MASTER OF SCIENCE IN MATHEMATICS

PROGRAM DIRECTOR
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PROGRAM DESCRIPTION
The Department of Mathematics and Statistics offers the M.S. degree in mathematics. Options for this degree include predoctoral studies, applied mathematics, computer science, secondary mathematics, statistics, and actuarial science. Graduate faculty members have a broad range of research interests in both pure and applied areas. The curriculum stresses theoretical as well as computational mathematics and is flexible enough to key a student’s program to individual interests and abilities. Receiving a well-rounded education in mathematics, graduates can pursue a Ph.D., secure a position in government or industry, or further a teaching career. The department has extensive computing facilities that include microcomputers, workstations, mainframe, and access to supercomputers.

FACULTY RESEARCH INTERESTS

Guang-Hwa (Andy) Chang, Ph.D., Professor
Statistics; computer vision

Jacek Fabrykowski, Ph.D., Professor
Elementary, combinatorial, and analytic number theory; math competitions and problem solving

Jozsi Jalics, Ph.D., Assistant Professor
Computational neuroscience; mathematical biology; dynamical systems; partial differential equations

G. Jay Kerns, Ph.D., Associate Professor
Statistical computing; signed measures; exchangeability in probability and statistics

Anita C. O’Mellan, Ph.D., Professor
Graph theory; combinatorics; early childhood mathematics education

Stephen E. Rodabaugh, Ph.D., Professor
Foundations of topology and fuzzy logic: point-set, lattice-theoretic, and categorical methods

Thomas D. Smotzer, Ph.D., Professor
Real analysis; measure theory; operator theory

Angela Spalsbury, Ph.D., Professor
Functional analysis; operator theory; measure theory

Jamal K. Tartir, Ph.D., Associate Professor
Set-theoretic topology

Thomas P. Wakefield, Ph.D., Associate Professor
Character theory; actuarial science

Eric J. Wingler, Ph.D., Professor
Real analysis; complex analysis; operator theory

George Yates, Ph.D., Professor
Applied mathematics; partial differential equations; mathematical biology; nonlinear waves
Admission Requirements

In addition to the minimum School of Graduate Studies and Research admission requirements, students must also have the following:

- A cumulative undergraduate cumulative grade point average of at least 3.0 (on a 4.0 scale) in all undergraduate mathematics and statistics courses
- A completed sequence in standard calculus comparable to MATH 1571 Calculus I, MATH 1572 Calculus II, and MATH 2673 Calculus III, including multivariable calculus
- Previous courses in discrete structures and linear algebra comparable to MATH 3715 Discrete Mathematics and MATH 3720 Linear Algebra and Matrix Theory
- Previous course in abstract algebra comparable to MATH 5821 Topics in Abstract Algebra or real analysis comparable to MATH 5851 Topics in Analysis
- The Graduate Record Examination

Students not satisfying all of the above may be admitted with provisional status subject to the approval of the graduate program director and the graduate dean.

Degree Requirements

- A minimum of 33 semester hours of credit excluding MATH 5821 and MATH 5851
- A cumulative grade point average of at least 3.0
- Students entering without a prior course in abstract algebra must include MATH 5821 in their program, to be taken in the earliest available semester, and students entering without a prior course in theoretical analysis must include MATH 5851 in their program, to be taken in the earliest available semester. These courses are not included in the 33-semester-hour minimum requirement.
- The student’s combined undergraduate and graduate programs must include a mathematics core comprising the following courses or their equivalent:
  - MATH 5821 Abstract Algebra I taken in the earliest available semester
  - MATH 5851 Real Analysis I taken in the earliest available semester
  - MATH 5825 Advanced Linear Algebra
  - MATH 5852 Real Analysis II
  - MATH 6996 Mathematical Project
- Satisfactory performance on written and oral examinations. The subject matter for these examinations should in part reflect both the core curriculum and the option selected (see Description of Options below) and must be approved by the Graduate Executive Committee. Additionally, the following distribution requirements apply:
  - Written exams on three courses
  - Oral exam on a thesis, or oral exam on a project and two courses
  - At least half of the hours of the courses examined must be at the 6900 level
  - At least one course from MATH 5825, 5852, 6915, or 6920 must be examined
- At least 17 hours of the student’s approved program must be at the 6900 level
- Math 6999 Thesis is highly recommended

Description of Options

In addition to completing the courses which make up the mathematics core, students will choose from among the following options. Each option has its own core and elective requirements. Under extenuating circumstances, reasonable substitutions can be made with the approval of the Graduate Executive Committee.

The description of the options will refer to the following list of sequences.

Abstract Algebra: MATH 6922, 6923
Actuarial Mathematics: STAT 5802, 6904
Advanced Data Analysis: STAT 6940, 6948
Combinatorics: MATH 5835, 6938
Complex Analysis: MATH 6975, 6976
Differential Equations: MATH 6953, 5857
Economics: ECON 6912, 6922
Logic: MATH 6984, 6985
Mathematical Statistics: STAT 6943, 6944
Number Theory: MATH 5828, 6928
Numerical Analysis: MATH 5861, 6925
Operations Research: MATH 5845, 6942
Real Analysis: MATH 6965, 6966
Topology: MATH 6980, 6981
Option I: Predoctoral Studies in Mathematics and Applied Mathematics

The core requirements are MATH 6915 Mathematical Foundations and the first course in each of the Abstract Algebra, Complex Analysis, Real Analysis, and Topology sequences. The elective requirements are the completion of any sequence excluding Actuarial Mathematics, Economics, Finance and one applied mathematics or statistics course.

Option II: Statistics

The core requirements are the Advanced Data Analysis and the Mathematical Statistics sequences. The elective requirement is 9 additional hours of statistics courses.

Option III: Actuarial Science

The core requirements are the Actuarial Mathematics sequence, the Mathematical Statistics sequence, and STAT 6948 Linear Models. The elective requirement is 9 additional hours taken from STAT 5800, 5814, 5840, 6905, 6910, 6945, and 6988. The Finance and Economics sequences are recommended.

Option IV: Applied Mathematics

The core requirement is the first course in at least four of the Advanced Data Analysis, Differential Equations, Mathematical Statistics, Numerical Analysis, and Operations Research sequences. The elective requirement is to complete two sequences excluding Actuarial Mathematics, Economics, and Finance.

Option V: Secondary/Community College Mathematics

The core requirement is MATH 6930 Differential Geometry. The elective requirements are MATH 6915 Mathematical Foundations, the first course of either the Combinatorics or Number Theory sequence, the first course of either the Mathematical Statistics or Advanced Data Analysis sequence, the first course of the Abstract Algebra, Complex Analysis, Real Analysis, or Topology sequence, and the completion of any sequence excluding Actuarial Mathematics, Economics, and Finance. Those students seeking certification should consult an advisor in the school of Education.

Option VI: Computer Science

Students in this option should plan their graduate program in consultation with advisors in both the Department of Mathematics and Statistics and the Department of Computer Science and Information Systems. The core requirements are MATH 6915 Mathematical Foundations, the first course of the Combinatorics sequence, the first course of either the Number Theory sequence, CSCI 6905, 6910, and 6915. The elective requirements are the completion of any sequence excluding Actuarial Mathematics, Economics, and Finance and two additional computer science courses. The Numerical Analysis, Graph Theory, Combinatorics, and Logic sequences are recommended.

Option VII: Individualized Program of Study

Students with a career goal not addressed by the options above will select coursework beyond the core appropriate to this goal in consultation with an advisor and subject to the approval of the Graduate Executive Committee.