one body problem and the equivalent one dimensional problem and To know how to find the solution of the Kepler's problem.

Subject Code: 17PM34
Course Name: TOPOLOGY (Global)
Upon   the completion of the course, the students will be able to

1. Analyze topology on a space is determined by the collection of open sets, closed   sets or by a basis of neighbourhoods at each point.
2. Understand the ideas of connected spaces and compact spaces.

3. Learn a Metric space to be Complete, Urysohn lemma and Metrizable spaces.

Subject Code: 17PME3A

Course Name: FUZZY SETS & LOGIC (Global)

Upon the completion of the course, the students will be able to

1. Learn the concepts of crisp sets and fuzzy sets and apply the fuzzy logic in real life application.
2. Analyze difference between crisp set and fuzzy set theory.
3. Know fuzzy relations and understand the concept of Compatibility or tolerance relations, orderings.

Subject Code: 17PME3B

Course Name: STOCHASTIC PROCESSES (Global)

Upon the completion of the course, the students will be able to

1. Analyze generating function and classification of distribution
2. Acquire knowledge on Markov chain and non homogeneous chains
3. Understand the poisson process and birth death process

SEMESTER - IV

Subject Code: 17PM41

Course Name: ADVANCED TOPOLOGY (Global)

Upon the completion of the course, the students will be able to

1. Gain knowledge of the local compactness.
2. Analyze properties of local finiteness.
3. Understand Baire Spaces, point wise and compact convergent.

Subject Code: 17PM42

Course Name: COMBINATORIAL MATHEMATICS (Global)

Upon the completion of the course, the students will be able to

1. Describe the rules of sum and product for permutation and combination with examples.
2. Discuss the enumerators for permutation and Recurrence relation.
3. Derive the theorem for Polya's theory of counting of function and to have the knowledge about orthogonal latin squares.

Subject Code: 17PM43

Course Name: FUNCTIONAL ANALYSIS (Global)

Upon the completion of the course, the students will be able to

1. Identify duals of inner product space and Banach space.
2. Understand the notion of orthogonal complement and orthogonal sets.
3. Explain main theorem for normed spaces and topological spaces.

Subject Code: 17PM44
Course Name: OPERATIONS RESEARCH (Global)

Upon   the completion of the course, the students will be able to

1. Develop mathematical models associated with network flows and related real life applications.
2. Perform Critical analysis of project schedule and analyzing the cost-time trade-offs in   the context of a project network.
3. Comprehend several non-linear programming algorithms such as, separable programming algorithm, quadratic programming algorithm, geometric programming algorithm and queuing system

Subject Code: 17PMR
Course Name: PROJECT (National)

Upon   the completion of the course, the students will be able to

1. Apply knowledge of Mathematics, in all the fields of learning including higher research and its extensions.
2. Innovate, invent and solve complex mathematical problems using the knowledge of pure and applied mathematics.
3. Explain the knowledge of contemporary issues in the field of Mathematics and applied sciences. Work effectively as an individual, and also as a member or leader in multi-linguistic and multi-disciplinary teams.

Course Outcomes

Programme Code: MC   **Programme Name: MCA**

Subject Code: 18MC11
Course Name: MATHEMATICAL FOUNDATION OF COMPUTER APPLICATION (Global)

Upon the completion of the course, the students will be able to,

1. Impact knowledge on complexity of algorithms using recurrence relations.
2. Acquire knowledge about functions and strong foundation on circuit analysis.
3. Recognize the concept of trees, connectivity and network flow problems in graph theory.

Subject Code: 18MC31
Course Name: OPTIMIZATION TECHNIQUES (Global)

Upon the completion of the course, the students will be able to,

1. Remember the concept of linear programming problem using Simplex Method.
2. Make out the rules of game theory for solving games and summarize the concept of inventory control.
3. Apply the notions of linear programming in solving transportation problems and Assignment Problem.