

Hajee Karutha Rowther Howdia College

(Autonomous)

Uthamapalayam 625 533, Theni District.



Department of Mathematics

Programme Specific Outcomes (PSOs)

Programme Outcomes (POs)

Course Outcomes (COs)

B.Sc. Mathematics

Programme Specific Outcomes (PSOs):

PS01: Graduates will develop the skill to write entrance exam conducted by IIT's/Universities to pursue PG and integrated Ph.D and will shine as great Mathematicians

PS02: Graduates to develop confidence to appear for SSC(CGL), IBPS, RRB and Civil services exam and will occupy higher posts in administrative level

PS03: Graduates will prepare in advance to appear for TRB after completing B.Ed. and become dedicated faculty.

PS04: Graduates develop teaching skills, subject knowledge in the course of the study which will help them to shine in various fields including Education, IT etc.

PS05: Graduates will use their course as training ground to develop their positive attitude skills which enable them to become a multi facet personalities shining in any chosen field.

Programme Outcomes (POs):

PO1: Communicate Mathematics effectively using various instructional strategies

PO2: Demonstrate a computational ability in solving a wide array of mathematical problems

PO3: Develop mathematical ideas from basic axioms and analyze valid mathematical reasoning.

PO4: Utilize mathematical skills to solve theoretical and applied problems

PO5: Identity applications of mathematics in various disciplines and society.

Course Outcomes (COs):

Course Code: 20UMAC11

Course Title: Analytical Geometry of 3D and Vector Calculus

Course Outcomes (COs):

CO1: Recall plane concepts in three dimension

CO2: Solve the problems related to lines and planes

CO3: Demonstrate the sphere concepts and relate their properties

CO4: Extend the concepts of differentiation in vector algebra

CO5: Demonstrate Line integrals, surface integrals and apply Stokes theorem

Course Code: 20UMAC1P

Course Title: MS Office- Practical

Course Outcomes (COs):

CO1: Create file and folders and select to save the document

CO2: Select spell for grammar check and save the document

CO3: Classify worksheet and analyzing data

CO4: Choose text using text effect and apply a graphic presentation

CO5: Identify basic navigation tools used in browsers

Course Code: 20UPHA11

Course Title: Mechanics, Properties of Matter and Sound

Course Outcomes (COs):

CO1: Analyze the laws of motion and central force

CO2: Discuss the centre of mass of a rigid body-motion

CO3: Discuss the variation of acceleration due to gravity

CO4: Understand the properties of matter like elasticity and viscosity

CO5: Discuss the Properties of Sound Waves

Course Code: 20UMAC21

Course Title: Trigonometry and Fourier Series

Course Outcomes (COs):

CO1: Recall expressions for trigonometric functions

CO2: Relate circular trigonometric functions and hyperbolic functions

CO3: Basic concepts in complex numbers and their related problems.

CO4: Find the sum of the infinite series.

CO5: Solving problems in Fourier series.

Course Code: 20UMAC2P

Course Title: Photoshop

Course Outcomes (COs):

CO1: Work with image editing and graphic design features.

CO2: Basic photo shop skills and concepts to create effective pictures.

CO3: Edit and apply special effects to enhance images.

CO4: Design actual graphics in realistic way.

CO5: Animate the 3D objects with some special effects.

Course Code: 20UPHA21

Course Title: Optics, Spectroscopy and Electronics

Course Outcomes (COs):

CO1: Know the different types of lenses, principal points, cardinal points and the equivalent focal length of the lens system.

CO2: Learn the principles of Interference, Diffraction and polarization and the experiments related to them.

CO3: Understand the concept of optical rotation

CO4: Gain a sound knowledge in semiconductor Physics, types of diodes, working of rectifiers and filters.

CO5: Construct logic gates using discrete components and IC's and to calculate their output voltage.

Course Code: 20UPHA2P

Course Title: Ancillary Physics Practical

Course Outcomes (COs):

CO1: Estimate the value of Young's modulus of a given wooden scale, the value of Rigidity modulus of a given wire and determine acceleration due to gravity.

CO2: Estimate the viscosity of a given liquid and Comparison of capacitances using B.G and Owen's bridge

CO3: Demonstration of interference patterns

CO4: Experiments related to sound and light

CO5: Verification of some simple digital circuits

Course Code: 20UMAC31

Course Title: Differential Calculus

Course Outcomes (COs):

CO1: Find n^{th} derivative and understand the geometrical meaning of a derivative and rate of change of variable

CO2: Develop problem solving skills using total differential coefficient and know the concept of maxima and minima

CO3: Acquire knowledge in polar sub tangent and subnormal

CO4: Solve problems in circle radius and centre of curvature

CO5: Learn to solve problems in evolute and p-r equations of curves

Course Code: 20UMAC32

Course Title: Theory of Equations

Course Outcomes (COs):

CO1: Explain relation between roots and co-efficients of equation.

CO2: Apply Newton's theorem to find the sum of the powers of the roots of an equation

CO3: Understand the concept of reciprocal roots and reciprocal equation

CO4: Solve the nature of the roots of equation using Descarte's rule of sign.

CO5: Find the real root of the equation by Horner's method.

Course Code: 20UMAA31

Course Title: Programming in C and C++

Course Outcomes (COs):

CO1: Illustrate the procedural paradigm with variables, constants, operations and I/O functions in C language. Demonstrate the concept of control statements

CO2: Know the concept of array and strings. Expose the concept of functions and structures

CO3: Apply C++ features to program design and implementation. and also explain Constructors ,operator overloading concepts.

CO4: Know the concept of Inheritance and Pointers.

CO5: Reveal the importance of I/O operation and files.

Course Code: 20UMAP31

Course Title: Programming in C and C++ (Lab)

Course Outcomes (COs):

CO1: Illustrate Programming principles.

CO2: Develop skills to solve mathematical problems. Construct programs using strings and functions

CO3: Relate conditional and looping statements.

CO4: Develop programs using arrays

CO5: Construct programs using function overloading

Course Code: 20UMAS31

Course Title: Sequences and Series

Course Outcomes (COs):

CO1: Define sequences and identify the different kinds of sequences

CO2: Identify Cauchy sequence and Cauchy's general principle

CO3: Identify the series and classify the convergent, divergent and infinite series

CO4: Solving problems using Comparison test

CO5: Explain Kummer's test and Raabe's test and solve problems

Course Code: 20UMAC41

Course Title: Integral Calculus

Course Outcomes (COs):

CO1: Understand definite and infinite integration by recalling the concept of integration and develop the skill to learn reduction formulae

CO2: Summarize about Riemann integral, Geometrical interpretation of Riemann integral and its properties

CO3: Learn to compare and contrast Beta and Gamma functions

CO4: Classify double and triple integration and learn about transformation of Cartesian to polar coordinates and transformation of Cartesian to Spherical coordinates

CO5: Describe the expansion of Fourier series of even or odd functions

Course Code: 20UMAC42

Course Title: Differential Equations and Laplace Transform

Course Outcomes (COs):

CO1: Find the integrating factors and solve linear, first order ODEs.

CO2: Solve the differential equations with constant coefficients.

CO3: Solve the second order differential equations and homogeneous equations.

CO4: Explain partial differential equations and solve them.

CO5: Analyze different methods of differential equations and solve using Laplace transforms.

Course Code: 20UMAA41

Course Title: Mechanics

Course Outcomes (COs):

CO1: Understand mathematical concepts on Forces acting at a point and develop the skill to learn how to resolve the forces acting at a point.

CO2: Acquire knowledge about forces acting on a body like moments of a force, like and unlike parallel forces, Varignon's theorem.

CO3: Learn to apply and clarify path and characteristic of a moving object in horizon and inclined plane.

CO4: Define and solve the outcomes of direct and oblique impacts of moving objects.

CO5: Illustrate and Explain about central Forces, central orbits and their polar and p-r forms.

Course Code: 20UMAA4P

Course Title: Programming in C and C++ (Lab)

Course Outcomes (COs):

CO1: Understand and write programs using control statements

CO2: Develop programs using arrays

CO3: Construct programs using string

CO4: Demonstrate the process of writing, compiling and executing programs in C++.

CO5: Implement the object oriented concepts such as inheritance and polymorphism in developing applications

Course Code: 20UMAS41

Course Title: Applications of Differential Equations

Course Outcomes (COs):

CO1: Formulate and solve the differential equation problems in the field of industrial organization engineering

CO2: Apply an adequate scientific language to formulate the basic concepts

CO3: Explain partial differential equations and their applications

CO4: Solve problems on physics regarding a simple pendulum.

CO5: Solve problems on Planetary Motion, Dynamical Problem with Variable Mass

M.Sc. Mathematics

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Programme Outcomes (POs):

PO1: Acquire Knowledge in recent developments in various branches of mathematics and participate in conferences / seminars / workshops and thus pursue research.

PO2: Develop problem solving skills and apply them independently to problems in pure and applied mathematics.

PO3: Sharper their analytic thinking .logical deductions and rigor in reasoning and competent to obtain employment in various sectors

PO4: Competency to meet global challengers through critical, rational, analytical and logical thinking.

PO5: Apply mathematical methodologies to open-ended real-world situations.

Course Outcomes (COs):

Course Code: 20PMAC11	Course Title: Groups and Rings
Course Outcomes (COs): CO1: Find the number of subgroups in a group CO2: Demonstrate and analyze the concepts of solvability of group CO3: Examine advanced ideas in the algebraic structures CO4: Solve the irreducibility of polynomials CO5: Explain chain conditions in Rings	

Course Code: 20PMAC12	Course Title: Real Analysis
Course Outcomes (COs): CO1: Recall and apply the concepts of continuity, discontinuity, compactness and connectedness in metric spaces. CO2: Demonstrate the differentiation of functions of real variables CO3: Evaluate the integral of functions of a real variable in the sense of Riemann Stieltjes CO4: Identity and classify the sequence of functions which point wise convergence and uniform convergence CO5: Analyze the structure of the exponential and logarithmic functions, the trigonometric functions, the gamma functions	

Course Code: 20PMAC13	Course Title: Differential Equation
Course Outcomes (COs): CO1: Apply concept Reduction of the order of a homogeneous equation, The wronskian and linear independence CO2: Explain, Second order equations with regular singular points, The Bessel equation CO3: Analyze and solve The Lipschitz condition, Convergence of the successive approximations CO4: Find the Origins of first order Partial differential equations-Cauchy's problem for first order equations CO5: Demonstrate Cauchy,s method of characteristics-Compatible Systems of first order equations-Charpit's method-Special types of first orderequations.	

Course Code: 20PMAC14	Course Title: Graph theory
Course Outcomes (COs): CO1: Relate connectivity concepts in the theory of network flow problems CO2: Analyze and Apply planarity concepts in computer graphics CO3: Apply the distance concepts in channel Assignment CO4: Explain matching concepts in job assignment problems CO5: Develop mathematical models of real life problems using domination	

Course Code: 20PMAE11	Course Title: Mechanics
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Course Outcomes (COs):

- CO1:** Recall the elementary principles of mechanics
- CO2:** Analyze and Demonstrate the Holonomic and non Holonomic systems
- CO3:** Solve one body central force problems
- CO4:** Evaluate an orbit equation for the Kepler Problem by using the Laplace-Runge – Lenz vector
- CO5:** Define and solve the equations of canonical transformations

Course Code: 20PMAE12	Course Title: Numerical Methods
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Course Outcomes (COs):

- CO1:** How to find complex roots
- CO2:** Demonstrate and Analyze Eigen values and Eigen vectors
- CO3:** Apply finite difference in Interpolating Polynomials
- CO4:** Classify and Explain Differentiation and Integration in Numerical Methods
- CO5:** Analyze Initial value problems in Ordinary differential equations

Course Code: 20PMAC21	Course Title: Linear Algebra
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Course Outcomes (COs):

- CO1:** Recall and demonstrate the concept of dual spaces and inner product spaces
- CO2:** Analyze and Construct Algebra of Transformation
- CO3:** Determine canonical forms and nilpotent transformations
- CO4:** Determine Rational canonical forms trace and transpose
- CO5:** Demonstrate the Hermitian, Unitary and normal transformations

Course Code: 20PMAC22	Course Title: Complex Analysis
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Course Outcomes (COs):

- CO1:** Recall and Analyze the concept in complex functions
- CO2:** Define and Evaluate complex integrals
- CO3:** Classify elliptic function and analyze their properties
- CO4:** Find the Taylor and Laurent series expansions for complex functions
- CO5:** Analyze and construct Elliptic functions

Course Code: 20PMAC23	Course Title: Differential Geometry
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Course Outcomes (COs):

- CO1:** Recall and Analyze knowledge in space curves
- CO2:** Demonstrate the metric concepts in surface
- CO3:** Find geodesics on curves
- CO4:** Apply surfaces of revolution
- CO5:** Evaluate principal curvature and line of curvature

Course Code: 20PMAC24

Course Title: Mathematical Statistics

Course Outcomes (COs):

CO1: Recall and interpret different types of distributions

CO2: Find the limiting distribution of a sequence of random variables

CO3: Analyze and Develop statistical inferences

CO4: Identify the appropriate maximum likelihood methods for a given situation and use it to estimate the parameter

CO5: Demonstrate optimal testing of hypotheses

Course Code: 20PMAE21

Course Title: Combinatorial Mathematical

Course Outcomes (COs):

CO1: Provides the counting strategy to solve and analyze problems involving the combinations, distributions and combinatorial identities

CO2: Explain about generating function for combinations, Enumerators for permutations

CO3: Determine the recurrence relations and solve with generating functions

CO4: Demonstrate inclusion-exclusion Principle.

CO5: Recall Polya"s formula and solve enumeration problems

Course Code: 20PMAE22

Course Title: Fuzzy Sets and Logics

Course Outcomes (COs):

CO1: Define and illustrate the concept of fuzzy sets and crisp sets

CO2: Analyze the axioms and build operations on fuzzy sets

CO3: Explain a brief introduction to fuzzy arithmetic concept

CO4: Compare the differences and similarities between Fuzzy sets and classical set theories

CO5: Apply rules of inference and infer from various types of fuzzy propositions

Course Code: 20PMAC31

Course Title: Field theory and Lattices

Course Outcomes (COs):

CO1: Recall and construct extension of a given field Explain the fundamental concepts of field extensions.

CO2: Construct a polygon using just a compass and a ruler.

CO3: Explain the concept of Galois Theory and the related results.

CO4: Analyze the theorems on finite division rings

CO5: Explain the properties of Lattice Theory.

Course Code: 20PMAC32

Course Title: Measure Theory

Course Outcomes (COs):

CO1: Apply the knowledge gained from concrete cases to a general situation by means of going to general measure starting from Lebesgue measure.

CO2: Utilize constructive type proof technique effectively.

CO3: Move sequentially from basic case to required case via all possible in between cases while introducing integration for general functions via simple functions.

CO4: Construct with new functions such as functions of bounded variations absolutely continuous functions.

CO5: Summarize the necessity of checking the existence and uniqueness whenever they come across such a situation.

Course Code: 20PMAC33

Course Title: Mathematical Methods

Course Outcomes (COs):

CO1: Understand and Apply Various transforms and Integral equations to solve problems in all respects.

CO2: Recognize and Solve the special cases of Volterra integral equations by the method of resolvent kernel method of successive approximations and by using transforms

CO3: Understand the relations between the Hankel, Fourier transforms and their applications in evaluating the equations

CO4: Understand the formulation of variational problems, the variation of functional and its properties

CO5: Demonstrate and apply the methods in all application problems in day-to-day life

Course Code: 20PMAE31

Course Title: Number Theory

Course Outcomes (COs):

CO1: Classify in the theory of integer from the list of axioms and explore some research problem in number theory.

CO2: Solve problems in Number Theory.

CO3: Find the greatest common divisor using the Euclidean algorithm.

CO4: Recognize various arithmetical functions. - solve systems of linear congruence's

CO5: Analyze & Explain reciprocity law

Course Code: 20PMAE32

Course Title: Cryptography

Course Outcomes (COs):

CO1: Recall the fundamentals of cryptography

CO2: Demonstrate standard cryptographic algorithms used to analyze confidentiality, integrity and authenticity.

CO3: List and Identify the security issues in the network, key distribution and management schemes

CO4: Explain in detail about Data encryption standard (DES) Structure

CO5: Analyze the Advanced Encryption standard (AES)

Course Code: 20PMAC41

Course Title: Topology

Course Outcomes (COs):

CO1: Recall and construct various topologies onsets and compare them

CO2: Define basic and make use of bases to generate topology and justify Connectedness in topological spaces

CO3: Classify and analyze the nature of compact topological spaces in particular on Real line

CO4: Define and Categorize separation axioms on different topological spaces

CO5: Interpret and extend the metrizable concepts of topological spaces

Course Code: 20PMAC42

Course Title: Functional Analysis

Course Outcomes (COs):

CO1: Develop the skills in analyzing the basic structure of Banach spaces

CO2: Recall the results in Banach spaces and Hilbert spaces

CO3: Apply Normed space theory to prove Hahn- Banach theorem

CO4: Demonstrate the fundamentals of functional analysis

CO5: Explain the operators and find the spectrum of operators

Course Code: 20PMAC43

Course Title: Optimization Techniques

Course Outcomes (COs):

CO1: Recall some basic principles of optimization techniques and solve shortest path problems, Maximal flow problems, CPM and PERT problems.

CO2: Analyze the relationship between exponential and Poisson distribution

CO3: Analyze and solve different models of queueing theory problems

CO4: Summarize game theory and decision analysis principles and solve some practical problems

CO5: Interpret the principle of non-linear problems.

Course Code: 20PMAC44

Course Title: Project

Course Outcomes (COs):

CO1: Understand need and scope of research

CO2: Outline the process of conducting research

CO3: Identify potential research areas in Education

CO4: Write null hypothesis/alternate hypothesis for any research problem

CO5: Write synopsis for a chosen area of research

Course Code: 20PMAE41

Course Title: Fluid Dynamics

Course Outcomes (COs):

CO1: Recall the curvilinear coordinates

CO2: Demonstrate the properties of fluids

CO3: Solve the equations of motion of a fluid when it is at rest and in motion

CO4: Analyze three dimensional flow and explain Stoke"s stream function

CO5: Find complex velocity potentials for standard two dimensional flows

Course Code: 20PMAE42

Course Title: Modern Applied Algebra

Course Outcomes (COs):

CO1: Apply the ideas and techniques of modern algebra

CO2: Make use of modern algebra in applied mathematics

CO3: Outline the digital computer programming language ALGOL & determine direct product

CO4: Construct the Boolean expression in minimized form

CO5: Construct encoding and decoding & Classify matrix encoding techniques