



MASTER OF SCIENCE IN MATHEMATICS

The Master of Science in Mathematics program prepares students for research and teaching senior level mathematics courses at the undergraduate level, and for doctoral studies. It aims to develop future mathematicians for the academe, for government service, and for industry.

PROGRAM REQUIREMENTS

Basic Courses	9 units
Major Courses	18 units
Elective Courses	3 units
Thesis	6 units
Total	36 units

BASIC COURSES

Graduate Seminar in Mathematics (MTH853M)

3 units

A study of the fundamentals of research, preparation of a thesis proposal, thesis writing procedure, mathematical topics for research, and a selection of topics on pure and applied mathematics.

Number Theory (MTH621M)

3 units

A course on the divisibility properties of integers, congruences, diophantine equations, quadratic reciprocity, arithmetic functions, and algebraic numbers.

Set Theory and Logic (MTH601M)

3 units

This course demonstrates the development of mathematical thought through basic logical structures and the concepts of classes and sets, functions, relations, partially ordered classes, axiom of choice, and transfinite numbers.

MAJOR COURSES

Advanced Linear Algebra 1 (MTH613M)

3 units

A course on matrices, vector spaces, linear transformations, eigenvalues, linear functionals, bilinear forms, and quadratic forms.

Abstract Algebra 1 (MTH611M)

3 units

The study of groups, group homomorphisms, Cayley's theorem, Lagrange theorem, permutation groups, and Sylow theorems.

Modern Complex Analysis 1 (MTH643M)

3 units

A course on complex numbers and the complex plane, analytic functions, Cauchy-Riemann equations, infinite series, complex integration, singularities, improper integrals, Cauchy integral theory, singularities, and residue theory.



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Real Analysis 1 (MTH641M)

3 units

A course on calculus in Euclidean spaces, Lebesgue measure and integration, function spaces, and Stone-Weierstrass theorem.

Combinatorial Geometry (MTH665M)

3 units

A course that provides an introduction to linear spaces, projective spaces, affine spaces, polar spaces, and generalized quadrangles.

General Topology (MTH663M)

3 units

A study of basic topological concepts such as sets, metric spaces, topological spaces, continuous mappings, separability, compactness and topological properties.

ELECTIVE COURSES

Abstract Algebra 2 (MTH711M)

3 units

The second course on abstract algebra which covers rings and ideals, fields, ring homomorphisms, polynomials, principal ideal rings, unique factorization domains and primitive rings.

Advanced Linear Algebra 2 (MTH713M)

3 units

A study of modules, canonical forms, orthogonal and unitary transformations, annihilators, and duality of inner transformations.

Advanced Probability Theory (MTH745M)

3 units

A course on the fundamentals of measure theory, probability space, random theory, random variables, expectation, independence, characteristic functions, convergence concepts, conditioning, and martingales.

Combinatorial Mathematics (MTH607M)

3 units

An introductory course in combinatorics that deals with selections and binomial coefficients, pairings problems, recurrence, the inclusion-exclusion principle, block-designs and error correcting codes, Steiner systems, sphere-packing and Golay codes.

Design Theory (MTH683M)

3 units

A study of block designs, symmetric designs, Hadamard matrices and designs, Latin squares, and other designs.

Differential Equations (MTH633M)

3 units

The course deals with the systematic development of the theory of first order equations; and the general theory of linear differential equations. It also includes series solutions of second order differential equations and other related topics.

Elementary Probability Theory (MTH605M)

3 units

A course on probability, random variables, moment generating functions, random vectors, special univariate and bivariate distributions.



Enumerative Approaches to Optimization (MTH681M)

3 units

A course on discrete optimization problems, successive conditioning, sequential decision models, dynamic programming, branch-and-bound algorithms.

Functional Analysis (MTH645M)

3 units

A course on normed linear spaces, Banach spaces (Hahn-Banach theorem, open mapping theorem, etc.), Hilbert spaces, operator theory, spectral theory, Banach Algebras.

Galois Theory (MTH617M)

3 units

A course on the fundamental theorem of Galois theory, fixed fields, galois group, ruler and compass constructions, symmetric rational functions, Zorn's lemma, separability and normality, galois fields, and the fundamental theorem of algebra.

General Topology 2 (MTH763M)

3 units

The second course on topology which includes the concepts of homotopy, fundamental groups, homology, cohomology, differential manifolds.

Graph Theory (MTH671M)

3 units

A study of graphs, subgraphs, trees, factorization, colorings, group graphs, and digraphs.

Introduction to Mathematical Statistics (MTH603M)

3 units

A study of modular distributive, brouwerian, and boolean lattices and their applications to algebra and topology, homomorphism, and congruence relations.

Linear Programming (MTH619M)

3 units

An introductory course that deals with the mathematics of the simplex method, duality, sensitivity analysis, extensions of linear programming.

Modern Complex Analysis 2 (MTH743M)

3 units

A course on entire, harmonic, analytic, and meromorphic functions, mobius transformations as well as theorems of Runge, Riemann, and Weierstrass.

Multivariate Analysis (MTH695M)

3 units

A study of the analysis of covariance, multivariate analysis of variance, discriminate analysis, factor analysis, cluster analysis, multi-dimensional scaling and reliability analysis.

Numerical Analysis (MTH631M)

3 units

A basic course on numerical solutions of linear systems, non-linear algebraic equations, interpolation and quadratures, ordinary differential equations and eigenvalue problems.



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Partial Differential Equations (MTH867M)

3 units

An introduction to the theory of solving partial differential equations, existence/uniqueness of solutions.

Permutation Groups (MTH615M)

3 units

A study of primitive groups, transitive groups, blocks constituents k-transitivity, and regular groups k-primitive.

Real Analysis 2 (MTH741M)

3 units

A study of the generalized measure and integration, and topological vector spaces.

Regression Analysis (MTH691M)

3 units

A study of simple random sampling, stratified random sampling, systematic and cluster sampling, ratio estimates and cost minimization.

Selected Topics (MTH855M)

3 units

A study of selected topics in specialized areas of mathematics to be chosen by the professor.

Stochastic Processes (MTH609M)

3 units

A course on poisson process, Markov chains, continuous time Markov chains, renewal theory, and martingales.

Time Series (MTH697M)

3 units

A course on linear extrapolation, exponential smoothing, filtering, spectral and cross-spectral analysis, ARMA, and ARIMA processes.

RESEARCH COURSE

Directed Research (MTH871M)

0 unit

A research course for students who have finished the course work but have not taken or passed the comprehensive examination.

THESIS

Thesis 1 TO 9 (MTH876M to MTH884M)

6 units

Conduct of an independent research under the supervision of a thesis mentor. Students who have already passed the comprehensive examination are qualified to enroll in this course.

ENTRY QUALIFICATIONS

- General average of 85%, B, 2.0 or higher.
- For the MS and Straight PhD program: Bachelor's degree in Mathematics or its equivalent.
- Applicants who do not meet the minimum entry qualification for a graduate program may be advised to take preparatory or refresher courses prior to admission to the program.