Department of Mathematics

The Department of Mathematics offers Master of Science degrees in Applied Mathematics–Industrial Mathematics, Mathematics, and Mathematics Education.

- M.S. in Applied Mathematics–Industrial Mathematics (p. 1)
- M.S. in Mathematics (p. 1)
- M.S. in Mathematics Education (p. 2)

Master of Science Degree in Applied Mathematics–Industrial Mathematics

The Master of Science Degree in Applied Mathematics–Industrial Mathematics is designed to provide students the opportunity for advanced training in marketable areas of Applied Mathematics, using research to solve real-world problems in the field of Applied Mathematics, and with preparation for leadership positions in the field. In order to provide students with advanced training in marketable areas, 24 semester credit hours of graduate mathematics courses and 3 semester credit hours of a course in the Colleges of Sciences or Engineering are required. Research exposure to and experience with real-world problems will be provided by enrollment in AIM 6943 Internship and Research Project. This course introduces students to research problems in the field as well as the opportunities to solve a real-life problem in an industrial setting. Students will prepare for leadership positions in the field by taking two courses in communication, leadership, and/or basic business practices.

Program Admission Requirements

To be admitted to the degree program for the M.S. in Applied Mathematics–Industrial Mathematics, applicants must satisfy the University-wide requirements for admission to graduate programs. The applicant must have completed a bachelor’s degree in mathematics, science, engineering, or a related field and must have taken Calculus I, Calculus II, Linear Algebra, and an upper-division course in mathematics. The applicant must submit a résumé, scores from the Graduate Record Examination (GRE), and three letters of reference from qualified scientists, mathematicians, or supervisors that can certify their ability to pursue studies in applied mathematics at the Master’s level.

Degree Requirements

Degree candidates are required to successfully complete 36 semester credit hours and meet University-wide degree requirements. Students admitted to the program must consult the Graduate Advisor of Record for their individual study plans and get approval before enrollment in each course.

Candidates for the degree must complete:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIM 5113</td>
<td>Introduction to Industrial Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>AIM 5283</td>
<td>Linear Algebra and Matrix Theory</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5203</td>
<td>Theory of Functions of a Real Variable I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5223</td>
<td>Theory of Functions of a Complex Variable I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5293</td>
<td>Numerical Linear Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

* Internship and Research Project

Upon completion of 18 semester credit hours in mathematics, a student is eligible to enroll in advanced courses selected from disciplines in the Colleges of Sciences or Engineering. The student must spend a semester in an industrial setting and must complete an internship-related project. To complete the internship-related project, the student will:

1. Submit either an employment letter from a company or a pre-internship proposal outlining the proposed work for approval by the student’s Supervising Professor.
2. Complete the proposed work after the internship has been completed.
3. Defend the project before the deadlines set forth by the University.

Students currently employed in industry may negotiate an alternative internship experience.

Master of Science Degree in Mathematics

Program Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, a Bachelor of Arts or Bachelor of Science in Mathematics is highly recommended as preparation. However, exceptional applicants with a Bachelor’s degree in a closely related field may also be considered for admission. Students who do not qualify for unconditional admission should anticipate that additional undergraduate and/or graduate coursework may be required to complete the degree. Applicants should provide scores from the Graduate Record Examination (GRE). It is recommended that the applicant submit two letters of reference, preferably from those who can speak to the applicant’s mathematical abilities.

Degree Requirements

Degree candidates are required to successfully complete 36 semester credit hours in one of two concentrations, (1) Mathematics or (2) Applied Mathematics.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MAT 5323</td>
<td>Mathematical Modeling</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5603</td>
<td>Numerical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5613</td>
<td>Numerical Solutions of Differential Equations I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5653</td>
<td>Differential Equations I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5673</td>
<td>Partial Differential Equations I</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5973</td>
<td>Directed Research</td>
<td>3</td>
</tr>
<tr>
<td>MAT 5983</td>
<td>Topics in Applied Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>MAT 6603</td>
<td>Optimization Techniques in Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>C. 3 semester credit hours of electives: Upon completion of 18 semester credit hours in mathematics, a student is eligible to enroll in advanced courses selected from disciplines in the Colleges of Sciences or Engineering.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>AIM 6943</td>
<td>Internship and Research Project</td>
<td>3</td>
</tr>
<tr>
<td>E. 6 semester credit hours selected from coursework in communications, leadership skills, and business principles such as:</td>
<td>6</td>
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<tr>
<td>MGT 5003</td>
<td>Conceptual Foundations of Management</td>
<td></td>
</tr>
<tr>
<td>MGT 5043</td>
<td>Management and Behavior in Organizations</td>
<td></td>
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<tr>
<td>MGT 5093</td>
<td>Leadership</td>
<td></td>
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</table>

Total Credit Hours: 36
A. Students must complete the following 9 hours of required coursework:

- MAT 5203 Theory of Functions of a Real Variable I
- MAT 5223 Theory of Functions of a Complex Variable I
- MAT 5243 General Topology I

B. Students must complete 9 hours of required coursework for the selected concentration:

**Mathematics Concentration**

- MAT 5173 Algebra I
- MAT 5283 Linear Algebra and Matrix Theory
- MAT 5403 Functional Analysis I

**Applied Mathematics Concentration**

- MAT 5293 Numerical Linear Algebra
- MAT 5603 Numerical Analysis
- MAT 5653 Differential Equations I

C. Students must normally take an additional 18 semester credit hours of coursework chosen from eligible graduate courses in the Department of Mathematics. Students may apply a maximum of 6 semester credit hours of graduate coursework from other disciplines as approved by the Graduate Advisor of Record. Undergraduate coursework taken for graduate credit must be approved by the Graduate Review Committee and may not exceed 6 hours of credit.

D. Students are required to pass an advanced comprehensive examination or successfully defend their thesis research results.

**Total Credit Hours**

36

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**Master of Science Degree in Mathematics Education**

**Program Admission Requirements**

In addition to satisfying the University-wide graduate admission requirements, a Bachelor of Arts or Bachelor of Science in Mathematics or a closely related field is highly recommended as preparation. Students who do not qualify for unconditional admission should anticipate that additional undergraduate and/or graduate coursework may be required to complete the degree. It is recommended that the applicant submit two letters of reference, preferably from those who can speak to the applicant's mathematical abilities. Applicants must submit a personal statement describing how an M.S. in Mathematics Education will advance the applicant's personal and professional goals.

**Degree Requirements**

Degree candidates are required to successfully complete 36 semester credit hours.

A. Students must complete the following courses:

- MAT 5023 Problem-Solving Seminar
- MAT 5033 Foundations and Fundamental Concepts of Mathematics
- MAT 5043 Euclidean and Non-Euclidean Geometry
- MAT 5103 Introduction to Mathematical Analysis
- MAT 5283 Linear Algebra and Matrix Theory
- MAT 5963 Introduction to Mathematics Education Research

B. Students must either write a Master’s thesis or complete 6 semester credit hours of advanced courses in the department as approved by the Graduate Advisor of Record.

**Total Credit Hours**

36