



ST. THOMAS COLLEGE (AUTONOMOUS)
THRISSUR, KERALA - 680 001

College with Potential for Excellence
NIRF INDIA Ranking 2021 : 64th

www.stthomas.ac.in

PROGRAMME OUTCOMES
PROGRAMME SPECIFIC OUTCOMES
COURSE OUTCOMES

M.Sc Mathematics

Outcomes

At the end of Post Graduate Program at St. Thomas College (Autonomous), a student will have obtained:

PO1	Attained profound Expertise in Discipline
PO2	Acquired Ability to function in multidisciplinary domains
PO3	Attained ability to exercise Research Intelligence in investigations and Innovations
PO4	Learnt Ethical Principles and be committed to Professional Ethics
PO5	Incorporated Self-directed and Life-long Learning
PO6	Obtained Ability to maneuver in diverse contexts with Global Perspective
PO7	Attained Maturity to respond to one's calling

Program Specific Outcomes

At the end of M.Sc. Mathematics at St. Thomas College (Autonomous), Thrissur, a student will have developed:

PSO1	Develop a strong base in theoretical and applied Mathematics.
PSO2	Acquire their analytical thinking, logical deductions and rigor in reasoning.
PSO3	Apply the tools to model the problems mathematically, analyze data quantitatively and create the ability to access and communicate mathematical information.
PSO4	Acquire knowledge in recent developments in various branches of Mathematics and thus pursue research.

Course Outcomes

M.Sc. Mathematics

MTH1C01- Algebra - I

At the end of this course, a student will have developed ability to:

CO1	Create knowledge of plane isometries
CO2	Understand group action and its applications
CO3	Apply Sylow theorem to solve problems in group theory
CO4	Understand group presentation
CO5	Explain polynomials over a ring.

M.Sc. Mathematics

MTH1 C02- Linear Algebra

At the end of this course, a student will have developed ability to:

CO1	Understand properties of vector spaces
CO2	Study linear transformations
CO3	Illustrate elementary canonical forms
CO4	Develop an idea of inner product spaces
CO5	Apply orthonormalization techniques to solve problems

M.Sc. Mathematics

MTH1 C03- Real Analysis I

At the end of this course, a student will have developed ability to:

CO1	Construt an idea of basic topology
CO2	Understand differentiation and related theorems
CO3	Understand differentiation of vector valued functions
CO4	Develop knowledge of Riemann Stieltjes integral
CO5	Infer uniform continuity and uniform convergence

M.Sc. Mathematics

MTH1 C04- Discrete Mathematics

At the end of this course, a student will have developed ability to:

CO1	State concepts of order relations.
CO2	Interpret Boolean algebra and their properties
CO3	Develop concepts of graph and related terms
CO4	Analyze characterization of special graphs
CO5	Construct concepts of automata and formal languages

M.Sc. Mathematics

MTH1 C05- Number Theory

At the end of this course, a student will have developed ability to:

CO1	Identify arithmetic functions and Dirichlet multiplication
CO2	Explain importance of prime numbers
CO3	Discuss quadratic residue and quadratic reciprocity laws
CO4	Demonstrate concepts in cryptography.
CO5	Classify symmetric and asymmetric cryptosystems

M.Sc. Mathematics

MTH2 C06-Algebra- II

At the end of this course, a student will have developed ability to:

CO1	Understand concepts of prime and maximal ideals
CO2	Explain algebraic extension field
CO3	Summarize separable extension field
CO4	Illustrate Galois theory
CO5	Create an idea of cyclotomic extensions

M.Sc. Mathematics

MTH2 C07- Real Analysis II

At the end of this course, a student will have developed ability to:

CO1	Understand Lebesgue measure
CO2	Develop concept of integration of non-negative functions
CO3	Explain functions of bounded variation
CO4	Interpret Lebesgue's differentiation theorem
CO5	Illustrate signed measures and related theorems

M.Sc. Mathematics

MTH2 C08- Topology

At the end of this course, a student will have developed ability to:

CO1	Develop basic concepts of topological Spaces
CO2	Identify quotient spaces
CO3	Explain spaces with special properties
CO4	Understand separation axioms
CO5	Analyze Urysohn and Tietze characterization of normality

M.Sc. Mathematics

MTH2 C09-ODE & calculus of variations

At the end of this course, a student will have developed ability to:

CO1	Create concepts of power series solutions
CO2	Explain special functions of mathematical physics
CO3	Develop idea of systems of first order equation
CO4	Analyze non-linear equations
CO5	Demonstrate boundary value problems and related theorems

M.Sc. Mathematics

MTH2 C10- Operations Research

At the end of this course, a student will have developed ability to:

CO1	Identify convex functions
CO2	Understand modeling and solving of linear programming problems
CO3	Interpret modeling and solving of integer programming problems
CO4	Develop concepts of flow and potential in networks
CO5	Explain theory of games

M.Sc. Mathematics

MTH2 A02- TECHNICAL WRITING WITH L^AT_EX

At the end of this course, a student will have developed ability to:

CO1	Understand the basic concept of L ^A T _E X
CO2	Plan to prepare a research paper with L ^A T _E X
CO3	Develop a beamer presentation

M.Sc. Mathematics

MTH2 A03- PROGRAMMING WITH SCILAB

At the end of this course, a student will have developed ability to:

CO1	Understand the basic Concepts of SCILAB
CO2	Develop 2-D & 3-D Graphics
CO3	Analyze Mathematical Problems with SCILAB

M.Sc. Mathematics

MTH 2A04- SCIENTIFIC PROGRAMMING WITH PYTHON

At the end of this course, a student will have developed ability to:

CO1	Explain basics of Python programming
CO2	Apply Python programming in numerical analysis
CO3	Apply Python programming in Linear algebra

M.Sc. Mathematics

MTH 3C11- Multivariable Calculus & Geometry

At the end of this course, a student will have developed ability to:

CO1	Develop an idea of functions of several variables
CO2	Understand contraction principle and inverse function theorem
CO3	Analyze characterization of curves
CO4	Interpret characterization of surfaces
CO5	Identify different curvatures

M.Sc. Mathematics

MTH3 C12- Complex Analysis

At the end of this course, a student will have developed ability to:

CO1	Develop concepts of conformality
CO2	Explain fundamental theorem and Cauchy's Integral formula
CO3	Create an idea of analytical functions and related theorems
CO4	Understand power series expansion
CO5	Understand periodic functions

M.Sc. Mathematics

MTH3 C13- Functional Analysis

At the end of this course, a student will have developed ability to:

CO1	Explain of Matrix Spaces
CO2	Understand Fourier Seies and Integrals
CO3	Understand Banach Spaces and related theorems
CO4	Illustrate Closed Graph and Open Mapping theorem
CO5	Analyse Inner Product Spaces

M.Sc. Mathematics

MTH3 C14- PDE & Integral Equations

At the end of this course, a student will have developed ability to:

CO1	Summarize first order partial differential equations
CO2	Develop methods of solving first order partial differential equations
CO3	Apply second order partial differential equations
CO4	Identify methods of solving second order partial differential equations
CO5	Demonstrate integral equations

M.Sc. Mathematics

MTH 3E01 - Coding theory

At the end of this course, a student will have developed ability to:

CO1	Discuss strong concept of error detection, correction and their effects
CO2	Demonstrate different types of codes
CO3	Interpret cyclic linear codes and dual cyclic codes
CO4	Create cyclic hamming codes
CO5	Develop decoding 2 error correcting BCH linear codes

M.Sc. Mathematics

MTH3 E02- Cryptography

At the end of this course, a student will have developed ability to:

CO1	Develop knowledge in classical cryptography
CO2	Discuss simple cryptosystems
CO3	Analyze different ciphers
CO4	Create block ciphers
CO5	Understand cryptographic hash functions

MTH3 E03- Measure & Integration

At the end of this course, a student will have developed ability to:

CO1	Explain measurability and their properties
CO2	Understand integration of complex functions using concepts of measure
CO3	Analyze Riesz representation theorem
CO4	Create knowledge in Lebesgue measures and their completion
CO5	Develop non measurable infinite set

M.Sc. Mathematics

MTH 3E04-Probability Theory

At the end of this course, a student will have developed ability to:

CO1	Understand random variables and their probability distributions
CO2	Explain moments and generating functions
CO3	Analyze multiple random variables
CO4	Identify covariance, correlation and moments.
CO5	Illustrate law of large numbers

M.Sc. Mathematics

MTH 4C15- Advanced Functional Analysis

At the end of this course, a student will have developed ability to:

CO1	Explain Duals and Transposes
CO2	Understand Compact Linear map, Spectrum of Compact operator
CO3	Explain Riesz Representation Theorem
CO4	Understand bounded operators and adjoints
CO5	Identify spectrum and numerical range

M.Sc. Mathematics

MTH 4E05- Advanced Complex Analysis

At the end of this course, a student will have developed ability to:

CO1	Analyze Mittag-Leffler theorem and Weierstrass theorem
CO2	Understand infinite products
CO3	Explain entire functions of finite order
CO4	Apply multiple valued functions in complex analysis
CO5	Demonstrate space of analytic and meromorphic functions

M.Sc. Mathematics

MTH 4E06- Algebraic Number Theory

At the end of this course, a student will have developed ability to:

CO1	Understand symmetric polynomials, modules and algebraic numbers
CO2	Explain ring of integers, quadratic fields and cyclotomic fields
CO3	Illustrate different factorizations
CO4	Explain Minkowski theorem
CO5	Develop Fermats last theorem

M.Sc. Mathematics

MTH 4E07- Algebraic Topology

At the end of this course, a student will have developed ability to:

CO1	Understand geometric complexes and polyhedra
CO2	Explain simplicial homology groups
CO3	Explain simplicial approximations
CO4	Understand Brouwer fixed point theorem and related results
CO5	Develop homotopic paths and covering homotopy property

M.Sc. Mathematics

MTH 4E08- Commutative Algebra

At the end of this course, a student will have developed ability to:

CO1	Understand properties of rings and ideals
CO2	Explain modules
CO3	Identify modules of fractions
CO4	Interpret integral dependence and valuation
CO5	Compare Noetherian rings and Artinian rings

M.Sc. Mathematics

MTH 4E09- Differential Geometry

At the end of this course, a student will have developed ability to:

CO1	Understand concepts of graphs and level sets
CO2	Explain vector fields on surfaces
CO3	Analyze geodesics, parallel transport and Weingarten map.
CO4	Explain properties of surfaces-curvature, local equivalence.
CO5	Identify different types of surfaces

M.Sc. Mathematics

MTH4 E10- Fluid Dynamics

At the end of this course, a student will have developed ability to:

CO1	Analyze equations of motion
CO2	Create two dimensional motion
CO3	Explain streaming motions and aerofoils
CO4	Interpret sources and sinks
CO5	Understand Stokes' stream functions

M.Sc. Mathematics

MTH 4E11- Graph Theory

At the end of this course, a student will have developed ability to:

CO1	Understand graph, vertex, path and cycles
CO2	Explain connectivity in communication networks
CO3	Develop matchings and coverings in bipartite graphs
CO4	Explain chromatic number and related topics
CO5	Illustrate coloring problem and study some special graphs

M.Sc. Mathematics

MTH 4E12- Representation Theory

At the end of this course, a student will have developed ability to:

CO1	Understand G-modules
CO2	Develop idea of reducibility
CO3	Analyze orthogonality relations
CO4	Develop induced representations
CO5	Explain reciprocity law

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MTH 4E13- Wavelet Theory

At the end of this course, a student will have developed ability to:

CO1	Understand basic properties of discrete fourier transforms
CO2	Develop wavelets on \mathbb{Z}^N
CO3	Interpret complete orthonormal sets in Hilbert space
CO4	Explain Fourier transform and convolutions
CO5	Explain wavelets and Fourier transform on \mathbb{R}