**MA - Master of Arts in Mathematics**

The MA in Mathematics is offered in two areas of concentration: **mathematics** (30-33 hours) and applied statistics (33 hours). Course work must be approved by the Department of Mathematics and Statistics and must include certain courses as explained in the discussion of the concentrations. Students who plan to continue to the PhD program in computational mathematics are urged to elect the concentration in **mathematics**. They may then use the doctoral qualifying examinations to satisfy the comprehensive examination requirement in the non-thesis option for the MA degree.

**Application and Admission**

In addition to the application materials required by The Graduate School, applicants must submit a 500-700 word Personal Statement by April 1 to be considered for Fall admission.

**Degree Requirements**

**Applied-Mathematics Concentration (30-33 Hours)**

The **mathematics** concentration offers a 30-hour thesis option and a 33-hour non-thesis option. At least half the work credited towards the degree must be in 600-level courses: 15 hours for the 30-hour program, and 18 hours for the 33-hour program.

**Algebra or Analysis (3 hours)**

Each candidate must complete any one of the following courses:

- MAT 517 Theory of Groups (3)
- MAT 545 Differential Equations and Orthogonal Systems (3)
- MAT 591 Modern Algebra (3)
- **MAT 592 Modern Algebra (3)**
- MAT 595 Mathematical Analysis (3)
- **MAT 596 Mathematical Analysis (3)**

(Note: Students who have had appropriate algebra or analysis courses as undergraduates may be exempted from this requirement upon approval by the Director of Graduate Study. In this case, these 3 hours must be replaced by 3 hours chosen in consultation with the Director of Graduate Study.)

**Core Courses (9 hours)**

At least 9 hours of course work must be chosen from the following list. At least 6 of these hours must constitute a complete year-long sequence.

- MAT 623, 624 Numerical Mathematics (3) (3)
- MAT 631, 632 Combinatorics and Graph Theory (3) (3)
- MAT 647, 648 Linear Algebra and Matrix Theory (3) (3)
- MAT 615, CSC 653 Symbolic Logic and Advanced Theory of Computation (3) (3)
- MAT 615, CSC 656 Symbolic Logic and Foundations of Computer Science (3) (3)
- CSC 653, 656 Advanced Theory of Computation and Foundations of Computer Science (3) (3)
- **MAT 688, 689 Mathematical Logic and Axiomatic Set Theory (3) (3)**
- **MAT 691, 692 Modern Abstract Algebra (3) (3)**
- MAT 693, 694 Complex Analysis (3) (3)
- MAT 695, 696 Real Analysis (3) (3)
- **MAT 697, 698 General Topology (3) (3)**
- MAT 645, 646 Approximation Theory (3) (3)
- STA 651, 652 Mathematical Statistics (3) (3)

**Electives (12-21 hours)**

With prior approval of the Director of Graduate Study a student will select 12-21 hours of other 500- or 600-level mathematical sciences courses.

**Thesis or Comprehensive Examination (Capstone Experience)**

Each candidate may elect to prepare a thesis or pass a written comprehensive examination on his/her program of course work. The thesis option is a 30 hour program; the non-thesis option is a 33 hour program.

**Thesis (6 hours)**

The candidate may prepare a thesis based on the investigation of a topic in mathematics. A thesis director will be appointed by the Department Head after consultation with the student and the Director of Graduate Study. Candidates may include up to 6 hours of thesis (MAT 699) in the required 30 hours. An oral examination on the thesis is required.

**Comprehensive Examination**
A candidate who does not prepare a thesis must take 33 hours of course work and pass a written comprehensive examination of his/her program. Please consult with the Director of Graduate Study for information concerning the comprehensive examination.

APPLIED STATISTICS CONCENTRATION (33 Hours)
Undergraduate prerequisite: A baccalaureate degree and the following courses or their equivalents: STA 290, 291; MAT 191, 292; and CSC 130 or 230 or 231.

Foundation Courses (7 hours)
- STA 551 Introduction to Probability (3)
- STA 552 Introduction to Mathematical Statistics (3)
- STA 581 SAS System for Statistical Analysis (1)

Students who have completed these courses as part of another degree prior to being accepted in the master's program may choose replacement courses.

Core Courses (8 hours)
- STA 661 Advanced Statistics in the Behavioral and Biological Sciences I (3)
- STA 662 Advanced Statistics in the Behavioral and Biological Sciences II (3)
- STA 668 Consulting Experience (1)
- STA 690 Graduate Seminar (1)

Statistics Electives (6-9 hours)
At least two courses chosen from the following:
- STA 670 Categorical Data Analysis (3)
- STA 671 Multivariate Analysis (3)
- STA 673 Statistical Linear Models I (3)
- STA 674 Statistical Linear Models II (3)
- STA 675 Advanced Experimental Design (3)
- STA 676 Sample Survey Methods (3)
- STA 677 Advanced Topics in Data Analysis and Quantitative Methods (3)

Interdisciplinary Electives (3-6 hours)
Student can earn the remaining credits required for the degree either by taking any STA courses at the 500 level or above (except STA 571) or by taking a maximum of six (6) hours of approved graduate courses outside of statistics. Pre-approved interdisciplinary electives are:
- CSC 523/524 Numerical Analysis and Computing (3)
- ECO 553 Economic Forecasting (3)
- ECO 722 Time Series and Forecasting (1-4)
- ECO 723 Predictive Data Mining (1-4)
- ERM 669 Item Response Theory (3)
- ERM 728 Factor Analysis and Multidimensional Scaling (3)
- ERM 729 Advanced Item Response Theory (3)
- ERM 731 Structural Equation Modeling in Education (3)
- HEA 602 Epidemiology (3)
- MAT 531 Combinatorial Analysis (3)
- MAT 541/542 Stochastic Processes (3)

Thesis or Project (Capstone Experience)
Each candidate must elect to prepare a thesis or project. Both options require 33 hours.

Thesis (6 hours)
The candidate may prepare a thesis based on the investigation of a topic in statistics. A thesis director will be appointed by the Department Head after consultation with the student and the Director of Graduate Study. Candidates will include 6 hours of thesis (STA 699) or 3 hours of STA 698 and 3 hours of STA 699 in the required 33 hours. An oral examination on the thesis is required.

Project (3 hours)
A candidate who does not prepare a thesis must complete a project under the direction of an advisor chosen by the Director of Graduate Study in consultation with the student. Three hours of STA 698 will be included in the 33 hour program.

Pure Mathematics Concentration (30-33 Hours)
The pure mathematics concentration offers a 30-hour thesis option and a 33-hour non-thesis option. At least half the work credited towards the degree must be in 600-level courses: 15 hours for the 30-hour program, and 18 hours for the 33-hour program.

Algebra and Analysis (9 hours)
Each candidate must complete any three of the following four courses:
MAT 591 Advanced Modern Algebra (3)
MAT 592 Abstract Algebra (3)
MAT 595 Mathematical Analysis (3)
MAT 596 Mathematical Analysis (3)
(Note: Students who have had appropriate algebra or analysis courses as undergraduates may be exempted from this requirement upon approval by the Director of Graduate Study. In this case, these 3, 6, or 9 hours must be replaced by the same number of hours chosen in consultation with the Director of Graduate Study.)

Students who intend to continue in the doctoral program in computational mathematics are strongly advised to complete all four of the above courses.

Core Courses (9 hours)
At least 9 hours of course work must be chosen from the following list. At least 6 of these hours must constitute a complete year-long sequence.
MAT 631, 632 Combinatorics and Graph Theory (3) (3)
MAT 647, 648 Linear Algebra and Matrix Theory (3) (3)
MAT 688, 689 Mathematical Logic and Axiomatic Set Theory (3) (3)
MAT 691, 692 Modern Abstract Algebra (3) (3)
MAT 693, 694 Complex Analysis (3) (3)
MAT 695, 696 Real Analysis (3) (3)
MAT 697, 698 General Topology (3) (3)

Electives (6-15 hours)
With prior approval of the Director of Graduate Study, a student will select 6-15 hours of other 500-600 level mathematics courses.

Thesis or Comprehensive Examination (Capstone Experience)
Each candidate may elect to (1) prepare a thesis or (2) pass a written comprehensive examination on his/her program of course work. The thesis option is a 30-hour program, and the non-thesis option is a 33-hour program.

Thesis (6 hours)
The candidate may prepare a thesis based on the investigation of a topic in mathematics. A thesis director will be appointed by the Department Head after consultation with the student and the Director of Graduate Study. Candidates may include up to 6 hours of thesis (MAT 699) in the required 30 hours. An oral examination on the thesis is required.

Comprehensive Examination
A candidate who does not prepare a thesis must take 33 hours of course work and pass a written comprehensive examination of his/her program. This requirement can be met by passing three of the department's doctoral qualifying examinations. Please consult with the Director of Graduate Study for further details.