**MASTER OF SCIENCE  (MATHEMATICS)**

**SEMESTER -1**

**CORE 1 - LINEAR ALGEBRA (21PMA01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To describe a diagonalizable operator T in a language of invariant direct sum decompositions.

**CO2**: To find the minimal polynomials, Jordan forms, and the rational forms of real matrices

**CO3**: To find the permutations, invert an invertible matrix by using determinants.

**CO4**: To solve diagonalization.

**CO5**: To get the Lagrange Interpolation

**CORE II – REAL ANALYSIS I (21PMA02)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To give the definition of concepts related to metric spaces, such as continuity, compactness, and completeness.

**CO2**: Connectedness that will help for further studies within topology and functional analysis

**CO3**: To demonstrate an understanding of limits, they are used in sequences, series, continuity, and differentiation.

**CO4**: To construct rigorous mathematical proofs of basic results in real analysis.

**CO5**: Understand the basics of finite, countable, and uncountable sets.

**CORE III – ORDINARY DIFFERENTIAL EQUATIONS (21PMA03)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To solve the differential equations by using various methods.

**CO2**: To find the regular and singular points.

**CO3**: To gain knowledge of existence and uniqueness.

**CO4**: Understand the method of successive approximations.

**CO5**: Know the properties of the Legendre and Bessel equations.

**CORE IV – MECHANICS (21PMA04)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: The formation of differential equations, which will help study the dynamics of mechanical systems

**CO2**: To describe the Hamilton-Jacobsi theory.

**CO3**: To solve the derivation of Lagrange's equation.

**CO4**: Understand the canonical transformation.

**CO5**: Know the other variational principles.

**ELECTIVE I - DISCRETE MATHEMATICS (21PMAE01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Express a logic sentence in terms of predicates, quantifiers, and logical connectives.

**CO2**: Apply the rules of inference and methods of proof, including direct and indirect proof forms, proof by contradiction, and mathematical induction.

**CO3**: Solve the mathematics problems that involve computing permutations and combinations of a set using fundamental enumeration principles.

**CO4**: Evaluate Boolean functions and simplify expressions.

**CO5**: Using the properties of Boolean algebra

**SEMESTER – II**

**CORE V - ABSTRACT ALGEBRA (21PMA05)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To find the number of Sylow subgroups.

**CO2**: To find the number of non-isomorphic abelian groups.

**CO3**: To find the splitting field and Galois group of the given polynomial

**CO4**: To check whether the given polynomial is solvable by radicals or not.

**CO5**: To verify the finite Abelian group

**CORVE VI – REAL ANALYSIS - II (21PMA06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Find the integrals of bounded functions on a closed, bounded interval.

**CO2**: Understand sequences of functions on a closed, bounded interval.

**CO3**: Understand sequences of functions on a closed, bounded interval

**CO4**: Understand a series of functions on a closed, bounded interval.

**CO5**: Find the derivative of the functions of several variables.

**CORVE VII – PARTIAL DIFFERENTIAL EQUATIONS (21PMA07)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Be familiar with the modelling assumptions that lead to PDEs.

**CO2**: Be familiar with the derivations that lead to PDEs.

**CO3**: Recognise the major classification of PDEs and the qualitative difference between the classes of equations.

**CO4**: Be competent in solving linear PDEs using classical methods.

**CO5**: Finding the Laplace transforms

**ELECTIVE II - NUMERICAL ANALYSIS (21PMAE01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Learn the principles for designing numerical schemes for differential equations.

**CO2**: Be able to analyse the consistency, stability, and convergence of a numerical scheme.

**CO3**: Be able to know, for each type of differential equation, what kind of numerical method is best suited and the reason behind these choices.

**CO4**: Be able to make a connection between the mathematical equations or properties and the corresponding physical meanings.

**CO5**: Be able to use a programming language or mathematical software to implement and test the numerical schemes.

**SEMESTER III**

**CORVE VIII – COMPLEX ANALYSIS (21PMA08)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: Be familiar with the modelling assumptions that lead to complex analysis.

**CO2**: Be familiar with the derivations that lead to complex analysis.

**CO3**: Recognise the major classifications of analytic functions, harmonic functions, and conformal mappings.

**CO4**: The qualitative difference between complex integration and real integration

**CO5**: To find the harmonic functions

**CORE IX – TOPOLOGY (21PMA09)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: To understand various concepts of topology.

**CO2**: Understand the continuity and connectivity.

**CO3**: To get knowledge of the product and metric topology.

**CO4**: Know the compactness.

**CO5**: To get the separation axioms, Urysohn and Tietze extension theorems

**CORE X- MEASURE THEORY AND INTEGRATION (21PMA10)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1**: The students will be able to gain knowledge of measures.

**CO2**: Be able to know external measures.

**CO3**: Generalisations of integrals with the help of measures

**CO4**: Finding the Product Measures

**CO5**: Solving the Differentiation, Integration, and Riemann Integrals

**CORE XI - GRAPH THEORY (21PMA11)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To identify the graphs of connectivity

**CO2**: To identify the graphs of trees

**CO3**: To find the independent set and cycle graph.

**CO4**: To understand graph colouring.

**CO5**: To check planarity.

**ELECTIVE III–PROGRAMMING WITH C++ (21PMAE06)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To acquire the knowledge of getting solutions to mathematical problems with the help of C++.

**CO2**: Understand the function in C++.

**CO3**: Recognise the types of data and symbols.

**CO4**: To know the file stream operations.

**CO5**: To get knowledge of the programming language in C++

**SEMESTER IV**

**CORE XII – FUNCTIONAL ANALYSIS (21PMA12)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Understand the relationship between metric spaces, normed spaces, and inner product spaces.

**CO2**: Understand the property of continuous linear functionals on Banach space.

**CO3**: Understand various types of operators on Hilbert space.

**CO4**: Know regular elements, singular elements, the spectrum of Banach algebra, and its ideals.

**CO5**: Understand the boundedness principle.

**CORE XIII – PROBABILITY THEORY (21PMA13)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To get knowledge of random variables.

**CO2**: To know the random events.

**CO3**: To understand the characteristics of functions.

**CO4**: Know the properties of characteristic functions.

**CO5**: Understand the various types of probability distributions.

**CORE XIV – CALCULUS OF VARIATION AND INTEGRAL EQUATIONS (21PMA14)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** To know different types of variational problems and find their extremals.

**CO2**: To find solutions to the Fredholm-Volterra integral equations through different methods.

**CO3**: To find the concept of variation and its properties.

**CO4**: To get knowledge of types of kernels, Eigen values, and Eigen functions.

**CO5**: Understand the orthogonal system of functions and Gram-ScSchmidt orthogonalization.