SRI PADMAVATI MAHILA VISVAVIDYALAYAM:: TIRUPATI

DEPARTMENT OF APPLIED MATHEMATICS

Programme Outcomes

1. To make the students understand the fundamental axioms in mathematics and capable of developing ideas based on them.
2. Inculcate mathematical reasoning.
3. Motivate students for research studies in mathematics and related fields.
4. Provide knowledge of a wide range of mathematical techniques or tools and its applications in other scientific, technical and engineering domains.
5. Provide advanced knowledge on topics in applied mathematics, empowering the students to pursue higher degrees at reputed academic institutions.

I SEMESTER

AM 101- ALGEBRA

At the end of the course, the students will be able to
CO 1: Apply the concepts of G-sets and class equation to solve the problems.
CO 2: Utilize the concepts of Sylow theorems to find the number of subgroups of different orders.
CO 3: Understand the concepts of Euclidean ring and other forms of polynomial rings.
CO 4: Understand the concepts of modules and vector spaces.

AM 102- REAL ANALYSIS

At the end of the course, the students will be able to
CO 1: Apply the concepts of real analysis in order to study theoretical development of different mathematical techniques and their applications.
CO 2 Understand the concepts of metric spaces and generalize the concepts of sequences and series, and continuous functions in metric spaces.
CO 3: Use theory of Riemann-Stieltjes integral in solving definite integrals arising in different fields of science and engineering.
CO 4: Construct rigorous mathematical proofs of basic results in real analysis and appreciate how abstract ideas and regions methods in mathematical analysis can be applied to important practical problems.

AM 103- TOPOLOGY

At the end of the course, the students will be able to
CO 1: Understand the concepts of topological spaces and having a grasp on basic definitions.
CO 2: Apply the concepts of continuity and compactness to the metric spaces and characterize compact metric spaces.
CO 3: Differentiate T_1-Spaces and Hausdorff space.
CO 4: Understand the Urysohn's lemma and Tietze extension theorem
CO 5: Apply the concept of connectedness to the real line and know the use of Weierstrass Approximation Theorem

AM 104- DISCRETE MATHEMATICS

At the end of the course, the students will be able to
CO 1: To construct mathematical arguments using logical connectives and quantifiers.
CO 2: Validate the correctness of an argument using statement and predicate calculus.
CO 3: Understand how lattices and Boolean algebra are used as tools in mathematical models in the study of networks.
CO 4: Learn how to work with some of the discrete structures which include sets, relations, functions, digraphs and recurrence relations.

AM 105 – Ordinary Differential Equations

At the end of the course, the students will be able to
CO 1: Understand the concept and applications of eigen value problems.
CO 2: Obtain power series solutions of several important classes of second order Ordinary Differential Equations at regular singular points
CO 3: Differentiate various kinds of special functions in detail, their properties and relations.
CO 4: Understand the existence and uniqueness of solutions and also emphasizes the rigorous justification of methods for approximating solutions in pure and applied mathematics.
CO 5: Solve problems of ordinary differential equations arising in various fields.

II SEMESTER

AM 201 - COMPLEX ANALYSIS

At the end of the course, the students will be able to
CO 1: Solve the problems on Mobius transformations & Cauchy-Riemann equations.
CO 2: Understand Cauchy's integral theorems and Cauchy's integral formula.
CO 3: Demonstrate the concepts on power series and Laurent's series in problem solving.
CO 4: Compute the residues at poles of the functions.

AM 202 – C PROGRAMMING

At the end of the course, the students will be able to
CO 1: Understand the data types, operators and features of C language.
CO 2: Implement programs using control statements like if, for, while and do-while.
CO 3: Implement programs using arrays.
CO 4: Differentiate pointers, arrays and functions.
CO 5: Understand the concepts of Structures, Unions and Files in C.

AM 203 –Principles of Mechanics

At the end of the course, the students will be able to
CO 1: Apply the variational principle in order to derive the equations of motion using Lagrangian and Hamiltonian equations.
CO 2: Understand the techniques of Canonical transformations, Poisson and Lagrange's brackets.
CO 3: Understand the concepts of stress and strain tensors and to derive their relation using Hooke's Law.
CO 4: Gain knowledge about the properties of fluids and to analyze the fluid motion.

AM 204 - Partial Differential Equations

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

CO 1: Understand various methods which are useful to solve partial differential equations.

CO 2: Solve the first order linear PDE's by using Charpit's method.

CO 3: Determine the solutions of linear PDE's of second and higher order with constant coefficients.

CO 4: Classify second order PDE and solve them by using separation of variable method.

AM 205 – OPERATIONS RESEARCH

After learning the course students able to

1. Solve Linear Programming Problems and to impart knowledge in concepts and tools of Operations Research
2. Solve Linear Programming Problems using Dual simplex method
3. Solve Transportation and Assignment Problems
4. Understand the concept of Game theory, PERT/ CPM with real life applications.

III SEMESTER

AM 301 - FUNCTIONAL ANALYSIS

At the end of the course, the students will be able to
CO 1: Understanding of the concepts of Banach Spaces and its role in Mathematics.
CO 2: Apply the concept of conjugate of a Banach space and open mapping theorem.
CO 3: Understanding of the concepts of Hilbert Spaces and its conjugate.
CO 4: Analyze adjoint, self adjoint, normal and unitary operators.
CO 5: Understand the concepts of Spectral theory and spectrum of an operator.

AM 302 (A) – INTERNAL ELECTIVE-I - MATHEMATICAL STATISTICS

At the end of the course, the students will be able to
CO 1: Learn the fundamental concept of statistics and techniques required for data analysis
CO 2: Apply statistical techniques which are widely used in practical analysis of any data.
CO 3: Recognize common probability distributions for discrete and continuous variables.
CO 4: Understand the central limit theorem and large-sample approximations for common statistics.

AM 302 (B) - INTERNAL ELECTIVE-I - ADVANCED ALGEBRA

At the end of the course, the students will be able to
CO 1: Understand the concepts of fields, extension of fields and irreducible polynomials.
CO 2: Understand the properties of finite fields and separable extensions.
CO 3: Understand the concepts of Galois Theory.
CO 4: Apply the concepts of Galois Theory to Classical problems.

AM 302 (C) - INTERNAL ELECTIVE-I – MATHEMATICAL METHODS

At the end of the course, the students will be able to
CO 1: Solve the problems of Half Range series.
CO 2: Understand the concepts of Hamilton's principle.
CO 3: Differentiate Fredholm and Volterra Integral equations.
CO 4: Construction of Green's function and Iterative techniques.

AM 303 - INTEGRAL TRANSFORMS

At the end of the course, the students will be able to
CO 1: Using the definitions of laplace transform to find some standard results.
CO 2: Demonstrate Dirichlet's conditions by using them to evaluate Fourier series.
CO 3: Determine Laplace and Inverse Laplace transforms to standard functions.
CO 4: Apply Laplace transforms techniques to solve differential equations and integral equations.
CO 5: Apply Laplace and Fourier techniques to solve boundary value problems.

AM 304 (A) – External Elective – Mathematics for Bio-Sciences

At the end of the course, the students will be able to
CO1: Apply the fundamental statistical techniques required for data analysis.

CO2: Perform correlation, regression analysis and appropriate statistical tests for real life situations
CO3: Use the basic concepts of vector and matrix algebra for analysis of matrices and systems of linear equations.
CO4: Understand basics and formulation of linear programming problems and appreciate their limitations. solve linear programming problems using graphical method.

AM 304 (B) – External Elective – Mathematics for Social Sciences

CO1: Use the basic concepts of vector and matrix algebra for analysis of matrices and systems of linear equations.
CO2: Compute the eigen values and eigenvectors of a square matrix and use them to diagonalizable matrices when this is possible.
CO3: Verify the value of the limit of a function at a point using the definition of the limit. Understand the consequences of the Intermediate mean value theorems.
CO4: Understand the concepts of definite integrals and apply them for finding areas, volume of surfaces.
Co 5: Compute the solutions the algebraic and transcendental equations by applying different numerical techniques.
Co 6: Apply various numerical methods to solve the Simultaneous algebraic equations.

AM 305 – Fluid Mechanics

After learning the course students able to

CO 1: Understand the basic concepts of Fluid Mechanics.

CO 2: Solve some axial-symmetry flow problems.

CO 3: Understand the importance of the concepts such as stress and rate of strain tensors and their relation in viscous fluids

CO 4: Solve the viscous fluid flow problems.

IV SEMESTER

AM 401 – Numerical Analysis

From this course students able to
CO 1: Apply Power method and Jacobi's method for computation of eigenvalues and eigenvectors of a matrix.
CO 2: Understand various numerical methods for finding the solution of initial value problem of ordinary differential equations.
CO 3: Identity and analyze different types of errors encountered in numerical computing.
CO 4: Apply appropriate numerical techniques with the understanding of their limitations for solving the parabolic, elliptic and hyperbolic partial differential equations
Co 5: Identify the challenging problems in continuous mathematics (which are difficult to deal with analytically) and find their appropriate solutions accurately and efficiently.

AM 402 (A) - INTERNAL ELECTIVE-II - ANALYTICAL NUMBER THEORY

Students will be able to
CO 1: Understand various arithmetic functions and Dirichlet multiplication.
CO 2: Compute the average order of arithmetic functions.
CO 3: Analyze the properties of linear congruences and simultaneous linear congruences, Chinese remainder theorem.
CO 4: Understand the concept of Quadratic Residue.

AM 402 (B) - INTERNAL ELECTIVE-II - MEASURE AND INTEGRATION

Students will be able to
CO 1: Understand measural sets and Lebeque measure.
CO 2: Differentiate Riemann integral and Lebeque integral.
CO 3: Analyze the properties of Lebeque integral
CO 4: Understand the concept of differentiation of an integral and absolute continuity.

AM 402 (C) - INTERNAL ELECTIVE-II –Introduction to Industrial Mathematics

Students will be able to
CO 1: Understand sampling and visualization of numerical 2D and 3D graphs.
CO 2: Apply R programming to evaluate statistical methods.
CO 3: Apply various numerical techniques to solve differential equations.
CO 4: Understand the concept of Fast Fourier Transform and computer simulation of electronic signals.

AM 403 – Mathematical Modeling

Upon successful completion of this course, the student will be able to
CO 1: Understand what a mathematical model is and explain the series of steps involved in mathematical modeling process.
CO 2: Understand the different classifications of mathematical models stating with examples,
CO 3: Understand the essential features of a good model and analyze the benefits of using amathematical model.
CO 4: Identify some simple real-life problems that can be solved using mathematical models.

AM 404 – Applied Graph Theory

Upon successful completion of this course, the student will be able to
CO 1: Understand basic concepts of graphs, subgraphs and paths.
CO 2: Solve the shortest path problems using Dijikstra's algorithem.
CO 2: Understand the concepts cuts edges and bonds in trees.
CO 4: Apply Connector problem to real life situations.
CO 5: Understand the concepts of Eulerian and Hamiltonian graphs. Apply these concepts to solve Chinese postman problem and Travelling salesman problems.
CO 6: Understand the assignment problems using matchings.

Department of Applied Mathematics

I Semester

Course Code	Course Outcomes	Po1	Po2	Po3	Po4	Po5
AM101	Co1			×		
	Co2				×	
	Co3	×				
	Co4	×				
AM102	Co1				×	
	Co2	×				
	Co3				×	
	Co4					×
AM103	Co1	×				
	Co2			×		
	Co3		×			
	Co4	×				
	Co5			×		
AM104	Co1				×	
	Co2		×			
	Co3	×				
	Co4			×		
AM105	Co1	×				
	Co2		×			
	Co3				×	
	Co4	×				
	Co5					×

II Semester

Course Code	Course Outcomes	Po1	Po2	Po3	Po4	Po5
AM201	Co1		×			
	Co2	×				
	Co3				×	
	Co4					×
AM202	Co1	×				
	Co2				×	
	Co3					×
	Co4		×			
	Co5	×				
AM203	Co1				×	
	Co2	×				
	Co3					×
	Co4		×			
AM204	Co1		×			
	Co2		×			
	Co3					×
	Co4				×	
AM205	Co1				×	
	Co2		×			
	Co3		×			
	Co4					×

III Semester

Course Code	Course Outcomes	Po1	Po2	Po3	Po4	Po5
AM301	Co1	×				
	Co2		×			
	Co3	×				
	Co4			×		
	Co5					×
AM302(A)	Co1	×				
	Co2				×	
	Co3		×			
	Co4	×				
AM302(B)	Co1	×				
	Co2		×			
	Co3					×
	Co4				×	
AM302(C)	Co1		×			
	Co2	×				
	Co3			×		
	Co4				×	
AM303	Co1		×			
	Co2				×	
	Co3		×			
	Co4			×		
	Co5					×
AM304(A)	Co1				×	
	Co2					×
	Co3	×				
	Co4			×		
AM304(B)	Co1	×				
	Co2		×			
	Co3		×			
	Co4			×		
	Co5				×	
	Co6				×	
AM305	Co1	×				
	Co2				×	
	Co3		×			
	Co4					×

IV Semester

Course Code	Course Outcomes	Po1	Po2	Po3	Po4	Po5
AM401	Co1				×	
	Co2		×			
	Co3		×			
	Co4					×
	Co5					×
AM402(A)	Co1	×				
	Co2				×	
	Co3		×			
	Co4	×				
AM402(B)	Co1	×				
	Co2		×			
	Co3		×			
	Co4				×	
AM402(C)	Co1	×				
	Co2		×			
	Co3				×	
	Co4					×
AM403	Co1	×				
	Co2		×			
	Co3				×	
	Co4					×
AM404	Co1	×				
	Co2				×	
	Co3		×			
	Co4				×	
	Co5					×
	Co6		×			