

Department of Mathematics

Programme Educational Objectives

Within few years of graduation we expect the graduates to attain the following
PEO 1: Possess logical, analytical and problem solving skills.
PEO 2: Confidence to Comprehend and construct mathematical proofs independently using the learning opportunities.
PEO 3: Ability to explore the nuances of mathematical techniques and apply them to various domains.
PEO4: Be either readily employable, engage in higher learning or Indulge in research and become responsible citizens
PEO 5: Practice ethics in their profession and pass it on to generations

Programme Outcome

On completion of the Programme the students will

PO1: acquire adequate knowledge in the principles underlying standard applications of mathematics.
PO2: possess the ability to analyse and synthesize mathematics /mathematics oriented problems and use appropriate mathematical techniques, skills and modern computing tools necessary for problem solving.
PO3: be able to comprehend and analyse real world problems and also develop creativity through practical components of the curriculum.
PO4: be capable of proposing new ideas and solutions, plan and organize various tasks through the co-curricular, extra-curricular and interdisciplinary activities and are able to communicate effectively.
PO5: engage in independent and lifelong learning to become freelance mathematics tutors and are able to communicate effectively or professionals and commit to social and professional ethics.

Course Outcomes(Cos)

Name of the Course	Course Outcomes
Core V Vector Calculus and Fourier Series	<p>CO1: know about the concepts of Gradient, Divergence and Curl.</p> <p>CO2: relate the identities involving the operators.</p> <p>CO3: evaluate Line integrals and surface integrals using Gauss divergence theorem.</p> <p>CO4: evaluate surface and volume integrals using Stoke's and Green's theorem.</p> <p>CO5: obtain Fourier series for various functions.</p> <p>CO6: convert any mathematical function to trigonometric function</p>
Core VI Statics	<p>CO1: find the resultant of two or more forces acting on a particle</p> <p>CO2: understand the concepts of equilibrium of a particle under three or more forces.</p> <p>CO3: compute the moment of a force and a couple.</p> <p>CO4: obtain the equation of the line of action of the resultant.</p> <p>CO5: comprehend the effect of friction on planar motion.</p> <p>CO6: identify the centre of mass for different geometrical figures</p>
Part III Allied III Mathematical Statistics I	<p>CO1: calculate the expected values and probabilities associated with the distributions of random variables</p> <p>CO2: evaluate expectation and variance..</p> <p>CO3: identify the relationship between attributes</p> <p>CO4: describe the theoretical distributions</p> <p>CO5: apply the special continuous probability distributions in real world problems</p>
Non-Major Elective Basic Mathematics for Competitive Examinations	<p>CO1: simplify fractions easily.</p> <p>CO2: acquire enough knowledge to solve problems on ages and profit and loss.</p> <p>CO3: solve problems in ratio and proportion and partnership.</p> <p>CO4: gain knowledge in solving problems involving time and other factors.</p> <p>CO5: calculate simple interest, compound interest and true discount.</p> <p>CO6: improve their numerical aptitude</p>
Part IV - Skill Enhancement Course I Professional English for Mathematics	<p>CO1: use the mathematical term at the appropriate place</p> <p>CO2: face interviews/present papers with more confidence</p> <p>CO3: write research articles</p> <p>CO4: create mathematical content for social media</p> <p>CO5: create blogspots on important mathematical topics</p>
Core VII Discrete Mathematics	<p>CO1: know various connectives in logic.</p> <p>CO2: construct truth table for statement formulae</p> <p>CO3: convert the statement formulae to its equivalent forms.</p> <p>CO4: characterize posets, semigroups and monoids.</p> <p>CO5: examine the concepts of lattices and Boolean algebra.</p> <p>CO6: minimize Boolean functions</p>
Core VIII Dynamics	<p>CO1: interpret and illustrate the basic concepts in Kinematics</p> <p>CO2: gain knowledge about simple harmonic motion and its</p>

	<p>application in Physical situation</p> <p>CO3: recall various properties of a projectile</p> <p>CO4: describe and evaluate direct and oblique impact of bodies.</p> <p>CO5: describe the properties of the central orbits.</p> <p>CO6: analyze the effects of forces on material bodies</p>
Allied IV Mathematical Statistics-II	<p>CO1: apply and compute maximum likelihood estimation.</p> <p>CO2: Explain all aspects of parametric testing techniques including single and multi-sample tests for mean and proportion</p> <p>CO3: Determine sampling of attributes</p> <p>CO4: describe Normal, uniform, Gamma, beta, t ,F and chi-square distributions.</p> <p>CO5: apply the special continuous probability distributions in real world problems</p>
Skill Enhancement Course II Graph Theory	<p>CO1: find the degree sequence, connectivity and isomorphism of graphs.</p> <p>CO2: identify various types of graphs</p> <p>CO3: identify and differentiate Hamiltonian and Eulerian graphs.</p> <p>CO4: explain various properties of digraphs</p> <p>CO5: write adjacency and incidence matrix of a given labeled graph or digraph and vice versa.</p>
Advanced Learners Course I Combinatorics	<p>CO1: understand the Principle of Inclusion-Exclusion</p> <p>CO2: analyze the concepts of Pigeonhole Principle and its applications</p> <p>CO3: compute the generating function of a sequence</p> <p>CO4: describe the method of Generating Functions</p> <p>CO5: relate functions of a real variable with sequences of numbers</p> <p>CO6: solve recurrence relations</p>
Advanced Learners Course I Statistical Quality Control	<p>CO1: design, use, and interpret control charts for variables</p> <p>CO2: tabulate the appropriate Acceptance Sampling Plan</p> <p>CO3: estimate the non-conformance rate and improve the process quality</p> <p>CO4: characterize various types of scientific sampling</p> <p>CO5: estimate the sampling inspection in an efficient manner</p> <p>CO6: enumerate the methods of statistical process control.</p>
Core IX Real Analysis I	<p>CO1: apply the properties of real numbers.</p> <p>CO2: acquire the knowledge of sets, relations and functions.</p> <p>CO3: classify the countable, uncountable, open, closed and compact sets.</p> <p>CO4: interpret the properties of sets in Metric spaces.</p> <p>CO5: analyse the nature of sets under limits and continuity.</p> <p>CO6: identify the relation between completeness and compactness of sets in metric space.</p>
Core X Complex Analysis I	<p>CO1: specify the geometric properties of the complex number system.</p> <p>CO2: analyze differentiability of complex functions in various domains.</p> <p>CO3: identify analytic and harmonic functions.</p> <p>CO4: derive and apply bilinear transformations and cross ratio.</p> <p>CO5: examine the convergence of power series</p>

	<p>CO6: express exponential, trigonometric, hyperbolic and logarithmic functions in terms of power series</p> <p>CO7: describe the transformation of various curves and regions in the complex plane under elementary analytic functions.</p>
Core XI Abstract Algebra	<p>CO1: acquire knowledge about mapping and Euclidean algorithm.</p> <p>CO2: acquire knowledge about the concept of rings and their basic properties.</p> <p>CO3: classify the properties of different algebraic structures.</p> <p>CO4: characterize the mappings between algebraic structures.</p> <p>CO5: discuss the structure preserving mappings like homomorphism, isomorphism etc.</p> <p>CO6: solve the problems related to algebraic structures.</p>
Core XII Group Project	<p>CO1: collaborate and cooperate among themselves to execute the task.</p> <p>CO2: develop communication and teamwork skills.</p> <p>CO3: pool their expertise, knowledge and skills and complete the tasks.</p> <p>CO4: effectively manage time, execute the plan and integrate various activities.</p> <p>CO5: break down a complex problem into simple components and determine solutions for the same.</p> <p>CO6: prepare and present the report of the project in an organized manner.</p>
Elective I Number Theory	<p>CO1: know about the basic concepts of numbers.</p> <p>CO2: understand the origin of the operations of integers and algorithms relevant to it.</p> <p>CO3: identify all prime numbers in a given range using the sieve of Eratosthenes.</p> <p>CO4: solve congruences</p> <p>CO5: test primitive roots.</p> <p>CO6: apply number theory in cryptography.</p>
Skill Enhancement Course III SCILAB	<p>CO1: describe the basic features of the SCILAB software.</p> <p>CO2: use basic structures to develop code in SCILAB to handle arrays and perform mathematical operations</p> <p>CO3: demonstrate appropriate use of graphical functions</p> <p>CO4: apply the concept of structures and functions in establishing databases/ simple banking operations</p> <p>CO5: interpret and visualize application of mathematical concepts in application processing and numeric manipulations</p> <p>CO6: apply the working knowledge of SCILAB package to solve ODE's and LPP's</p>
Core XIII Real Analysis II	<p>CO1: explain and illustrate the connectedness of metric spaces and its relation to continuity of functions</p> <p>CO2: describe the concept of uniform continuity and compact sets</p> <p>CO3: gain a complete knowledge of derivatives and apply them appropriately</p>

	<p>CO4: analyze various properties of monotonic functions and functions of bounded variation</p> <p>CO5: recognize the impact of monotonicity and bounded variation in Riemann- Stieltjes Integral</p> <p>CO6: relate upper and lower integrals with Riemann- Stieltjes Integral</p>
Core XIV Complex Analysis II	<p>CO1: understand the basic idea of complex integration</p> <p>CO2: derive and apply various Cauchy's integral formulae</p> <p>CO3: express a given function as a power series in the defined region.</p> <p>CO4: identify and classify the singular points and the behaviour of a function in the neighbourhood of a singular point</p> <p>CO5: acquire knowledge about the residue of a function and various methods to find the same.</p> <p>CO6: derive and apply Cauchy residue theorem to evaluate certain types of real definite integrals</p>
Core XV Linear Algebra	<p>CO1: find basis, linear independence and dimension in a vector space.</p> <p>CO2: relate the concept of dual space and the notion of an inner product space</p> <p>CO3: identify the algebra of linear transformations and the matrix of a linear transformation</p> <p>CO4: acquire knowledge about the types of linear transformations and their properties</p> <p>CO5: discuss about the types of matrices</p> <p>CO6: apply the concept of characteristic roots and characteristic vectors of a square matrix.</p>
Elective II Operations Research	<p>CO1: recall the basic concepts of Linear Programming Problems and solve them</p> <p>CO2: explain the concept of Duality and its applications</p> <p>CO3: minimize the cost in transportation problems and assignment problems</p> <p>CO4: determine the appropriate order for a series of jobs to be done on a finite number of service facilities</p> <p>CO5: apply the optimization techniques in inventory control.</p> <p>CO6: demonstrate the applications of various optimization tools to the real life problems involving networks.</p>
Elective III - Fuzzy and Intuitionistic Fuzzy Sets	<p>CO1: compare fuzzy sets with crisp sets.</p> <p>CO2: acquire knowledge about the fuzzy logic and defuzzification methods and apply them</p> <p>CO3: acquire knowledge about Genetic Algorithms</p> <p>CO4: express the given system using associative memories.</p> <p>CO5: explain the concepts of Intuitionistic fuzzy sets and its basic properties.</p> <p>CO6: apply the methods of fuzzy sets and fuzzy logic in fuzzy control systems.</p>
Skill Enhancement Course IV Internship / Summer Training	<p>CO1: learn to use profession specific terminology.</p> <p>CO2: effectively plan and utilize ICT tools to complete the task</p> <p>CO3: apply the knowledge acquired in the campus to the task.</p>

	<p>CO4: demonstrate problem-solving and critical thinking skills.</p> <p>CO5: exhibit appropriate workplace attitudes</p> <p>CO6: manage and review their personal behavior and attitudes</p>
<p>Advanced Learners Course I Statistical Quality Control</p>	<p>CO1: calculate annuity, present value of annuities, perpetuities and redemption of loans</p> <p>CO2: acquire knowledge about mortality tables and life assurance premiums</p> <p>CO3: analyze about assurance benefit, life annuities and temporary annuities</p> <p>CO4: analyze the difference between net premiums for assurance plans and annuity plans</p> <p>CO5: relate policy values and premium conversion tables</p> <p>CO6: calculate life assurance premiums and assurance benefits</p>
<p>Advanced Learners Course II Introduction To Wavelet Theory</p>	<p>CO1: acquire knowledge about the concepts of bases, orthonormality, orthogonality and complex Fourier series</p> <p>CO2: distinguish the wavelet transform, Fourier transform in continuous and discrete cases</p> <p>CO3: apply Fourier transform to signals and describe the properties of wavelets used in continuous wavelet transform</p> <p>CO4: differentiate continuous wavelet transform and discrete wavelet transform in continuous and discrete cases</p> <p>CO5: classify the normalization of Haar bases at different scales</p> <p>CO6: analyse various conditions in restrictions on filter coefficients</p>
<p>Allied III Mathematics I (For Physics and Chemistry)</p>	<p>CO1: find the sum of binomial, exponential and logarithmic series</p> <p>CO2: find the sum of binomial, exponential and logarithmic series</p> <p>CO3: gain knowledge of real life applications of matrices.</p> <p>CO4: understand how interpolation technique is applied in real life</p> <p>CO5: know about the properties of trigonometric functions and their applications</p> <p>CO6: explain the fundamentals of the mathematics and apply while creating innovations</p>
<p>Allied IV Mathematics II (For Physics and Chemistry)</p>	<p>CO1: understand the basic concepts of calculus.</p> <p>CO2: find curvature of curves and distinguish the significance of curvature representation in different co-ordinate systems.</p> <p>CO3: find the solution of higher order differential equations.</p> <p>CO4: know about various methods of solving Partial differential equations</p> <p>CO5: acquire knowledge about the Laplace transforms and its inverse.</p> <p>CO6: obtain the Fourier series for various function</p>
<p>Allied III – Mathematics (For B.Com, B.Com(CA), B.Com(e.com))</p>	<p>CO1: calculate simple, compound interest, rate of interest etc.</p> <p>CO2: perform various operations on matrices.</p> <p>CO3: describe the concepts in Linear Programming Problem.</p> <p>CO4: solve the linear programming problem using simplex method.</p> <p>CO5: minimize the cost in transportation and assignment problems.</p> <p>CO6: interpret the concept of game theory.</p>

Programme Outcomes

On completion of the programme the students will

PO1: possess the to analyse and synthesize the concepts in mathematics and related subjects and to use appropriate mathematical techniques, skills and modern computing tools necessary for problem solving.
PO2: comprehend and analyse real world problems and also develop creativity through practical components of the curriculum.
PO3: engage in independent learning to become freelance mathematics tutors, professionals or researchers.
PO4: expose and develop technical, analytical and creative skills.
PO5: promote and uphold Self-Discipline, Leadership Qualities, Secular Outlook, National Integration and Civic Responsibility.
PO6: augment the Acquisition of Micro and Macro Skills of Tamil, Malayalam, Hindi and French Language Usages.
PO7: enhance Communicative Linguistic Competency and Employability Quotient.
PO8: exhibit consistent academic excellence and integrated personality towards lifelong learning.

Programme Specific Outcomes

On completion of the programme the students will

PSO1: acquire adequate knowledge in the basic principles of Mathematics and allied subjects.
PSO2: have a sound mathematical foundation that improves analytical and logical skills.
PSO3: be able to solve real life problems depicted in Mathematical form.

Course Outcomes

Semester	Course Code	Course Name	Course Outcomes	
I	121M01	Part III Core I Algebra and Calculus	CO1	test the convergency and divergency of an infinite series.
			CO2	apply binomial, exponential and logarithmic series to determine the sum of an infinite series.
			CO3	transform and solve algebraic equations.
			CO4	determine the curvature of curves in different co-ordinate systems.
			CO5	contextually acquire skill in comprehending and applying the properties of Beta and Gamma functions.
	121M02	Part III Core II Differential Equations and Laplace Transforms	CO1	solve first order and higher degree differential equations
			CO2	solve the linear differential equations with constant and variable coefficients.
CO3			solve simultaneous differential equations.	

			CO4	formulate partial differential equations and solve first order partial differential equations.
			CO5	solve differential equations using Laplace Transforms
II	221M03	Part III Core III Analytical Geometry of Three Dimensions	CO1	apply the concepts of direction ratios and direction cosines in planes and straight lines
			CO2	use the concepts of straight lines through planes.
			CO3	discuss the various aspects of sphere and sections of a sphere.
			CO4	identify various types of cone and obtain their equations.
			CO5	use various types of coincides and solve simple geometrical problems
	221M04	Part III Core IV- Operations Research with TORA	CO1	solve the Linear Programming Problem using graphical, simplex and duality methods
			CO2	minimize the cost in transportation problems and assignment problems
			CO3	interpret the concept of game theory
			CO4	apply the optimization techniques in inventory control
			CO5	demonstrate the applications of various optimization tools to the real life problems involving networks.

Sem	Course Code	Course Name	Course Outcomes	
I	121AS1/ 121AK1/ 121AF1	Part III - Allied I Basic Mathematics and Statistics	CO1	solve a system of linear equations by direct and iterative methods
			CO2	estimate a data using interpolation methods and determine the derivatives of functions using various interpolation methods.
			CO3	evaluate integrals using various numerical techniques
			CO4	apply correlation concepts to determine the correlation coefficients.
			CO5	derive regression equations and also recall the basic properties of Normal distributions
	121AW1	Part III - Allied I Mathematics for Statistics I	CO1	know the basic concepts of convergency and divergency of series.
			CO2	compute the summation of binomial, exponential and logarithmic series.
			CO3	determine the roots of a algebraic equations
			CO4	perform Mathematical operations of complex numbers in trigonometric form
			CO5	solve simple trigonometric function using expansion
II	221AS2	Part III	CO1	construct truth table and normal forms for

	/221AK2/ 221AG2/ 221AF2	Allied II Discrete Mathematics		statement formulae using connectives in logic
			CO2	distinguish between relations and functions and describe various associated properties
			CO3	simplify Boolean expressions and manipulate lattices in appropriate context.
			CO4	recall various properties of graphs and to prove results related to path, cycles, connectivity and matrix representations.
			CO5	distinguish the types of phrase structure grammar and manipulate various states involved in finite state automata
	221AW2	Part III Allied II Mathematics for Statistics II	CO1	compute the derivatives of functions.
			CO2	compute successive derivatives
			CO3	evaluate integrals using various methods
			CO4	know about Laplace transform of various functions.
			CO5	obtain Fourier series of various functions.