Krishnasamy College of Science, Arts and Management for Women, Cuddalore

Department of Mathematics

2023-2024

Program: B.Sc. MATHEMATICS

Program Code: 201

PROGRAMME OUTCOME

Students who successfully complete the UG mathematics major will be able to:

- Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines.
- Acquire problem solving skills, analytical thinking, creativity and mathematical reasoning.
- Ability to analyse, interpret and draw conclusions from quantitative / qualitative data.
- Communicate mathematical ideas with clarity and able to identify, formulate and solve mathematical problems.
- Ability to evaluate the reliability and support them with evidence and examples and addressing opposing viewpoints.
- Use mathematical ideas into model real-world problems .
- Utilize technology to address mathematical ideas.
- Enhances professional skills in mathematics and some specialized areas of applied mathematics.
- Produces professionals who can work on real life and challenging problems.
- Equips students analyze and write logical arguments to prove mathematical concepts.

Krishnasamy College of Science, Arts and Management for Women, Cuddalore

Department of Mathematics

2023-2024

Program: M.Sc. MATHEMATICS

Program Code: 401

PROGRAMME OUTCOME

Students who successfully complete the PG mathematics major will be able to:

- Apply knowledge of Management theories and Human Resource practices to Solve business problems through research in Global context.
- Communicate mathematical ideas with clarity and able to identify, formulate and solve mathematical problems.
- Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
- Ability to work independently, identify and manage a project.
- Enhances professional skills in mathematics and some specialized areas of Applied mathematics.
- Develop confidence to crack the competitive exams like NET, GATE, SET, etc.
- Prepare with skills and competencies to become an entrepreneur.

Krishnasamy College of Science, Arts and Management for Women, Cuddalore

Department of Mathematics

COURSE OBJECTIVES & COURSE OUTCOMES

2022-2023

B.Sc., Mathematics

COURSE CODE :22UMATC13

COURSE TITLE : CLASSICAL ALGEBRA

COURSE OBJECTIVES

In this course students are exposed to topics like Theory of Equations, Summation of Series, Matrices and Elementary Number Theory. The stress is on the development of problem solving skills.

COURSEOUTCOMES

On successful completion of the course ,the student will be able to:

- Apply the fundamental concept of theory of equations and to find solutions.
- Apply Descarte's rule, Horner's method, Newton Raphson methods for finding approximate solutions.
- Apply summation of series using Binomial, Exponential and Logarithmic series for finding approximations.
- Apply the elementary number theory for highest power of prime number.
- Apply the elementary number theory for Fermat's and Wilson's theorem.

COURSE CODE :22UMATC14

COURSE TITLE DIFFERENTIAL CALCULUS AND TRIGONOMETRY

COURSE OBJECTIVES

To inculcate the basics of differentiation and their applications, the notion of curvatures, radius of curvature in Cartesian and polar coordinates, Evolutes & Involutes, students can be trained to understand the basic concepts of Trigonometry.

COURSE OUTCOMES

On successful completion of the course, the students will be able to

- To know the basic concepts of Successive approximations and Lebnitz's theorem
- Know the principles of Maxima and Minima for 2 variables.
- Find the radius of curvature for Cartesian and Polar coordinates, Evolutes and Involutes.
- Know the expansions of Trigonometric functions.
- Understand the concepts of Hyperbolic and Inverse Hyperbolic functions, Logarithm of Complex numbers, summation of Trigonometry series, Gregory series.

COURSE CODE :22UPHYA01

COURSE TITLE :PHYSICS – I

COURSE OBJECTIVES

- To understand the concept of elasticity and strength of solid materials, viscous properties of liquids and surface tension.
- To acquire knowledge on centre of gravity, state of equilibrium and stability of floating.
- To study the heat capacity, conduction, convection, and radiation
- To understand conversion of heat into mechanical work.
- To know the phenomena of light such as interference, diffraction, polarization, and their applications

COURSE OUTCOMES

Students studying this course would understand the following:

- Fundamentals of elasticity, theory of bending, flow of liquids and viscous forces and surface tension
- Centre of gravity of bodies of different shapes, equilibrium of states and forces involved in stability of floating.
- Transmission of heat by the process of conduction, convection, and radiation.
- Various laws involved in heat transformation, thermodynamics, and the concept of entropy
- The phenomena like interference diffraction, and polarization, optical activity of liquids and its uses.

COURSE CODE:22UENVS 18

COURSE TITLE: ENVIRONMENTAL STUDIES

Course Objectives

- To gain knowledge about the importance of environmental sciences and natural resources.
- To learn the concept, structure and function of ecosystem and the importance of biodiversity.
- To understand and gain knowledge about environmental pollution and management.
- To impart knowledge about social issues and human population.
- To acquire the skills for identifying and solving pollution problem.

Course Outcomes

After completion of this course, students will be able to gain knowledge in

- The scope and importance of environmental science and natural resources.
- The structure and functions of Ecosystem and biodiversity and its conservation.
- The problem of environmental pollution and its management
- . The social issues and human population.
- They will identify and solve the pollution problem.

COURSE CODE:22UMATC23

COURSE TITLE: INTEGRALCALCULUS

COURSE OBJECTIVES

In this paper the student is exposed to the idea of integration and different methods of integration. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage. The application of integration to the evaluation of areas and volumes is also introduced.

COURSE OUTCOMES

On successful completion of the course, the students will be able to

- Solve problems using the different methods of integration.
- Solve problems in techniques of Reduction formulae and Bernoulli's formula.
- Solve problems in Change of order of integration and Properties of definite integrals.
- Solve problems in double and triple integrals.
- Apply double and triple integrals in finding area and volume.

COURSE CODE:22UMATC24

COURSE TITLE : ANALYTICAL GEOMETRY 3D

COURSE OBJECTIVES

This paper aims to understand the fundamental concepts of Analytical Geometry in Three Dimension, such as Distance between points, Projections, Angle between planes, Line of intersection of two planes, Length of perpendicular, Symmetrical form of the equations of a line, Co planar lines, Shortest distance between two given lines, Centre and radius of Sphere, Equation of a circle on a sphere, The equation of Right circular cone and cylinder, Central quadratics

COURSE OUTCOMES

On successful completion of the course, the students will able to:

- Explain fundamental concepts of analytical geometry in 3D, about direction cosines of a line and the plane, equation and plane.
- Know the straight line, symmetric form of equation of a line, equation of a line passing through two given points, the plane and the straight line, intersection of three planes.
- Understand the Length of perpendicular distance, Co planar lines.
- Solve problems on Symmetrical form of the equations of a line, Shortest distance between two given lines, Centre and radius of Sphere
- Find the equation of Sphere, the length of the tangent form of point to sphere, equation of a circle on a sphere, intersection of two spheres, cone, cylinder and central quadrics.

COURSE CODE:22UPHYA02

COURSE TITLE: PHYSICS II

COURSE OBJECTIVES

- To understand the concept and laws of electrostatics, working of capacitors.
- To acquire knowledge on current electricity, electromagnetic induction and resonance circuits.
- To understand the atom models, X-rays and nuclear properties and reactions.
- To study fundamentals of solid-state electronics diodes and transistors.
- To know the number system, logic gates and basic digital circuits.

COURSE OUTCOMES

Students studying Allied Physics-II would have learnt the following:

- Electric intensity, potential and capacitor principle and its types.
  laws used in electrical circuits, specific resistance measurement and laws of electro magnetic induction.
- Various atom models, nuclear models, fission and fusion reactions.
- Solid state electronic devices diode and transistor, their characteristics and applications.
- The number systems, conversion between them and logic gates and digital circuits.

COURSE CODE:22UPHYP02

COURSE TITLE: PHYSICS PRACTICAL

COURSE OBJECTIVES

- To know the method of determining elastic properties of solids
- To learn the experimental method to determine surface tension and viscous properties of liquids
- To acquire knowledge of measurement of optical properties of solid
- To acquire knowledge to measure the size of very small objects.

- To gain knowledge of finding thermal properties of liquids
- To obtain the electrical properties of a conductor and to perform experiments to study the semiconductor devices and digital circuits.

COURSE OUTCOMES

After Completion of the Allied Physics Practical course the student would be conversant in measuring the

- elastic properties
- surface tension
- Viscous
- Thermal
- electrical
- optical properties and
- acquired knowledge of semiconductor diodes and digital gates.

COURSE CODE:22UMATE26-2

COURSE TITLE: MATRIX THEORY

COURSE OBJECTIVES

In this course students are trained to develop skills in finding rank, inverse, Eigen values, Eigen vectors and quadratic forms.

COURSE OUTCOMES

On successful completion of the course, the students will be able to:

- Find the rank and inverse of a matrix.
- To understand the symmetric, skew symmetric, Hermitian, orthogonal and Unitary matrices
- Find Eigen Values and Eigen Vectors.
- Diagonalize the matrix using similarity transformation.
- Find the nature of Quadratic forms.

COURSE CODE : 22UVALE27

COURSE TITLE : Value Education

Course Objectives

- To incorporate human values in educational system.
- To imbibe deeper understanding of the need and importance of value-based living.
- To develop an honorable character.
- To make the students understand how values lead to success.
- To make the student realize that all the problems can be solved by one's innate goodness

Course Outcomes

- The students understand the importance of value-based living.
- Students become aware of the Universal Value System.
- Students learn how success is directly value based
- Students develop an honorable character.
- Students learn to face all the problems courageously.

COURSE CODE : 22USOFS28

COURSE TITLE: Soft Skills

Course Objectives:

- To develop the receptive skills of listening and reading.
- To improve the skills of interpreting and transcoding information.
- To develop the presentation skills of speaking and writing.
- To improve communication skills with reference to Personal and interpersonal Interaction.
- To enhance the personality traits with regard to employability.

Course Outcomes:

- The students understand the receptive skills of listening and reading.
- Students learn how to interpret and transcode information.
- Students learn Personal and Interpersonal Skills of Speaking.
- Students learn to write without mistakes.
- Students become aware of the effect of Good Personality Traits.

SEMESTER III

COURSE CODE : 22UMATC33

COURSE TITLE: ABSTRACT ALGEBRA

Course Objectives :

Modern algebra plays a major role in other branches of Mathematics. Properties of groups, Various subgroups such as normal subgroups such as normal subgroups, quotient groups are studied. Homomorphism of groups and rings, automorphisms of groups are discussed. The properties of rings, ideals, quotient rings and Euclidean rings are discussed.

Course Outcomes:

On successful completion of the course, the students will be able to:

- Explain the fundamental concepts of algebra such as groups, subgroups, quotient groups.
- Understand the concept of Homomorphism, Automorphisms.
- Solve problems on ideals, Cayley's theorem and permutation groups.
- Demonstrate accurate and efficient use of a ring with examples, some classes of a ring, homomorphism of a ring, ideals, quotient rings and integral domain.

- Solve problems in the above related topics, Normal subgroups, Quotient groups, Homomorphisms, Ideals and Integral domain.

COURSE CODE : 22UMATA03

COURSE TITLE: MATHEMATICAL STATISTICS-I

Course Objectives:

To Learn Statistical Methods Probability theory, Random variables, Distribution functions, Mathematical expectations, Generating functions, Correlation , Regression, and some standard Distributions. Students should be given practice on Statistical methods so that he could apply the techniques to solve real world problems in the field of Science, Technology and Business Management.

Course Outcomes:

On successful completion of the course, the students will be able to

- **CO1:** Understand the concepts of Probability theory and their usage in real world Situations .
- **CO2:** Solve problems on Random variables, Distribution functions and Mathematical expectations.
- **CO3:** Understand the Generating functions and its applications.
- **CO4:** Apply the standard distributions in many field of Science , Engineering ,Medicine ,Nano technology and Business.
- **CO5:** Solve problems in Correlation and Regression Analysis.

COURSE CODE : 22UMATE36-2

COURSE TITLE: PROGRAMMING IN C LANGUAGE

Course Objectives:

To make the students abreast with the programming concepts Constants, variables, data types, operators, expressions , formatted input-output statements, Control statements and to master them in C Language. Students can be given practice to write a complete C

programs to solve all kinds of problems arise day today life in Science, technology and Business

Course Outcomes:

At the end of the Course the students should be able to exhibit

- CO1: Knowledge pertaining to C-Language Fundamentals
- CO2: Logic using Control Statements
- CO3: Modular Programming using Functions
- CO4: Knowledge pertaining to arrays and structures.
- CO5: Advanced Programming techniques to solve a very complex problems.

COURSE CODE : 22UCOMN38

COURSE TITLE: ELEMENTS OF ACCOUNTING

Course Objectives

- To facilitate the non- commerce students to have a basic knowledge in Book-Keeping and Accounting.
- To provide basic knowledge on basis of accounting
- To provide basic knowledge on subsidiary books
- To provide knowledge on error on accounting
- To provide basic knowledge on financial accounts

Course Outcomes

On Successful completion of the course, student will be able

- To gain knowledge on accounting basics
- To gain knowledge on journal and trial balance
- To acquire knowledge on subsidiary books
- To acquire knowledge on finding out errors
- To finalize final accounts

COURSE CODE :22UMATC43

COURSE TITLE: REAL ANALYSIS – I

Course Objectives:

To lay a good foundation of Analysis and to acquire knowledge about Real number system, metric spaces, various limiting behavior of sequences and series, open sets, closed sets and to enhance the mathematical maturity and to work comfortably with these concepts.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1:** Understand examples and counter examples in Functions and Sequences
- **CO2:** Know Proof techniques.
- **CO3:** Improve Problem solving skills in Analysis.
- **CO4**: Understand the concepts of Convergence sequence.
- **CO5** : Solve problems on Metric spaces and Continuous functions.

COURSE CODE:22UMATC44

COURSE TITLE: STATICS

Course Objectives:

This Course aims to provide basic skills and problem solving techniques in forces acting at a point, Coplanar system of forces, friction and equilibrium of strings and chains.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1**: Apply the fundamental concept of statics to
  a. Demonstrate the application of vectors for the analysis of static equilibrium ;
  b. Analyze static equilibrium to particles and rigid bodies and apply the principles of equilibrium for analyzing beams.
- **CO2:** Understand problem solving techniques on Parallel forces and Moments.
- **CO3:** Solve problems on Equilibrium of three forces acting on a rigid body.
- **CO4**: Solve equations involving frictional, statistical, dynamical and limiting frictions.
- **CO5**: Illustrate the mathematical aspects that provide the skills and problem solving in forcesacting at a point, coplanar forces and equilibrium of strings and chains.

COURSE CODE: 22UMATA04

COURSE TITLE : MATHEMATICAL STATISTICS-II

Course Objectives:

The objective is to train students in some concepts in mathematical statistics. The theory of sample moments, significant test, sampling theory and analysis of variance are introduced. Practical problems are solved.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1**: Gain working knowledge related to the problems of theoretical statistics.
- **CO2**: Apply the fundamental concept of statistical methods to solve some real life problems.
- **CO3**: Gain a basic knowledge for study of advanced courses in this area.
- **CO4**: Solve problems on Testing of Hypothesis.
- **CO5:** Apply the Analysis of Variance and Design of Experiments over the collection of data for Research problems.

COURSE CODE:22UCOMN48

COURSE TITLE: PRINCIPLES OF COMMERCE

Course Objectives

- To familiarize non-commerce students with the principles of commerce
- To acquaint and equip the students with the latest knowledge in the field of Commerce;
- To prepare Students for higher studies in Commerce;
- To take a job in the trade/finance, insurance organizations and industry with basic Commercial know-how;
- To impart the students the basic requirements to enable them to take up Business as a career.

Course Outcomes

On Successful completion of the course, student will be able to

- Acquire knowledge on basics of commerce
- Find out the different types of organization
- Acquire knowledge on the functions of marketing
- To find out the type of banks
- Acquire knowledge on working of stock exchange

COURSE CODE:22UMATS48

COURSE TITLE: QUANTITATIVE APTITUDE II

Course Objectives:

To enhance the problem solving skills and to prepare for any type of competitive examination and identify the teaching techniques and help the students to acquire the competencies and improve the basic mathematical skill.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

- **CO1**: Understand the concept of ratio and proportion.
- **CO2**: Know the shortcuts and tricks involved in solving time and distance problems.
- **CO3**: Learn how to solve the tricky questions based on time and work.
- **CO4**: Gain knowledge in order to answer problems based on trains.
- **CO5**: Apply the concept of relative speed related to boats and streams.

SEMESTER-V

COURSE CODE: 22UMATC51

COURSE TITLE:LINEAR ALGEBRA

Course Objectives:

To study the Algebraic structures of Vector Spaces and Linear Transformation such as
Linear dependence and independence, Dual space, Inner product paces, Algebra of Linear transformations, Characteristic roots, Matrices, Canonical forms, Triangular forms, Trace and Transpose, Determinants.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1**: Explain the fundamental concepts of Algebraic structures of Vector Spaces and Linear Transformation.
- **CO2**: Understand the concepts of Dual Space- Inner Product Spaces.
- **CO3**: Solve problems on Linear dependence and independence.
- **CO4:** Understand the concepts of Linear transformation on Matrices, Canonical forms, Triangular forms.
- **CO5:** Solve problems on trace of Matrix**,** Transpose and Determinants

COURSE CODE:22UMATC52

COURSE TITLE: REAL ANALYSIS – II

Course Objectives:

To study the analytic concepts of connectedness, compactness, derivatives, Riemann integration. To enhance the mathematical maturity and to work comfortably with concepts, Rolles's theorem, Taylor's theorem and sequences and series of functions.

Course Outcomes:

On successful completion of the course, the students will able to:

- **CO1**: Describe fundamental properties of matric spaces that lead to the development of Compact metric spaces.
- **CO2**: Demonstrate an understanding of a set of measure zero and how that are used in Riemann integral.
- **CO3**: Understand the Rolle's theorem,Fundamental theorem of calculus and Taylor's theorem
- **CO4**: Understand the point-wise convergence and uniform convergence of a sequence of functions and series of functions.
- **CO5:** Solve problems on complete and compact Metric spaces, Riemann Integration, sequences and series of functions

COURSE CODE:22UMATC53

COURSE TITLE: DYNAMICS

Course Objectives:

This course aims to provide basic skills and problem solving techniques in kinematics of point and Newton's Laws of motion. Projectiles and simple harmonic motions are studied in detail. Problems in moment of inertia are also considered. The course enhances the problem solving skill of the student.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1**: Apply the fundamental concept of dynamics to

(a) Demonstrate their understanding of the principles of kinematics and kinetics of particles and planar rigid bodies.

(b) Analyze planar rigid body kinematics and kinetics.

- **CO2:** Solve equations of projectiles, moment of inertia and simple harmonic motions.
- **CO3:** Illustrate the mathematical aspects that provide the skills and problem techniques in kinematics of point and Newton's laws of motion.
- **CO4:** Solve problems on work done power energy**,** Work done in stretching an elastic string, Power , Energy , Kinetic Energy.
- **CO5:** Understand **t**he Principle of work-Energy, Potential Energy, The Principle of conversation of energy.

COURSE CODE:22UMATC54

COURSE TITLE:DIFFERENTIAL EQUATIONS

Course Objectives:

The course aims to introduce the concepts of Equations of the First Order and Higher Degree, Euler's homogeneous linear equations, Legendre's Linear Equations, Simultaneous Equations, Laplace Transform and Formation of PDF.

Course Outcomes:

On successful completion of the course, the students will be able to:

- CO1: Explain the fundamental concepts of ordinary differential equations an their role in modern mathematics.
- CO2: Use ordinary differential equations to model simple electric circuits, population growth and mass-spring systems, as well as other applications.
- CO3: Demonstrate accurate and efficient use of the Laplace transforms and their applications in the solution of ordinary differential equations.
- CO4: Apply problem-solving using concepts and techniques from ordinary differential equations and Laplace transforms relevant to diverse situations in physics, engineering, financial mathematics and in other

mathematical Contexts

- CO5: Apply the differential equations in geometrical and physical problems arise in real life situations

COURSE CODE:22UMATE58-1

COURSE TITLE: DISCRETE MATHEMATICS

Course Objectives:

Students must understand Mathematical reasoning in order to read, comprehend and construct Mathematica arguments. Mathematical logic, which serves as foundation for subsequent discussions is discussed. Discret Structures such as Sets and Permutations, Recurrence Relation and Mathematical Induction are studied.

Course Outcomes:

Students will be introduced to have knowledge of many mathematical concepts in

- **CO1**: Examples and counter examples for different types Logical Statements.
- **CO2**: Proof techniques.
- **CO3**: Problem solving techniques studied in Discrete Mathematics such as Logic, Relations, Functions, Some Algebraic Structure.
- **CO4:** Equivalence relations ,Composition of functions and inverse functions.
- **CO5:** Lattices as Partially Ordered Sets,Properties of Lattices,Lattices as Algebraic, Special Lattices and Boolean Algebra.

COURSE CODE :22UMATS59

COURSE TITLE :QUANTITATIVE APTITUDE- III

Course Objectives:

To enhance the problem solving skills and to prepare for any type of competitive examination in th topics simple interest, compound interest, logarithms, area, surface area and volume.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1**: Compute simple interest.
- **CO2**: Solve Problems on compound interest.
- **CO3**: Understand logarithms.
- **CO4:** Calculate area of certain space.
- **CO5**: Find surface area and volume for the real world problems.

SEMESTER-VI

COURSE CODE:22UMATC61

COURSE TITLE: VECTOR ANALYSIS

Course Objectives:

The objective of the module is to introduce and develop the methods of vector analysis. These methods provide a natural aid to the understanding of geometry and some physical concepts. They are also a fundamental tool in many theories of Applied Mathematics.

Course Outcomes:

On successful completion of the course, the students will be able to:

- **CO1**: Explain the fundamental concepts of vectors, direction cosines, direction ratios and workoutscalar and vector products of two and three vector.
- **CO2:** Understand the concepts of Solenoidal and Irrotational vectors.
- **CO3**: Differentiate vector functions of a single variable, find the gradient, divergence and curl and prove identities involving them.
- **CO4**: Integrate vectors, compute line, surface and volume integrals in a vector field.
- **CO5**: Do the verification of Gauss divergence theorem, Stoke's and Green's theorem.

COURSE CODE:22UMATC62

COURSE TITLE:COMPLEX ANALYSIS

Course Objectives:

To understand the functions of complex variables, continuity and differentiation of complex variable functions, analytic functions and C – R equations. To learn about elementary transformation concepts and to know about power series expansions of Taylor's and Laurant's series, the singularity concepts and residues, solving definite integrals using the residues

Course Outcomes:

Students will be introduced to have knowledge of many mathematical concepts in

- **CO1:** Examples and counter examples in Limits, Functions of Complex variables and Continuous functions
- **CO2:** Proof techniques in Complex Analysis.
- **CO3:** Problem solving skills in Analytic functions and Elementary Transformation..
- **CO4**: Problem solving skills in Harmonic functions, Complex integration, definite Integral, Cauchy's Theorem, Cauchy's integral formula.
- **CO5**: Computations of Singularities, Residues and zeros of Analytic functions.

COURSE CODE: 22UMATC63

COURSE TITLE:OPERATIONS RESEARCH

Course Objectives:

To introduce the various techniques of Operations Research, to teach the various methods of solving Linear Programming Problems, Transportation Problems, Assignment Problems and their applications, and to make the students solve real life problems in Business and Management.

Course Outcomes:

After completion of the course, students will be able to

- **CO1** : Understand the various techniques to solve Linear Programming Problems.
- **CO2** : Apply the Transportation and Assignment problem concepts in real life problems.

- **CO3**: Solve the Network problems by using PERT & CPM Methods.
- **CO4** : Deal industrial models and also prerequisite for studying advanced courses in Nonlinear Programming Problems, Inventory Control Problem and Queuing Theory.
- **CO5**: Acquire the knowledge to write TNPSC Statistical, UG TRB,

Polytechnic TRB exams

COURSE CODE:22UMATC64

COURSE TITLE:GRAPH THEORY

Course Objectives:

To study and develop the concepts of graphs, subgraphs, connectivity, Eulerian and Hamiltonian graphs, Trees, Colourings and Planarity. To acquire knowledge to model real world problems using graph theory.

Course Outcomes:

After completion of the course, students will be able to

- **CO1**: Give Examples and counter examples of Graphs and Subgraphs
- **CO2**: Understand Proof techniques in Graph theory.
- **CO3:** Know the Intersection Graphs and Line Graphs, Incident Matrices, Intersection Graphs and Line Graphs,Operations on Graphs.
- **CO4**: Get Problem solving skills in Chromatic Number and Chromatic Index.
- **CO5:** Understand the concepts of Hamiltonian Graphs, Trees, Planarity and Colouring.

M.Sc. MATHEMATICS

SEMESTER: I

COURSE CODE : 22PMATC11

COURSE TITLE : ADVANCED ABSTRACT ALGEBRA

COURSE OBJECTIVES

- To learn the importance of Sylow's Theorems
- To learn the basic concepts of Direct Products and ideas of polynomials
- To attain depth knowledge about the algebraic structure of extension fields
- To provide the use of Galois theory in discussing the existence of roots of the polynomials
- To learn about finite fields and important theorem related to division rings.

COURSE OUTCOMES

At the end of the course, the student will be able

- To find the number of Sylow sub groups.
- To find the number of non-Isomorphic Abelian groups.
- To understand fields and roots of polynomials.
- To find the splitting field, Galois group of the given polynomial.
- To check whether the given polynomial is solvable by radicals or not.

COURSE CODE : 22PMATC12

COURSE TITLE : ADVANCED REAL ANALYSIS

COURSE OBJECTIVES

- To give the students a thorough knowledge of real valued functions and their properties.
- To discuss the concepts of Riemann –stieltjes integral and its properties.
- To develop the concept of analysis in abstract situations.

COURSE OUTCOMES

Our successful completion of this course, students will be able to

- Demonstrate an understanding the theory of function of bounded variations,sequence Of functions, Riemann-stieltjes integrals.
- To apply the theory in the course to solve a variety of problems at an appropriate Level of difficulty.
- Demonstrate skills in constructing rigorous mathematical analysis.
- The student will gain confidence in proving theorems and solving problems.
- Student will understand the generalized concept of Differential Calculus.

COURSE CODE : 22PMATC13

COURSE TITLE : ORDINARY DIFFERENTIAL EQUATIONS

COURSE OBJECTIVES

- 1.To develop strong background on finding solutions to linear differential equations with constant and variable coefficients and also singular points.
- 2.To study existence and uniqueness of the solutions of first order differential equations.

COURSE OUTCOMES

After successful completion of the course the student will be able to:

- Understand the concept of Wronskian formula.
- Understand the concept of initial value problems.
- Understand the concept of Existence and uniqueness theorems.
- Understand the Bessel Function.
- Understand the Lipschitz condition.

COURSE CODE :22PMATC14

COURSE TITLE : OPTIMIZATION TECHNIQUES

COURSE OBJECTIVES

- To enlighten the students in the field of operations research.
- To help the students to apply OR techniques in business and management problems.
- To provide a mathematical programming for finding applications in diverse fields Including engineering, computer science and economics.

COURSE OUTCOMES

On successful completion of the course, the student will be able to,

- Ability to apply the theory of optimization methods and algorithms to develop and For solving various types of optimization problems.
- Ability to go in research by applying optimization techniques in real value problems
- Analyze decision making under certainty and uncertainty by game theory.
- Understand unconstrained and constrained optimization problems.
- Understand Non-Linear programming problems.

COURSE CODE :22PMATE15-2

COURSE TITLE : MATHEMATICAL STATISTICS

COURSE OBJECTIVES

- To study random variables and its applications.
- To explore probability distributions.
- To understand moments and their functions.
- To introduce significance tests.
- Concepts of ANOVA

COURSE OUTCOMES

After completion of this course the student will be able to

- Apply the concepts of random variables in real life situations.
- Identify the type of statistical situation to which different distributions can be applied

COURSE CODE : 22PCSCO17-1

COURSE TITLE : FUNDAMENTALS OF COMPUTER APPLICATION

COURSE OBJECTIVES

- To know about computer and basic applications of computer.
- To get knowledge about operating system.
- To aim at imparting a basic level appreciation Programme.
- To Understand word processing.
- To develop Word spread sheet and power point Presentation.

COURSE OUTCOMES

- Students are able to know about computer and basic applications of computer.
- Students are able to get knowledge about operating system.
- Students are able to aim at imparting a basic level appreciation Programme.
- Students can able to make spread sheets and its styles.
- Students get knowledge about Power point presentation.

SEMESTER: II

COURSE CODE :22PMATC21

COURSE TITLE : ADVANCED LINEAR ALGEBRA

COURSE OBJECTIVES

- To aim learning the students to solve systems of linear equations using multiple methods, matrix operations including inverses
- To establish basic properties of algebra of polynomials over a field
- To apply principles of matrix algebra
- To investigate determinant of matrices and its properties
- To understand the canonical forms of matrices and its properties.

COURSE OUTCOMES

Students will be introduced to and have the knowledge of many mathematical concepts, Examples and Counter Examples, Proof Techniques and Problem Solving studied in Linear Algebra such as

- Systems of linear equations
- The algebra of linear Equations
- The algebra of Polynomials
- Determinant functions
- Diagonalization, Decompositions.

COURSE CODE :22PMATC22

COURSE TITLE : MEASURE THEORY AND INTEGRATION

COURSE OBJECTIVES

- To generalize the concept of integration using measures.
- To develop the concept of analysis in abstract situations.
- To discuss convergence in measure and properties of L^p Space.

COURSE OUTCOMES

Students will be able to get knowledge of many mathematical concepts

- Examples and counter examples
- Problem solving techniques
- Understand the fundamental studies in measurable sets, measurable functions and convergence in measure.
- Student will understand the generalized concept of convergence in measure.

- Student will understand the measurability in a product space.

COURSE CODE :22PMATC23

COURSE TITLE : PARTIAL DIFFERENTIAL EQUATIONS

COURSE OBJECTIVES

- To introduce to the students the various types of partial differential equations.
- How to solve the partial differential equations.

COURSE OUTCOMES

On successful completion of the course, the student will be able to:

- Solve various types of first order PDE.
- Solve various types of second order PDE.
- Solve Elliptic differential equation.
- Solve Parabolic differential equation.
- Solve Hyperbolic differential equation.

COURSE CODE :22PMATC234

COURSE TITLE : CLASSICAL DYNAMICS

COURSE OBJECTIVES

- Classical mechanics afford the student an opportunity to master many of mathematics techniques.
- It is certainly true that classical mechanics today is far from being a closed subject.
- Alternate means exist in the curriculum for acquiring the mathematics needed in other branches
- To give a details knowledge about the mechanical system of particles, applications of Lagrange's equations and Hamilton's equations as well as the theory of Hamilton Jacobi Theory.

COURSE OUTCOMES

- Be able to solve the Lagrange's equations for simple configurations using various methods
- Be able to understand the concept of Hamilton Jacobi Theory.
- Be able to understand the concept canonical Transformations
- To develop skills in formulating and solving physics problems

- Able to get idea of dynamical systems are of relatively recent origin, the concept of motion in phase- space and its geometrical depiction is simple

COURSE CODE :22PMATE25-1

COURSE TITLE : NUMBER THEORY AND CRYPTOGRAPHY

COURSE OBJECTIVES

The course aim is to introduce the concept divisibility and Euclidean algorithm, quadratics residues and reciprocity, encryption and decryption, primality test.

COURSE OUTCOMES

- Students able to understand the divisibility and Euclidean algorithm.
- Students able to understand quadratics residues and reciprocity.
- Students able to analyse encryption and decryption.
- Students able to do the primality test.
- Students able to the determine the elliptic curve primality test.

COURSE CODE : 2PHUMR27
COURSE TITLE: HUMAN RIGHTTS

COURSE OBJECTIVES

- To understands the conceptual background of Human Rights.
- To study international and regional norms and institutional mechanisms of
- Human Rights.
- To know the international concern for Human Rights.
- To explores the emerging issues in international human rights.
- To study the Classification of Human Rights.
-

COURSE OUTCOMES :

At the end of the course, the student

- will have knowledge about the conceptual background of Human Rights.
- can apprise on International Human Rights norms and mechanisms.
- can understand the emerging dimensions of Human Rights in international forum.

- can explain about the Third Generation Human Rights
- can discusses about Right to Clean Environment.

SEMESTER III

COURSE CODE: 22PMATC31

COURSE TITLE: ADVANCED COMPLEX ANALYSIS

COURSE OBJECTIVES

This course aims to train the students to get essential knowledge in functions of a complex variable, Analytic functions and their properties, Residue theorem and its applications, Riemann mapping theorem are discussed in detail.

COURSE OUTCOMES

On successful completion of the course, the students will be able to

- To learn the concepts of Complex Integration.
- Compute the Taylor's theorem, to determine the nature of the removable Singularities, zeros and poles.
- Explain the convergence of power series and develop analytical capabilities in Taylor or Laurent series in a given domain;
- Determine the concept of conformal mapping of polygons, to find Schwarz –Christoffel formula.
- With this course students are prepared to learn about advance complex Analysis.

COURSE CODE: 22PMATC32

COURSE TITLE : TOPOLOGY

COURSE OBJECTIVES

To provide knowledge on point set topology, topological space, Quotient spaces, product spaces and metric spaces sequences, continuity of functions connectedness and compactness, homotopy and covering spaces.

COURSE OUTCOMES

On successful completion of the course, the students will be able to

- Define and illustrate the concept of topological spaces and continuous functions.
- Prove a selection of theorems concerning topological space, continuous functions, product topologies, and quotient topologies.
- Define and illustrate the concept of product of topologies and illustrate the concepts of the separation axioms.
- Define connectedness and compactness, and prove a selection of related theorems, and describe different examples distinguishing general, geometric, and algebraic topology.

COURSE CODE: 22PMATC33

COURSE TITLE : RESEARCH METHODOLOGY

COURSE OBJECTIVES

- The prime aim of this paper is to enrich the knowledge of Research and motivation in Research.
- The concept of different types of modules are introduced.
- Localization and its applications introduced.
- Holomorphic functions, complex differentiation, integrations are discussed in detail.
- Fourier transform formal properties are discussed.

COURSE OUTCOMES

- To understand meaning of Research and objectives of Research.
- To understand various stages of preparing publishing a research articles and ethical issues.
- To understand the fundamental of logical reasoning in pure mathematics and modelling aspects of applied mathematics.
- To understand Different technique of interpretation.
- To understand Holomorphic functions and the calculus of residues.

COURSE CODE : 22PMATC34

COURSE TITLE : STOCHASTIC PROCESSES

COURSE OBJECTIVES

The objectives are to

- Acquire the skill of advanced level of mathematical sophistication and enhancing the horizons of knowledge.
- Acquire understanding of applicability of different concepts of stochastic processes on some physical situation.
- To familiarize the students with the use of stochastic models in different areas.

COURSE OUTCOMES

At the end of the course, the student will be able to

- working knowledge related to the problems of uncertainty.
- a basic knowledge for doing research in this area.
- Classify Poisson, Markov and birth and death process.
- Understand the Markov chains and Markov processes.
- Understand Renewal process.

COUSE CODE: 22PMATE35-1

COURSE TITLE : DISCRETE MATHEMATICS

COURSE OBJECTIVES

- To explore the knowledge in Lattices and their applications.
- To develop applications of switching circuits.
- To understand mathematical reasoning in order to read, comprehend and construct mathematical arguments.
- To develop mathematical foundations to understand and create mathematical arguments in crpto systems.
- To motivate students how to solve practical problems using Discrete Mathematics.

COURSE OUTCOMES

After completion of this course the student will be able to

- Understand how Lattices can be used as a tool and mathematical model in the study of networks and circuits.
- Construct mathematical arguments using logical connectives and quantifiers.
- Apply codes to develop Mathematical Models.
- Explore Applications of crypto systems in modern technology.
- Learn how to work with some of the discrete structures which include semi-groups and its applications.

COURSE CODE: 22PCSCO37-2

COURSE TITLE: MANAGEMENT INFORMATION SYSTEM

COURSE OBJECTIVES

- Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making.
- Understand Modern Information System & its life cycle.
- Analyze and synthesize Concept of DSS, IS, ES information system.
- Develop the skills about Testing Security & Cost benefit analysis.
- Learning Concept of Knowledge & Human dimension.

COURSE OUTCOMES

- Evaluate the role of information systems in today's competitive business environment
- Interpret information systems in the enterprise.
- Explain relationships between concepts of information systems, organization, management and strategy.
- Debate infrastructure of information technology &illustrate redesigning the organization with information systems.
- Evaluate models for determining the business value of information systems &identify appropriate strategies to manage the system implementation process

SEMESTER IV

COURSE CODE:22PMATC41
COURSE TITLE: FUNCTIONAL ANALYSIS

COURSE OBJECTIVES

This course introduces functional analysis and perator theoretic concepts. This area combines ideas from linear algebra and analysis in order to handle infinite-dimensional vector spaces and linear mappings thereof.

COURSE OUTCOMES

On successful completion of the course, the students will be able to

- Appreciate how ideas from different areas of mathematics combine to produce new tools that are more powerful than would otherwise be possible.
- Understand how functional analysis underpins modern analysis.
- Develop their mathematical intuition and problem-solving capabilities, especially in predicting the space in which the solution of a partial differential equation belongs to.
- Learn advanced analysis in terms of Sobolev spaces, Besov spaces, Orlicz spaces and other distributional spaces.
- Definition and examples of Banach Algebras – To understand the Regular and simple elements, radical and semi-simplicity

COURSE CODE: 22PMATC42

COURSE TITLE: FLUID DYNAMICS

COURSE OBJECTIVES

- To know the knowledge about fluid particles in steady and unsteady compressible and incompressible flows.
- To provide the basic knowledge of two and three dimensional potential flows.
- To apply the viscous flow in some real life situations.

COURSE OUTCOMES

On successful completion of the course, the student will be able to,

- Identify and obtain the values of fluid properties and relationship between them and understand the principles of continuity, momentum, and energy as applied to fluid motions.
- Recognize these principles written in form of mathematical equations.
- Apply dimensional analysis to predict physical parameters that influence the flow in fluid dynamics.
- Understand stress components and rate of strain quadric.
- Understand Viscosity, Laminar flow, Viscous flow.

COURSE CODE:22PMATC43

COURSE TITLE: GRAPH THEORY

COURSE OBJECTIVES

- To understand and apply the fundamental concepts in graph theory.
- To apply graph theory based tools in solving practical problems.
- To understand the Eulerian graphs and Hamiltonian graphs.
- To introduce the idea of coloring in graphs.
- To develop the understating of Geometric Duals in Planar graphs.

COURSE OUTCOMES

After completion of this course the student will be able to

- Understand the basics of graph theory and their various properties.
- Develop Models using graphs and to solve the problems algorithmically.
- Apply graph theory concepts to solve real world applications like routing, TSP/traffic control, etc.
- Analyse the significance of graph theory in different engineering disciplines.
- Understand the applications of duality and planarity o graphs.

COURSE CODE: 22PMATE44-3

COURSE TITLE: NUMERICAL METHODS

COURSE OBJECTIVES

- To introduce wide range of range of numerical methods for solving mathematical problems.
- To explore the concepts of Derivation and Analysis in numerical methods.
- To Solve system of linear algebraic equations and interpolations.
- To learn Solving techniques in Numerical integration & differentiation.
- To upgrade the students to learn Numerical solution of ordinary differential equations.

COURSE OUTCOMES

After completion of this course the student will be able to

- Obtain numerical solution of algebraic and transcendental equation.
- Learn about interpolation with evenly and unevenly spaced points.
- Develop logical skills in Solving numerical differentiation and integration.
- Obtain numerical solution of ordinary differential equations.
- Develop and apply the appropriate Numerical techniques in various Science and Engineering problems, interpret the results and assess accuracy.