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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-2019-2020

PROGRAMMEOUTCOMES	
PO1	To understand and apply the knowledge of mathematical science to solve real life problems.
PO2	To design the methodology suitable to the problem on hand.
PO3	To analyze and interpret solution outputs and generate new ideas based on the outputs.
PO4	To lead, work in a team and give priority to the success of the aim of the team.
PO5	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.
PEO4	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 the real world problems and heuristic issues.

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PEO4	To enable students to recognize the need for and the ability to engage in life-long learning.

Course outcomes (Cos) 2019-2020

B.Sc..Mathematics

S.No	Semester	CourseCode/Name	CourseOutcome
CO1	I	Basic Mathematics –I (Differential Calculus and Vector Differentiation)	➢To manipulate, and solve problems using, successive differentiation & vector operators. ➢To calculate Maxima & Minima for functions of two variables and Lagrange multiplier method. ➢To solve curvature, evolutes, asymptotes and envelopes in simple cases. ➢To calculate gradient, divergence and curl vectors in R3.
CO2	I	Basic Mathematics –II (Trigonometry, Analytical Geometry 3D And Calculus)	➢ To manipulate the expansions of basic trigonometric functions. ➢ To calculate summation of trigonometric series and Gregory's series. ➢ To understand the concept of analytical geometry and be able to use properties of spheres, cone and cylinder in real cases. ➢ To manipulate, and solve problems using, integral calculus.
CO3	I	Allied- I- Paper –I Programming In C	➢ To Design C Programs for problems. ➢ To Write and execute C programs for simple applications.
CO4	I	CoreIII Basic Mathematics-III Differential Equations	➢ 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. ➢ 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)	➢ To understand the theory of, and be able to solve problems in Green's Theorem, Stokes' Theorem, and Gauss's Divergence Theorem. ➢ To manipulate the relation between root and coefficients, symmetric functions of the roots in terms of the coefficients, and transformation of equation. ➢ 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	➢ To solve problems in elementary number theory. ➢ To apply elementary number theory. ➢ To develop a deeper conceptual understanding of the theoretical basis of number theory and cryptography. ➢ To define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime factorization.
CO10	III	Core–VI Numerical Analysis	➢ To solve problems in algebraic and transcendental equations. ➢ To understand about finite differences. ➢ Students develop and analyze numerical techniques. ➢ To apply various numerical methods to solve ordinary differential equations. ➢ To get the research inquiry and analytical thinking abilities.
CO11	III	Allied–II–Paper–I– Mathematical Statistics I	➢ To get the methodology for the planning and execution for any scientific enquiry. ➢To learn statistical techniques and statistical data. ➢To understand the concept of random variables. ➢To understand the concept of central limit theorem for i.i.d random variables. ➢To gather knowledge of constructions and uses of fixed and chain-based index numbers.

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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.
CO13	IV	Core –VIII OperationsResearch	➢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	➢To understand about celestial objects. ➢To get knowledge about eclipses. ➢To apply in different zones of Earth. ➢Astronomical refraction. ➢To apply in different phases of the Moon.
CO15	IV	Allied-II MathematicalStatisticsIII	➢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. ➢Understand the concept of sampling theory.
CO16	V	Core-X Modern Algebra	➢To get knowledge and understand about algebraic structures like groups, rings, and vector spaces. ➢To understand about morphisms.
CO17	V	Core –XI Real Analysis	➢To gain knowledge about connectedness, completeness, and compactness. ➢To understand the Riemann integrals and the fundamental theorem of calculus. ➢To analyze the problem and find the solution. An ability to construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium. ➢To understand the analysis of couples and friction.
CO18	V	Core – XII Statics	➢To construct free-body diagrams and to calculate the reactions necessary to ensure static equilibrium. ➢To understand the analysis of couples and friction.

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

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			➢To represent functions as Taylor, power, and Laurent series; classify singularities and poles; find residues; and evaluate complex integrals using the residue theorem.
CO23	VI	Core–XV Dynamics	➢To get knowledge of internal forces and moments in members. ➢To calculate centroids and moments of inertia. ➢To get knowledge of kinematic and kinetic analyses, and energy and momentum methods for particles and systems of particles. ➢To get knowledge of kinematic and kinetic analyses, and energy and momentum methods for rigid bodies.
CO24	VI	Core-XVI Discrete Mathematics	➢To successfully complete the course will demonstrate the following outcomes by tests, homework, and written reports. ➢To get knowledge of relations and functions. ➢To get knowledge of how logical reasoning is used in mathematics to prove theorems, in computer science to verify the correctness of programs, and in physical science to draw conclusions. ➢To find the solutions of recurrence relations. ➢To study ordering relations.
CO25	VI	Elective Paper-II Graph Theory	➢ To get knowledge in graph theory. ➢To understand the properties of graph theory. ➢To understand the concept of Kuratowski's graph. ➢To understand the matrix representation of graphs. 4o mini

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CO26	VI	Elective Paper-II Mathematica L Modelling	➢ To successfully complete this module, you will be able to demonstrate knowledge. ➢ To get the correct methodology when developing mathematical models. ➢ To design and develop the solutions. 4o mini
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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M.Sc.,Mathematics-2019-2020

PROGRAMMEOUTCOMES	
PO1	To apply the knowledge of mathematical science to solve real life problems.
PO2	To design the methodology suitable to the problem encountered.
PO3	To analyze and interpret solutions and generate new ideas based on the outputs.
PO4	To inculcate research ability in the mathematical science.
PO5	To lead, work in team, and give priority to the success of the team.
PROGRAMSPECIFICOUTCOME	
PSO1	Todevelopproblem-solvingskillsandapplythemindependentlytoproblemsinpureandapplied mathematics.
PSO2	Toassimilatecomplexmathematicalideasandarguments.
PSO3	Toimproveyourownlearningandperformance
PSO4	Todevelopabstractmathematicalthinking.
PEO1	To equip students with knowledge, abilities and insight in mathematicsand related fields.
PEO2	To enable them to work as a mathematical and scientific researcherandto work as ateam.
PEO3	Toequipstudentswith theabilityto translateandsynthesizetheirunderstandingtowardsnature,humananddevelopment.
PEO4	To develop the ability to utilize the mathematical problem solvingmethodssuchasanalysis,modeling,programmingandmathematical software applications in addressing the real worldproblemsand heuristicissues.
PEO5	Toenablestudentstorecognizetheneedforandtheabilitytoengageinlife-longlearning.

Courseoutcomes(Cos)-2019-2020
M.Sc.,Mathematics

S.No	Semester	CourseCode/Name	CourseOutcome
CO1	I	Algebra	☐ To understand the concept of Group Theory, Ring Theory. ☐ To get knowledge of Linear Transformations. ☐ To understand the analysis of Fields. ☐ Research inquiry and analytical thinking abilities. ☐ To simplify algebraic expressions to analyze functions and graphs. ☐ To create graphs using key features.

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CO2	I	RealAnalysis	□ To know the motion of the Riemann-Stieltjes integral; prove elementary properties of the Riemann integral and the Fundamental Theorem of Calculus. □ To describe the Infinite series and Infinite Products, Sequences of Functions. □ To understand Multivariable Differential Calculus and Implicit Functions and Extremum problem. □ To describe fundamental properties of the real numbers that lead to the formal development of real analysis. □ To comprehend rigorous arguments developing the theory underpinning real analysis. □ To demonstrate an understanding of limits and how they are used in sequences, series, differentiation, and integration. □ To construct rigorous mathematical proofs of basic results in real analysis.
CO3	I	Ordinary Differential Equations	□ To complete this course students should be able to solve first order equations, systems of periodic coefficients and use these methods to solve applied problems. □ To get knowledge of Sturm-Liouville Problem. □ To understand about the stability of stationary solutions. □ To solve first order differential equations utilizing the standard techniques for separable, exact, linear, homogeneous, or Bernoulli cases. □ To find the complete solution of a non-homogeneous differential equation as a linear combination of the complementary function and a particular solution. □ To find the complete solution of a non-homogeneous differential equation with constant coefficients by the method of undetermined coefficients. □ To find the complete solution of a differential equation with constant coefficients by variation of parameters.

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CO4	I	Programming In C++	☐ To know the proper lines of C++, Encapsulation, Inheritance, and Polymorphism. ☐ To explain the various data types, operations, and functions of C++. ☐ To know the concept of constructors and destructors. ☐ To explain the concept of inheritance, types of inheritance, and polymorphism, virtual functions. ☐ To explain the types of streams, format, and format of input and output operations. ☐ To know the procedural and object-oriented paradigm with concepts of streams, classes, functions, data, and objects.
CO5	II	Classical Dynamics	☐ To complete the course will demonstrate the following outcomes by tests, homework, and written reports: ☐ To get knowledge of mechanical systems, virtual work, energy, and momentum. ☐ To understand the concept and applications of Lagrange's Equation. ☐ To have a deep understanding of the mathematical foundations of quantum mechanics. ☐ To solve the Schrödinger equation using various approximation methods. ☐ To have a basic understanding of relativistic effects in quantum mechanics.
CO6	II	Fluid Dynamics	• To get knowledge of Two Dimensional and conformal mapping. • To get knowledge of solving problems in viscous flow - steady viscous flow. • To identify how properties of fluids change with temperature and their effect on pressure and fluid flow. • To describe fluid pressure and its measurement. • To define the relationship between pressure and elevation as it relates to manometers, barometers, and other pressure measuring devices. • To calculate forces on a plane submerged in a static fluid. • To calculate buoyancy on a body submerged in a static fluid. • To use the general energy equation to calculate changes in fluid flow for circular and non-circular pipes for incompressible fluids.

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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: To understand the significance of harmonic functions, Riemann zeta function. • To get knowledge of periodic functions, the Weierstrass. • Abilities in conformal mapping. • To analyze functions of a complex variable using series expansions, using line integrals, using geometry, and using partial differential equations. • To explain the major theorems that distinguish complex analysis from real analysis. • To apply complex analysis to compute geometric mappings and real integrals.
CO9	II	Measure Theory And Integration	To introduce the concepts of measure and integral with respect to a measure. To show their basic properties. To provide a basis for further studies in Analysis, Probability, and Dynamical Systems. To identify, describe, and apply emerging technologies in teaching and learning environments. To demonstrate knowledge, attitudes, and skills of digital age work and learning. To plan, design, and assess effective learning environments and experiences. To implement curriculum methods and strategies that use technology to maximize student learning. To develop technology-enabled assessment and evaluation strategies.
CO10	II	MathematicalMethods	• To understand the significance of Calculus of Variations, Fourier Transforms, and Hankel Transform. • To get knowledge of linear integral equations and Method of successive approximations. • Stillness in transformation from one function into another function. • To communicate both orally and verbally about music of all genres and styles in a

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			clear and articulate manner (comprehension). • To analyze and interpret texts within a written context. • Students will be able to judge the reasonableness of obtained solutions. • To evaluate theory and critique research within the discipline.
CO11	II	Graph Theory	□ To get knowledge in Graph Theory. □ To understand the properties of Graph Theory. □ To understand the concept of Kuratowski's graph. □ To understand Matrix representation of graphs.
CO11	II	MathematicalProbability	□ o get knowledge and understanding of the place of probability theory knowledge in cognitive processes, describe the basic probability theory and mathematical statistics concepts; special abilities and skills. □ To calculate the probabilities of events with an appropriate choice of the method of calculation. □ To be familiar with the types of random variables, be able to write them, and calculate their numerical characteristics. □ To evaluate numerical characteristics of the sample and interpret the meanings of the parameters of the population. □ To formulate and test hypotheses, and draw the appropriate conclusions. □ To understand important distributions.
CO12	II	MathematicalModeling	□ Having successfully completed this module, you will be able to demonstrate knowledge and understanding of: □ The concept of mathematical modeling. □ The mathematical descriptions of some real systems. □ The correct methodology when developing mathematical models. □ Skill in applications. □ To design and develop solutions.

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CO13	II	Research Methodology	▯ To familiarize participants with the basics of research and the research process. ▯ To have basic knowledge on qualitative research techniques. ▯ To have adequate knowledge on measurement & scaling techniques as well as quantitative data analysis. ▯ To get the methodology for the planning and execution of any scientific inquiry.
CO14	II	Participation inBounded Research	▯ To do the allotted work in research. ▯ To learn to do a review of literature.
CO15	III	Topology	▯ Upon successful completion of this course, the student will be able to: (Knowledge based) distinguish among open and closed sets on different topological spaces. ▯ To know the two fundamental topologies: discrete and indiscrete topologies. ▯ To identify precisely when a collection of subsets of a given set equipped with a topology forms a topological space. ▯ To understand when two topological spaces are homeomorphic. ▯ To identify the concepts of distance between two sets; connectedness, denseness, compactness, and separation axioms. ▯ To explain the notion of metric space. ▯ To know the use of open balls on metric spaces, construct the metric topology, and define open-closed sets of the space.
CO16	III	Stochastic Processes	▯ On successful completion of the course, students should be able to: ▯ To explain fundamentals of probability theory, random variables, and random processes. ▯ To understand the mathematical concepts related to probability theory and random processes. ▯ To understand the characterization of random processes and their properties. ▯ To formulate and solve engineering problems involving random processes. ▯ To analyze the given probabilistic model of the problem. ▯ To make precise statements about random processes. ▯ To use computational techniques to generate simulation results.

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CO17	III	Advanced Numerical Analysis	□ o solve an algebraic or transcendental equation using an appropriate numerical method. □ To solve a differential equation using an appropriate numerical method. □ To evaluate a derivative at a value using an appropriate numerical method. □ To solve a linear system of equations using an appropriate numerical method. □ To calculate a definite integral using an appropriate numerical method. □ Skill in finding the roots of the given equation.

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

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CO22	III	Biomedical Instrumentation	☐ To familiarize students with various medical equipment and their technical aspects. ☐ To introduce students to the measurements involved in some medical equipment. ☐ To understand diagnosis and therapy-related equipment. ☐ To understand the problem and ability to identify the necessity of an equipment for a specific problem.
CO23	III	GreenChemistry	☐ To understand the environmental status and evolution. ☐ To know about the pollution and its prevention measures. ☐ To familiarize with green chemistry. ☐ To learn about the bio-catalytic reactions. ☐ To understand about the vitamins and antibiotics.
CO24	III	Internet and Web Design	☐ Acquire knowledge about functionalities of the Internet. ☐ Acquire knowledge about functionalities of the World Wide Web. ☐ Explore markup languages features and create interactive web pages using them. ☐ Learn and design client-side validation using scripting languages. ☐ To acquire knowledge about open-source JavaScript libraries. ☐ To design front-end web pages and connect to the back-end databases.
CO25	III	Insurance Services	To learn the principles of insurance and the functions of life and general insurances and the IRDA
CO26	III	CounsellingPsychology	To learn counselling and its process
CO27	III	HerbalMedicine	• To develop individualized goals and plan for wellness. • To gather information about past and current health status. • To create a comprehensive assessment of health inputs.

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

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CO31	IV	Number Theory	□ To solve problems in elementary number theory. □ To apply elementary number theory to cryptography. □ To develop a deeper conceptual understanding of the theoretical basis of number theory and cryptography. □ To do research inquiry and analytical thinking abilities. □ To find quotients and remainders from integer division. □ To apply Euclid's algorithm and backward substitution. □ To understand the definitions of congruences, residue classes, and least residues. □ To determine multiplicative inverses, modulo nnn, and use them to solve linear congruences.
CO32	IV	CombinatorialMathematics	□ Apply diverse counting strategies to solve varied problems involving strings, combinations, distributions, and partitions. □ Write and analyze combinatorial, algebraic, inductive, and formal proofs of combinatorial identities. □ Recognize properties of graphs such as distinctive circuits or trees. Will become familiar with these that naturally appear in various other fields of mathematics and computer science. □ They will learn how to use these structures to represent mathematical and applied questions, and they will become comfortable with the combinatorial tools commonly used to analyze such structures. □ To apply mathematical concepts and principles to perform numerical and symbolic computations. □ To use technology appropriately to investigate and solve mathematical and statistical problems. □ Write clear and precise proofs.

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CO33	IV	Design and Analysis of Algorithms	• To analyze worst-case running times of algorithms using asymptotic analysis. • Students will be able 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. • Students will be able to conduct interviews and focus groups that address questions relevant to the discipline. • Students will be able to design and execute research plans using the major methodologies of the discipline (experiments, surveys, qualitative techniques, etc.) to answer disciplinary specific questions. • One sentence in length that clearly states the behaviors that students should be able to demonstrate.
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	*	*	*	*	*	*	

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CO26	*	*	*	*	*	*	*
CO27	*	*	*	*	*	*	
CO28	*	*	*	*	*	*	
CO29				*	*	*	*
CO30				*	*	*	
CO31				*	*	*	*
CO32	*	*	*	*	*	*	
CO33			*	*	*	*	
CO34	*	*	*	*	*	*	

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PROGRAMMEOUTCOMES	
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 skills 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.
PROGRAMSPECIFICOUTCOME	
PEO1	Victorious in getting employment in different areas, such as industries, laboratories, banks, insurance companies, educational/research institutions, 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.

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Course outcomes (Cos)-2019-2020
M.Phil_Mathematics

S.No	Semester	CourseCode/Name	CourseOutcome
CO1	I	RESEARCH METHODOLOGY	☐ To understand the nature of the problem to be studied and identify the related area of knowledge. ☐ To review literature to understand how others have approached or dealt with the problem. ☐ To collect data in an organized and controlled manner so as to arrive at valid decisions. ☐ To analyze data appropriate to the problem.
CO2	I	ALGEBRAANDANALYSIS	☐ 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	ADVANCEDNUMERICALANALYSIS	• 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 the exact solution is unknown. • Determine approximate solutions of systems 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 the shooting method and finite difference method.
CO4	I	RESEARCH ANDPUBLICATIONETHICS	• 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.

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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	*	*	*	*	*	*

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