



**PRIST**  
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UNIVERSITY  
NAAC ACCREDITED  
THANJAVUR - 613 403 - TAMIL NADU

Program Outcomes and Course outcomes of  
Department of Mathematics

Programme offered:

S.No	ProgrammeName	POandCO
1.	B.Sc.,Mathematics	Yes
2.	M.Sc.,Mathematics	Yes
3.	M.Phil.,Mathematics	Yes

B.Sc.,Mathematics-2020-2021

PROGRAMMEOUTCOMES	
PO1	<input type="checkbox"/> To understand and apply the knowledge of mathematical science to solve real-life problems.
PO2	<input type="checkbox"/> To design the methodology suitable to the problem on hand.
PO3	<input type="checkbox"/> To analyze and interpret solution outputs and generate new ideas based on the outputs.
PO4	<input type="checkbox"/> To lead, work in a team, and give priority to the success of the aim of the team.
PO5	<input type="checkbox"/> To recognize and learn the importance of life-long learning.
PROGRAMSPECIFICOUTCOME	
PSO1	To think in a critical manner.
PSO2	To know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
PSO3	To formulate and develop mathematical arguments in a logical manner.
PSO4	To acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.
PSO5	To understand, formulate, and use quantitative models arising in social science, business, and other contexts.
PEO1	To provide students with knowledge, abilities, and insight in mathematics and related fields.
PEO2	To enable them to work as a mathematical professional or qualify for training as a scientific researcher.
PEO3	To develop the ability to utilize the mathematical problem-solving methods such as analysis, modeling, programming, and mathematical software applications in addressing real-world problems and heuristic issues.
PEO4	To enable students to recognize the need for and the ability to engage in life-long learning.

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Course outcomes (Cos) 2020-2021  
B.Sc., Mathematics

S.No	Semester	CourseCode/Name	CourseOutcome
CO1	I	Basic Mathematics –I (Differential Calculus and Vector Differentiation)	<input type="checkbox"/> To manipulate and solve problems using successive differentiation and vector operators. <input type="checkbox"/> To calculate maxima and minima for functions of two variables and the Lagrange multiplier method. <input type="checkbox"/> To solve curvature, evolutes, asymptotes, and envelopes in simple cases. <input type="checkbox"/> To calculate gradient, divergence, and curl vectors in $\mathbb{R}^3$ .
CO2	I	Basic Mathematics –II ( Trigonometry, Analytical Geometry 3D And Calculus)	<input type="checkbox"/> To manipulate the expansions of basic trigonometric functions. <input type="checkbox"/> To calculate the summation of trigonometric series and Gregory's series. <input type="checkbox"/> To understand the concept of analytical geometry and be able to use properties of spheres, cones, and cylinders in real cases. <input type="checkbox"/> To manipulate and solve problems using integral calculus.
CO3	I	Allied- I- Paper –I Programming In C	<input type="checkbox"/> To design C programs for problems. <input type="checkbox"/> To write and execute C programs for simple applications.
CO4	I	CoreIII Basic Mathematics-III Differential Equations	<input type="checkbox"/> To understand the theory of, and be able to solve (in simple cases), ordinary differential equations and partial differential equations, and standard types of linear equations. <input type="checkbox"/> To understand the theory of Fourier and Laplace transforms and apply it to the solution of ordinary and partial differential equations.
CO6	II	Core -IV Basic Mathematics IV Vector integration And Classical Algebra)	<input type="checkbox"/> To understand the theory of, and be able to solve problems in Green's Theorem, Stokes' Theorem, and Gauss's Divergence Theorem. <input type="checkbox"/> To manipulate the relation between roots and coefficients, symmetric functions of the roots in terms of the coefficients, and the transformation of equations. <input type="checkbox"/> To calculate summation related to binomial, exponential, and logarithmic series.

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CO7	II	Allied- I- Paper –II Fundamentals Of Computing	To use and define the vocabulary associated with computer technology. To identify the components of computer systems and state their function. To differentiate between the various operating systems and application programs that are available for personal computers. To understand the relationship between computer hardware and software. To identify computer tools that may be applied to assist with various common applications.
CO8	III	Core-V Number Theory	<input type="checkbox"/> To solve problems in elementary number theory. <input type="checkbox"/> To apply elementary number theory. <input type="checkbox"/> To develop a deeper conceptual understanding of the theoretical basis of number theory and cryptography. <input type="checkbox"/> To define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime factorization.
CO10	III	Core-VI Numerical Analysis	<input type="checkbox"/> To solve problems in algebraic and transcendental equations. <input type="checkbox"/> To understand about finite differences. <input type="checkbox"/> Students develop and analyze numerical techniques. <input type="checkbox"/> To apply various numerical methods to solve ordinary differential equations. <input type="checkbox"/> To get research inquiry and analytical thinking abilities.
CO11	III	Allied-II-Paper-I- Mathematical Statistics I	<input type="checkbox"/> To get the methodology for the planning and execution for any scientific enquiry. <input type="checkbox"/> To learn statistical techniques and statistical data. <input type="checkbox"/> To understand the concept of random variables. <input type="checkbox"/> To understand the concept of the central limit theorem for i.i.d. random variables. <input type="checkbox"/> To gather knowledge of constructions and uses of fixed and chain-based index numbers.
CO12	III	Allied-II Mathematical Statistics II	To learn the statistical techniques and statistical data. To understand the concept of correlation and regression. To get knowledge of tests of significance based on parametric and non-parametric tests. To get the methodology for the planning and execution for any scientific enquiry.

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CO13	IV	Core -VIII Operations Research	To use OR techniques in business tools for decision making. To develop PERT and CPM networks and find the shortest path. To understand the concept of sequencing problems and game theory. To get knowledge about inventory theory.
CO14	IV	Core- IX Astronomy	<input type="checkbox"/> To understand about celestial objects. <input type="checkbox"/> To get knowledge about eclipses. <input type="checkbox"/> To apply in different zones of Earth astronomical refraction. <input type="checkbox"/> To apply in different phases of the Moon.
CO15	IV	Allied-II Mathematical Statistics III	To learn statistical techniques and statistical data. To understand the concept of various distributions. A knowledge of tests of significance based on parametric and non-parametric tests. Design/development of solutions. To understand the concept of sampling theory.
CO16	V	Core-X Modern Algebra	<input type="checkbox"/> To get knowledge and understand about algebraic structures like groups, rings, and vector spaces. <input type="checkbox"/> To understand about morphisms.
CO17	V	Core -XI Real Analysis	<input type="checkbox"/> To gain knowledge about connectedness, completeness, and compactness. <input type="checkbox"/> To understand the Riemann integrals and the fundamental theorem of calculus. <input type="checkbox"/> To analyze the problem and find the solution. An ability to construct free-body diagrams and calculate the reactions necessary to ensure static equilibrium. <input type="checkbox"/> To understand the analysis of couples and friction.
CO18	V	Core - XII Statics	<input type="checkbox"/> To construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium. <input type="checkbox"/> To understand the analysis of couples and friction.

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CO19	V	Core-XIII Programming in C++	<p>To understand and design the solution to a problem using object-oriented programming concepts.</p> <p>To reuse the code with extensible class types, user-defined operators, and function overloading.</p> <p>To understand functions and parameter passing.</p> <p>To understand object-oriented design and programming.</p>
CO20	V	Elective Paper- I Fuzzy Analysis	<p><input type="checkbox"/> To get the knowledge and understand classical sets vs fuzzy sets (FS) – types of FS – operations on FS.</p> <p><input type="checkbox"/> To get the knowledge and understand Zadeh's extension principle.</p> <p><input type="checkbox"/> To get the knowledge and understand fuzzy relations – fuzzy relational equations – possibility theory.</p> <p><input type="checkbox"/> To get the knowledge and understand fuzzy measures. Fuzzy relation equations based on sup-compositions and fuzzy relation equations based on wi-composition.</p>
CO21	V	Elective Paper-I Formal Languages And Automata Theory	<p><input type="checkbox"/> To design the pushdown automata.</p> <p><input type="checkbox"/> Comprehend the hierarchy of problems arising in the computer sciences.</p> <p><input type="checkbox"/> To get an idea for designing compiler design.</p> <p><input type="checkbox"/> To get knowledge about regular expressions and computability theory.</p> <p><input type="checkbox"/> To acquire a fundamental understanding of the core concepts in automata theory and formal languages.</p> <p><input type="checkbox"/> To design grammars and automata (recognizers) for different language classes.</p> <p><input type="checkbox"/> To identify formal language classes and prove language membership properties.</p> <p><input type="checkbox"/> To prove and disprove theorems establishing key properties of formal languages and automata.</p>
CO22	VI	Core – XIV Complex Analysis	<p><input type="checkbox"/> To represent complex numbers algebraically and geometrically,</p> <p><input type="checkbox"/> To define and analyze limits and continuity for complex functions as well as consequences of continuity,</p> <p><input type="checkbox"/> To apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra,</p> <p><input type="checkbox"/> To analyze sequences and series of analytic functions and types of convergence,</p> <p><input type="checkbox"/> To evaluate complex contour integrals directly</p>

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			<p>and by the fundamental theorem.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> To represent functions as Taylor, power, and Laurent series, classify singularities and poles, find residues, and evaluate complex integrals using the residue theorem.</li> </ul>
CO23	VI	Core-XV Dynamics	<ul style="list-style-type: none"> <li><input type="checkbox"/> To get knowledge of internal forces and moments in members.</li> <li><input type="checkbox"/> To calculate centroids and moments of inertia.</li> <li><input type="checkbox"/> To get knowledge of kinematic and kinetic analyses and energy and momentum methods for particles and systems of particles.</li> <li><input type="checkbox"/> To get knowledge of kinematic and kinetic analyses and energy and momentum methods for rigid bodies.</li> </ul>
CO24	VI	Core-XVI Discrete Mathematics	<ul style="list-style-type: none"> <li><input type="checkbox"/> To successfully complete the course will demonstrate the following outcomes by tests, homework, and written reports.</li> <li><input type="checkbox"/> To get knowledge of relations and functions.</li> <li><input type="checkbox"/> To get knowledge of logical reasoning as used in mathematics to prove theorems, in computer science to verify the correctness of programs, and in physical science to draw conclusions.</li> <li><input type="checkbox"/> To find the solutions of recurrence relations.</li> <li><input type="checkbox"/> To study ordering relations.</li> </ul>
CO25	VI	Elective Paper-II Graph Theory	<ul style="list-style-type: none"> <li><input type="checkbox"/> To get knowledge in Graph Theory.</li> <li><input type="checkbox"/> To understand the properties of Graph Theory.</li> <li><input type="checkbox"/> To understand the concept of Kuratowski's graph.</li> <li><input type="checkbox"/> To understand Matrix representation of graphs.</li> </ul>
CO26	VI	Elective Paper-II Mathematica L Modelling	<p>To successfully complete this module, you will be able to demonstrate knowledge of correct methodology when developing mathematical models.</p> <p>To design and develop effective solutions.</p>

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CO27	VI	Free Elective Indirect Taxes	To gain knowledge of various provisions of central excise, customs law, service tax, VAT, and sales tax, and their applications in different circumstances.
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B.Sc., Curriculum Mapping  
 Programme Educational Objectives vs Programme Outcome

PO PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*	*		*	
PEO2		*		*	
PEO3		*			
PEO4					*

B.Sc. Curriculum Mapping

Programme Outcome vs Courses Outcome

PO CO	PO1	PO2	PO3	PO4	PO5
CO1	*	*	*	*	*
CO2	*	*	*	*	*
CO3	*	*	*	*	*
CO4	*	*	*	*	*
CO5	*	*	*	*	*
CO6	*	*	*	*	*
CO7				*	*
CO8	*	*	*	*	*
CO9				*	*
CO10	*	*	*	*	*
CO11			*	*	*
CO12	*	*	*	*	*
CO13	*	*	*	*	*
CO14	*	*	*	*	*
CO15	*	*	*	*	*
CO16			*	*	*
CO17	*	*	*	*	*
CO18	*	*	*	*	*
CO19			*	*	*
CO20	*	*	*	*	*
CO21	*	*	*	*	*
CO22	*	*	*	*	*
CO23	*				
CO24					
CO25	*				
CO26					
CO27					

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PROGRAMMEOUTCOMES	
PO1	To apply the knowledge of mathematical science to solve real-life problems.
PO2	To design methodologies suitable for the encountered problems.
PO3	To analyze and interpret solutions and generate new ideas based on the outputs.
PO4	To inculcate researchability in mathematical science.
PO5	To lead, work in teams, and prioritize the success of the team.
PROGRAMSPECIFICOUTCOME	
PSO1	<input type="checkbox"/> To develop problem-solving skills and apply them independently to problems in pure and applied mathematics.
PSO2	<input type="checkbox"/> To assimilate complex mathematical ideas and arguments.
PSO3	<input type="checkbox"/> To improve personal learning and performance.
PSO4	<input type="checkbox"/> To develop abstract mathematical thinking.
PEO1	<input type="checkbox"/> To equip students with knowledge, abilities, and insights in mathematics and related fields.
PEO2	<input type="checkbox"/> To enable students to work as mathematical and scientific researchers and as part of a team.
PEO3	<input type="checkbox"/> To equip students with the ability to translate and synthesize their understanding in relation to nature, human development, and other contexts.
PEO4	<input type="checkbox"/> To develop the ability to utilize mathematical problem-solving methods such as analysis, modeling, programming, and software applications in real-world problems and heuristic issues.
PEO5	<input type="checkbox"/> To recognize the need for and engage in lifelong learning.

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Courseoutcomes(Cos)-2020-2021  
M.Sc.,Mathematics

S.No	Semester	CourseCode/Name	CourseOutcome
CO1	1	Algebra	<ul style="list-style-type: none"> <li><input type="checkbox"/> To understand the concept of Group Theory and Ring Theory.</li> <li><input type="checkbox"/> To acquire knowledge of Linear Transformations.</li> <li><input type="checkbox"/> To comprehend the analysis of Fields.</li> <li><input type="checkbox"/> To develop research inquiry and analytical thinking abilities.</li> <li><input type="checkbox"/> To simplify algebraic expressions to analyze functions and graphs.</li> <li><input type="checkbox"/> To create graphs using key features.</li> </ul>
CO2	1	RealAnalysis	<ul style="list-style-type: none"> <li><input type="checkbox"/> To understand the notion of the Riemann-Stieltjes integral and prove elementary properties of the Riemann integral and the Fundamental Theorem of Calculus.</li> <li><input type="checkbox"/> To describe infinite series, infinite products, and sequences of functions.</li> <li><input type="checkbox"/> To grasp multivariable differential calculus, implicit functions, and extremum problems.</li> <li><input type="checkbox"/> To outline the fundamental properties of real numbers that lead to the formal development of real analysis.</li> <li><input type="checkbox"/> To comprehend rigorous arguments that develop the theory underpinning real analysis.</li> <li><input type="checkbox"/> To demonstrate understanding of limits and their use in sequences, series, differentiation, and integration.</li> <li><input type="checkbox"/> To construct rigorous mathematical proofs of basic results in real analysis.</li> </ul>

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CO3	I	Ordinary Differential Equations	<p>To solve first-order differential equations and systems with periodic coefficients, and apply these methods to solve practical problems.</p> <p>To gain knowledge of the Sturm-Liouville problem and its applications.</p> <p>To understand the stability of stationary solutions in differential equations.</p> <p>To solve first-order differential equations using standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases.</p> <p>To find the complete solution of a non-homogeneous differential equation as a linear combination of the complementary function and a particular solution.</p> <p>To solve a non-homogeneous differential equation with constant coefficients using the method of undetermined coefficients.</p> <p>To find the complete solution of a differential equation with constant coefficients using the method of variation of parameters.</p>
CO4	I	Programming In C++	<p>To understand the core concepts of C++ including encapsulation, inheritance, and polymorphism.</p> <p>To explain various data types, operations, and functions in C++.</p> <p>To comprehend the concepts of constructors and destructors.</p> <p>To elucidate the concepts of inheritance, types of inheritance, polymorphism, and virtual functions.</p> <p>To describe the types of streams and the format of input and output operations in C++.</p> <p>To differentiate between procedural and object-oriented paradigms, and apply concepts related to streams, classes, functions, data, and objects.</p>
CO5	II	Classical Dynamics	<p>To complete the course, students will demonstrate the following outcomes by tests, homework, and written reports:</p> <p>To get knowledge of mechanical systems, virtual work, energy, and momentum.</p> <p>To understand the concept and applications of Lagrange's equation.</p>

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			<input type="checkbox"/> Have a deep understanding of the mathematical foundations of quantum mechanics. <input type="checkbox"/> To solve the Schrödinger equation using various approximation methods. <input type="checkbox"/> To have a basic understanding of relativistic effects in quantum mechanics.
CO6	II	Fluid Dynamics	<input type="checkbox"/> To gain knowledge of two-dimensional and conformal mapping. <input type="checkbox"/> To understand how to solve problems in viscous flow, specifically steady viscous flow. <input type="checkbox"/> To identify how properties of fluids change with temperature and their effects on pressure and fluid flow. <input type="checkbox"/> To describe fluid pressure and its measurement. <input type="checkbox"/> To define the relationship between pressure and elevation as it relates to manometers, barometers, and other pressure-measuring devices. <input type="checkbox"/> To calculate forces on a plane submerged in a static fluid. <input type="checkbox"/> To calculate buoyancy on a body submerged in a static fluid. <input type="checkbox"/> To use the general energy equation to calculate changes in fluid flow for circular and non-circular pipes for incompressible fluids.
CO7	I	Research Led seminar	To know the emerging areas in research
CO8	II	Complex Analysis	On completion of this unit, successful students will be able to: Understand the significance of harmonic functions. Comprehend the Riemann zeta function.

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			<p>On completion of this unit, successful students will be able to:</p> <p>Gain knowledge of periodic functions and the Weierstrass function.</p> <p>Develop abilities in conformal mapping.</p> <p>Analyze functions of a complex variable using series expansions, line integrals, geometry, and partial differential equations.</p> <p>Explain the major theorems that distinguish complex analysis from real analysis.</p> <p>Apply complex analysis to compute geometric mappings and real integrals.</p>
CO9	II	Measure Theory And Integration	<p>To introduce the concepts of measure and integral with respect to a measure,</p> <p>To show their basic properties,</p> <p>To provide a basis for further studies in Analysis, Probability, and Dynamical Systems.</p> <p>To identify, describe, and apply emerging technologies in teaching and learning environments.</p> <p>To demonstrate knowledge, attitudes, and skills of digital age work and learning.</p> <p>To plan, design, and assess effective learning environments and experiences.</p> <p>To implement curriculum methods and strategies that use technology to maximize student learning.</p> <p>To develop technology-enabled assessment and evaluation strategies.</p>
CO10	II	Mathematical Methods	<p>To understand the significance of Calculus of Variations, Fourier Transforms, and Hankel Transforms.</p> <p>To gain knowledge of linear integral equations and the method of successive approximations.</p> <p>To understand the transformation from one function into another.</p> <p>To communicate both orally and verbally about music of all genres and styles in a clear and articulate manner (comprehension).</p> <p>To analyze and interpret texts within a written context.</p> <p>Students will be able to judge the reasonableness of obtained solutions.</p> <p>To evaluate theory and critique research within the discipline.</p>

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CO11	II	Graph Theory	<p>To gain knowledge in Graph Theory.</p> <p>To understand the properties of Graph Theory.</p> <p>To grasp the concept of Kuratowski's graph.</p> <p>To understand the matrix representation of graphs.</p>
CO11	II	Mathematical Probability	<p>To gain knowledge and understanding of the role of probability theory in cognitive processes, and describe basic concepts in probability theory and mathematical statistics.</p> <p>To calculate the probabilities of events using appropriate methods.</p> <p>To be familiar with types of random variables, be able to define and calculate their numerical characteristics.</p> <p>To evaluate and interpret the numerical characteristics of samples and population parameters.</p> <p>To formulate and test hypotheses, and draw appropriate conclusions.</p> <p>To understand important distributions.</p>
CO12	II	Mathematical Modeling	<p>Having successfully completed this module, you will be able to demonstrate knowledge and understanding of:</p> <p>The concept of mathematical modeling.</p> <p>The mathematical descriptions of some real systems.</p> <p>The correct methodology when developing mathematical models.</p> <p>Skills in applications.</p> <p>Designing and developing solutions.</p>
CO13	II	Research Methodology	<p>To familiarize participants with the basics of research and the research process.</p> <p>To have basic knowledge of qualitative research techniques.</p> <p>To have adequate knowledge of measurement and scaling techniques as well as quantitative data analysis.</p> <p>To get the methodology for the planning and execution of any scientific inquiry.</p>
CO14	II	Participation in Bounded Research	<p>To do the allotted work in research.</p> <p>To learn how to conduct a review of literature.</p>
CO15	III	Topology	<p>Upon successful completion of this course, the student will be able to:</p> <p>Distinguish among open and closed sets in various topological spaces.</p> <p>Understand the fundamental topologies of discrete spaces.</p>

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			<p>and indiscrete.</p> <p>Identify when a collection of subsets forms a topological space.</p> <p>Recognize when two topological spaces are homeomorphic.</p> <p>Understand concepts like distance between sets, connectedness, denseness, compactness, and separation axioms.</p> <p>Explain the notion of a metric space.</p> <p>Use open balls in metric spaces, construct the metric topology, and define open and closed sets of the space.</p>
CO16	III	Stochastic Processes	<p>On successful completion of the course, students should be able to:</p> <p>Explain the fundamentals of probability theory, random variables, and random processes.</p> <p>Understand the mathematical concepts related to probability theory and random processes.</p> <p>Characterize random processes and their properties.</p> <p>Formulate and solve engineering problems involving random processes.</p> <p>Analyze given probabilistic models of problems.</p> <p>Make precise statements about random processes.</p> <p>Use computational techniques to generate simulation results.</p>
CO17	III	Advanced Numerical Analysis	<p>To solve an algebraic or transcendental equation using an appropriate numerical method.</p> <p>To solve a differential equation using an appropriate numerical method.</p> <p>To evaluate a derivative at a value using an appropriate numerical method.</p> <p>To solve a linear system of equations using an appropriate numerical method.</p> <p>To calculate a definite integral using an appropriate numerical method.</p> <p>Skill in finding the roots of the given equation.</p>

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CO18	III	Cryptography	<p>To analyze key agreement algorithms to identify their weaknesses.</p> <p>To describe the ethical issues related to the misuse of computer security.</p> <p>To develop code to implement a cryptographic algorithm or write an analysis report on any existing security product.</p> <p>Cryptographic Algorithms: Symmetric Encryption and Message Confidentiality, Public-Key Cryptography and Message Authentication.</p> <p>The Network Security: Internet Security Protocols and Standards, Internet Authentication Applications, Wireless Network Security.</p> <p>Software Security and Trusted Systems.</p>
CO19	III	Algebraic Coding Theory	<p>Upon completion of this course, students should be able to:</p> <p>Define channel capacities and properties using Shannon's Theorems.</p> <p>Construct efficient codes for data on imperfect communication channels.</p> <p>Generalize the discrete concepts to continuous signals on continuous channels.</p> <p>Define and illustrate main concepts and prove fundamental theorems concerning error-correcting codes covered in the course.</p> <p>Calculate the parameters of given codes and their dual codes using standard matrix and polynomial operations.</p> <p>Encode and decode information by applying algorithms associated with well-known codes.</p> <p>Compare the error-detecting and error-correcting capabilities of given codes for a binary symmetric channel.</p>
CO20	III	Writing for the media	To know the intricacies of Media
CO21	III	Applicable Mathematical Techniques	<p>To use OR techniques in business tools for decision making.</p> <p>To develop assignment problems and replacement problems.</p> <p>To understand the concept of decision analysis and game theory.</p> <p>To get knowledge about interpolation.</p>

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CO22	III	Biomedical Instrumentation	<p>To familiarize students with various medical equipments and their technical aspects.</p> <p>To introduce students to the measurements involved in some medical equipment.</p> <p>To understand diagnosis and therapy-related equipments.</p> <p>To understand the problem and have the ability to identify the necessity of an equipment for a specific problem.</p>
CO23	III	Green Chemistry	<p>To understand the environmental status and evolution.</p> <p>To know about pollution and its prevention measures.</p> <p>To familiarize with green chemistry.</p> <p>To learn about bio-catalytic reactions.</p> <p>To understand about vitamins and antibiotics.</p>
CO24	III	Internet and Web Design	<ul style="list-style-type: none"> <li><input type="checkbox"/> Acquire knowledge about functionalities of the Internet.</li> <li><input type="checkbox"/> Acquire knowledge about functionalities of the World Wide Web.</li> <li><input type="checkbox"/> Explore markup languages' features and create interactive webpages using them.</li> <li><input type="checkbox"/> Learn and design client-side validation using scripting languages.</li> <li><input type="checkbox"/> Acquire knowledge about open-source JavaScript libraries.</li> <li><input type="checkbox"/> Design frontend webpages and connect to the backend databases.</li> </ul>
CO25	III	Insurance Services	<ul style="list-style-type: none"> <li><input type="checkbox"/> To learn the principles of insurance and the functions of life and general insurances and the IRDA.</li> </ul>
CO26	III	Counselling Psychology	<ul style="list-style-type: none"> <li><input type="checkbox"/> To learn counseling and its process.</li> </ul>
CO27	III	Herbal Medicine	<ul style="list-style-type: none"> <li><input type="checkbox"/> To develop individualized goals and plans for wellness.</li> <li><input type="checkbox"/> To gather information about past and current health status.</li> <li><input type="checkbox"/> To create a comprehensive assessment of health inputs.</li> </ul>

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CO28	III	Societal Project(Scaffold Research)	<input type="checkbox"/> To describe the inter-linkage of institutions and their effects on individuals. <input type="checkbox"/> To explain how social change factors affect social structures and individuals. <input type="checkbox"/> To describe how culture and social structure vary across time and place and with what effect. <input type="checkbox"/> To identify examples of specific social policy implications using reasoning about social structural effects.
CO29	IV	Functional Analysis	<p>Upon successful completion of this course, the student will be able to:</p> Distinguish among open and closed sets on different topological spaces. Know the two fundamental topologies: discrete and indiscrete topologies. Identify precisely when a collection of subsets of a given set equipped with a topology forms a topological space. Understand when two topological spaces are homeomorphic. Identify the concepts of distance between two sets; connectedness, denseness, compactness, and separation axioms. Develop research inquiry and analytical thinking abilities.
CO30	IV	Visual Programming	To do visual programs by using the Visual Basic work environment. Distinguish and compose events and methods. Recognize and arrange control structures. Understand the development of applications. Understand the use of various system libraries.

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CO31	IV	Number Theory	<ul style="list-style-type: none"> <li><input type="checkbox"/> To solve problems in elementary number theory.</li> <li><input type="checkbox"/> To apply elementary number theory to cryptography.</li> <li><input type="checkbox"/> To develop a deeper conceptual understanding of the theoretical basis of number theory and cryptography.</li> <li><input type="checkbox"/> To do research inquiry and analytical thinking abilities.</li> <li><input type="checkbox"/> To find quotients and remainders from integer division.</li> <li><input type="checkbox"/> To apply Euclid's algorithm and backward substitution.</li> <li><input type="checkbox"/> To understand the definitions of congruences, residue classes, and least residues.</li> <li><input type="checkbox"/> To determine multiplicative inverses, modulo <math>mn</math>, and use them to solve linear congruences.</li> </ul>
CO32	IV	Combinatorial Mathematics	<ul style="list-style-type: none"> <li><input type="checkbox"/> To apply diverse counting strategies to solve varied problems involving strings, combinations, distributions, and partitions.</li> <li><input type="checkbox"/> To write and analyze combinatorial, algebraic, inductive, and formal proofs of combinatoric identities.</li> <li><input type="checkbox"/> To recognize properties of graphs such as distinctive circuits or trees, and become familiar with those that naturally appear in various other fields of mathematics and computer science.</li> <li><input type="checkbox"/> To learn how to use these structures to represent mathematical and applied questions, and become comfortable with the combinatorial tools commonly used to analyze such structures.</li> <li><input type="checkbox"/> To apply mathematical concepts and principles to perform numerical and symbolic computations.</li> <li><input type="checkbox"/> To use technology appropriately to investigate and solve mathematical and statistical problems.</li> <li><input type="checkbox"/> To write clear and precise proofs.</li> </ul>

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CO33	IV	Design and Analysis of Algorithms	To argue the correctness of algorithms using inductive proofs and invariants, to analyze worst-case running times of algorithms using asymptotic analysis, and to design and conduct experiments to address questions germane to the discipline. Students will be able to design and administer surveys that address questions appropriate to the discipline, conduct interviews and focus groups that address questions relevant to the discipline, and design and execute research plans using the major methodologies of the discipline (experiments, surveys, qualitative techniques, etc.) to answer disciplinary-specific questions.
CO34	IV	Project	Do research and prepare project

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M.Sc Curriculum Mapping

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives-PEO	PO1	PO2	PO3	PO4	PO5
PEO1	*				*
PEO2		*	*	*	*
PEO3	*	*	*	*	*
PEO4	*		*	*	*
PEO5	*		*	*	*

M.Sc Curriculum Mapping

Programme Outcome vs Course Outcome

Programme Outcome-PO Course Outcome-CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1				*	*		
CO2	*		*	*	*	*	
CO3	*	*	*	*	*	*	
CO4	*	*	*	*	*	*	
CO5	*	*	*	*	*	*	
CO6	*	*	*	*	*	*	
CO7					*		*
CO8	*	*	*	*	*	*	
CO9	*	*	*	*	*	*	
CO10	*		*	*	*	*	
CO11	*	*	*	*	*	*	
CO12	*	*	*	*	*	*	
CO13				*	*	*	*
CO14				*	*	*	
CO15				*	*	*	*
CO16	*	*	*	*	*	*	
CO17			*	*	*	*	
CO18	*	*	*	*	*	*	
CO19	*	*	*	*	*	*	
CO20				*	*	*	*
CO21	*	*	*	*	*	*	
CO22	*	*	*	*	*	*	
CO23	*	*	*	*	*	*	
CO24	*	*	*	*	*	*	
CO25	*	*	*	*	*	*	
CO26	*	*	*	*	*	*	*
CO27	*	*	*	*	*	*	*

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CO28	*	*	*	*	*	*	
CO29				*	*	*	*
CO30				*	*	*	*
CO31				*	*	*	*
CO32	*	*	*	*	*	*	*
CO33			*	*	*	*	
CO34	*	*	*	*	*	*	

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PROGRAMME OUTCOMES	
PO1	After successful completion of Master of Philosophy in Mathematics students will be able to demonstrate basic knowledge in mathematical science.
PO2	The students would acquire basic knowledge of research and skill to design and conduct classes and interpret the results.
PO3	The students will be able to demonstrate understanding of basic knowledge in modern mathematical techniques.
PO4	The students will be able to acquire knowledge to solve real life problems.
PO5	The students will be able to reinforce research skills and high end recent advances in mathematics.
PO6	The students will be able to communicate effectively and demonstrate professional and ethical responsibilities.
PROGRAM SPECIFIC OUTCOME	
PSO1	To develop research level thinking in the field of pure and applied mathematics. To assimilate complex mathematical ideas and arguments.
PSO2	To improve your own learning and performance.
PSO3	To develop abstract mathematical thinking.
PROGRAM SPECIFIC OUTCOME	
PEO1	Victorious in getting employment in different areas, such as industries, laboratories, banks, insurance companies, educational/research institutions, and administrative positions, since the impact of the subject concerned is very wide
PEO2	Keep on discovering new avenues in the chosen field and exploring areas that remain conducive for research and development.
PEO3	Encourage personality development skills like time management, crisis management, stress interviews and working as a team.

*S. Arjunan*

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Course outcomes (Cos)-2020-2021  
M.Phil., Mathematics

S.No	Semester	CourseCode/Name	CourseOutcome
CO1	I	RESEARCH METHODOLOGY	To understanding the nature of problem to be studied and identifying the related area of knowledge. To reviewing literature to understand how others have approached or dealt with the problem. To collecting data in an organized and controlled manner so as to arrive at valid decisions. To analyzing data appropriate to the problem
CO2	I	ALGEBRA AND ANALYSIS	To know the definitions and understand the key concepts introduced in this modules. To be able to investigate the properties of modules. The concept of a module as a generalization of a vector space and an abelian group. Have the knowledge of basic properties of primary decompositions and Noetherian Rings. Studying Nakayama's lemma Studying the topological concepts and Riesz representation theorem. Studying the notion of Lebesgue measure and their properties. To learn the concepts of Laplace transforms and inverse Laplace transforms. To know the concepts of Inversion theorem and Plancherel theorem. To learn the ideas of transformations. To study the Riemann mapping theorem. Solve difficult problems using the above concepts.

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CO3	I	ADVANCED NUMERICAL ANALYSIS	<p>Students will be able to Understand the theoretical and practical aspects on the use of numerical methods. Analyze the errors obtained in the numerical solutions of problems. Demonstrate the use of interpolation methods to find intermediate values in the given graphical and/or tabulated data. Numerically solve a lot of practical problems where exact solution is unknown. Determine approximate solutions of system of linear algebraic equations using the method of matrix decomposition. Understand the idea of interpolation namely the deviation of the given function from the approximating polynomial. Evaluate the derivative of the given function by approximating polynomial. Study in detail the numerical methods involved in shooting method, finite difference method.</p>
CO4	I	RESEARCH AND PUBLICATION ETHICS	<p>To demonstrate research and publication ethics  Identify publication misconduct and predatory journals  Apply different tools for plagiarism checking  Utilize various indexing and citation databases and outline research metrics  Appraise research integrity</p>

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M.Phil., Curriculum Mapping

Programme Educational Objectives vs Programme Outcome

Programme Outcome-PO Programme Educational Objectives-PEO	PO1	PO2	PO3	PO4	PO5	PO6
PEO1	*				*	*
PEO2		*	*	*	*	*
PEO3	*	*	*	*	*	*
PEO4	*		*	*	*	*
PEO5	*		*	*	*	*

M.Phil Curriculum Mapping

Programme Outcome vs Course Outcome

Programme Outcome-PO Course Outcome-CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1				*	*	
CO2	*		*	*	*	*
CO3	*	*	*	*	*	*
CO4	*	*	*	*	*	*

HOD/Maths

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