The Department of Mathematics offers the following undergraduate and graduate programs. Specific requirements for these programs are listed within this Department of Mathematics section in the following order:

**Undergraduate Majors (B.A.)**
- Mathematics (p. 1)
- Mathematics-Statistics/Actuarial Science (p. 2)
- Mathematics-Teaching (p. 2)

**Minors**
- Data Science (p. 3) (also listed in Department of Computer Science and Department of Physics)
- Mathematics (p. 4)
- Mathematics-Teaching (p. 4)
- Mathematics (K-8)-Teaching (p. 4)
- Statistics and Actuarial Science (p. 5)

**Graduate Majors (M.A.)**
- Mathematics (p. 5):
  - Mathematics emphasis
  - Secondary Teaching emphasis
  - Community College Teaching emphasis
- Mathematics for the Elementary and Middle Grades (K-8) (p. 6)

**Graduate Majors (P.S.M.)**
- Industrial Mathematics (p. 7)

**Program Certificate**
- Statistical Computing (p. 8)

**Notes:**
1. A student majoring or minoring in mathematics, who has a grade point average of less than 2.25 in all departmental courses used for that major or minor may not apply a departmental course in which a grade of less than C- is earned to her/his major or minor.
2. Undergraduate students who have been admitted to the university provisionally because of non-satisfaction of the high school mathematics requirements may not enroll in any mathematics credit course before this requirement has been met.
3. Students who complete the requirements for more than one program (major or minor) within mathematics may have that noted on their transcripts.

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**Bachelor of Arts Degree Programs**

**Mathematics Major**

The Mathematics major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours. Students are encouraged to discuss Undergraduate Research (MATH 4990) with their adviser.

**Common core:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1420</td>
<td>Calculus I *</td>
</tr>
<tr>
<td>MATH 1421</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MATH 2422</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MATH 2500</td>
<td>Linear Algebra for Applications</td>
</tr>
</tbody>
</table>

**Mathematics core:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 2900</td>
<td>Discrete and Argumentative Mathematics</td>
</tr>
<tr>
<td>MATH 4420/5420</td>
<td>Advanced Calculus I</td>
</tr>
<tr>
<td>MATH 4421/5421</td>
<td>Advanced Calculus II</td>
</tr>
<tr>
<td>MATH 4500/5500</td>
<td>Modern Algebra I</td>
</tr>
<tr>
<td>MATH 4501/5501</td>
<td>Modern Algebra II</td>
</tr>
<tr>
<td>MATH 4900</td>
<td>Senior Mathematics Seminar</td>
</tr>
</tbody>
</table>

**Probability/Statistics:** select one of the following. MATH/STAT 3751 will not satisfy this requirement if a student has credit for STAT 1772.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH/STAT 3751</td>
<td>Probability and Statistics</td>
</tr>
<tr>
<td>STAT 1772</td>
<td>Introduction to Statistical Methods</td>
</tr>
</tbody>
</table>

and

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH/STAT 3752</td>
<td>Introduction to Probability</td>
</tr>
<tr>
<td>STAT 1772</td>
<td>Introduction to Statistical Methods</td>
</tr>
<tr>
<td>&amp; STAT 3771/5771</td>
<td>and Applied Statistical Methods for Research</td>
</tr>
</tbody>
</table>

**Electives:** Select two of the following. MATH/STAT 3752/5752 cannot be used if used for the Probability/Statistics requirement. Other junior/senior level mathematics courses may be substituted with approval of advisor and Department Head.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 3410/5410</td>
<td>Dynamical Systems: Chaos Theory and Fractals</td>
</tr>
<tr>
<td>MATH 3425/5425</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>MATH 3440/5440</td>
<td>Numerical Analysis *</td>
</tr>
<tr>
<td>MATH 3530/5530</td>
<td>Combinatorics</td>
</tr>
<tr>
<td>MATH 3600/5600</td>
<td>Euclidean Geometry</td>
</tr>
<tr>
<td>MATH 3610/5610</td>
<td>Modern Geometries</td>
</tr>
<tr>
<td>MATH 3630/5630</td>
<td>Differential Geometry</td>
</tr>
<tr>
<td>MATH 3640/5640</td>
<td>History of Mathematics</td>
</tr>
<tr>
<td>MATH/ACT SCI 3780</td>
<td>Mathematics of Finance</td>
</tr>
</tbody>
</table>
Mathematics Major-Statistics/Actuarial Science

The Mathematics-Statistics/Actuarial Science major requires a minimum of 120 total hours to graduate. This total includes UNIFI/General Education requirements and the following specified major requirements, plus electives to complete the minimum of 120 hours.

The major is available in two emphases, the Statistics emphasis and the Actuarial Science emphasis. Each emphasis requires completion of the common core, the seminar/research requirement, the core for the chosen emphasis (Statistics or Actuarial Science), and 6 hours of electives that do not duplicate course work chosen to meet the chosen emphasis (Statistics or Actuarial Science) core requirement.

Required
Mathematics:
Common core: 15
MATH 1420 Calculus I*
MATH 1421 Calculus II
MATH 2422 Calculus III
MATH 2500 Linear Algebra for Applications

Statistics/Actuarial Science core: 9
STAT 1772 Introduction to Statistical Methods
or STAT 1774 Introductory Statistics for Life Sciences
STAT 3775/5775 Introduction to Mathematical Statistics
MATH/STAT 3752 Introduction to Probability

Computer Programming: 3-4
Select one of the following:
CS 1130 Visual BASIC Programming
CS 1160 C/C++ Programming
CS 1510 Introduction to Computing
STAT 4772/5772 Statistical Computing I

Seminar/research: 1-3
MATH 4900 Senior Mathematics Seminar
or MATH 4990 Undergraduate Research in Mathematics

Select and complete ONE of the following Emphasis Core: 9
Statistics Emphasis Core:
Select three from the following:
STAT 3771/5771 Applied Statistical Methods for Research

Actuarial Science Emphasis Core:
Select three from the following:
ACT SCI/MATH 3780 Mathematics of Finance
ACT SCI 4735/5735 Actuarial Mathematics
ACT SCI 4739/5739 Topics in Actuarial Science, Topics in Actuarial Science: Long-Term Actuarial Mathematics
ACT SCI 4788/5788 Loss Models
ACT SCI 4785/5785 Introduction to Financial Engineering

Electives 6
Select two electives from the following list. The same course cannot be used to satisfy both the emphasis core and elective requirement.

STAT 3771/5771 Applied Statistical Methods for Research
STAT 3776/5776 Regression Analysis
STAT 3778/5778 Spatial Data Analysis
STAT 4772/5772 Statistical Computing I
STAT 4773/5773 Design and Analysis of Experiments
STAT 4777/5777 Statistical Quality Assurance Methods
STAT 4779/5779 Applied Multivariate Statistical Analysis
STAT 4782/5782 Statistical Computing II
ACT SCI 3731 Actuarial Examination Preparation **
ACT SCI 4735/5735 Actuarial Mathematics
ACT SCI 4739/5739 Topics in Actuarial Science, Topics in Actuarial Science: Long-Term Actuarial Mathematics
ACT SCI 4785/5785 Introduction to Financial Engineering
ACT SCI 4788/5788 Loss Models
MATH 3440/5440 Numerical Analysis
MATH 3780/5780 Mathematics of Finance

Total Hours 43-46

* MATH 1420 has prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.
** ACT SCI 3731 may be repeated for credit for preparation for different exams, however only 3 hours will count toward the Statistics/Actuarial Science major.
requirements, the Professional Education Requirements, and the following specified major requirements to complete the minimum of 122-123 hours.

This major leads to endorsement #143: 5-12 Mathematics.

### Required

**Mathematics:**

**Common core:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
</table>
| MATH 1420    | Calculus I *                              | 4
| MATH 1421    | Calculus II                              | 4
| MATH 2422    | Calculus III                             | 4
| MATH 2500    | Linear Algebra for Applications          | 3

**Teaching core:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
</table>
| MATH 1310    | Technology for Secondary Mathematics Teachers | 3
| MATH 2303    | Introduction to Teaching Secondary Mathematics | 3
| MATH 2900    | Discrete and Argumentative Mathematics    | 3
| MATH 3302    | Field Experience in Teaching Secondary Mathematics | 1
| MATH 3304    | The Teaching of Secondary Mathematics     | 3
| MATH 3305    | Connections: University Mathematics and the Secondary Curriculum | 3
| MATH 3313    | Topics in Secondary Mathematics          | 3
| MATH 3600/5600 | Euclidean Geometry                      | 3
| MATH 4500/5500 | Modern Algebra I                         | 3

**Probability and Statistics:**

Select one of the following. MATH 3751 / STAT 3751 will not satisfy this requirement if a student has credit for STAT 1772.

Select two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH/STAT 3751</td>
<td>Probability and Statistics</td>
</tr>
<tr>
<td>STAT 1772</td>
<td>Introduction to Statistical Methods</td>
</tr>
<tr>
<td>&amp; MATH 3752/5752</td>
<td>and Introduction to Probability</td>
</tr>
<tr>
<td>STAT 1772</td>
<td>Introduction to Statistical Methods</td>
</tr>
<tr>
<td>&amp; STAT 3771/5771</td>
<td>and Applied Statistical Methods for Research</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 3530/5530</td>
<td>Combinatorics</td>
</tr>
<tr>
<td>MATH 3610/5610</td>
<td>Modern Geometries</td>
</tr>
<tr>
<td>MATH 4420/5420</td>
<td>Advanced Calculus I</td>
</tr>
<tr>
<td>MATH 4501/5501</td>
<td>Modern Algebra II</td>
</tr>
<tr>
<td>MATH 4510/5510</td>
<td>Elementary Number Theory</td>
</tr>
<tr>
<td>MATH 4615/5615</td>
<td>Geometric Transformations</td>
</tr>
</tbody>
</table>

**Computer Science:**

Select one of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1120</td>
<td>Media Computation</td>
</tr>
<tr>
<td>CS 1130</td>
<td>Visual BASIC Programming</td>
</tr>
<tr>
<td>CS 1160</td>
<td>C/C++ Programming</td>
</tr>
</tbody>
</table>

### Notes:

For departmental approval to student teach, a student in the program must satisfy the University requirements to student teach and the following specific departmental requirements:

1) Must earn a C– or better in: MATH 1420, MATH 1421, MATH 2500, MATH 2900, MATH 3302, MATH 3600/5600, MATH 4500/5500, and courses taken to satisfy the Probability and Statistics and Computer Science requirements.

2) MATH 3302 is offered credit/no credit only effective Fall 2019 and beyond, and student must pass this course.

3) Must earn a grade of C or higher in: MATH 2303 and MATH 3304.

4) Must complete all of the courses in the major with a major grade point average of 2.50 or higher.

### Minors

#### Data Science Minor

The Data Science minor is an interdisciplinary program that integrates computer programming, machine learning, statistics, predictive modeling and visualization to provide students with broad based skills for extracting gainful information from data that originate from a variety of sources. A final project (ideally with corporate or non-profit partnerships) will ensure that students employ their skills to solve a real-world problem.

**Statistics:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
</table>
| STAT 1772    | Introduction to Statistical Methods      | 3
| STAT 4784/5784 | Introduction to Machine Learning         | 3

**Computer Science:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
</table>
| CS 1510      | Introduction to Computing                | 4
| CS 2150      | Computing for Data Science               | 3-7
| CS 1520      | Data Structures                          |
| & CS 1800    | and Discrete Structures                  |
| CS 3140/5140 | Database Systems                         | 3

**Physics:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
</table>
| PHYSICS 4160/5160 | Data Visualization, Modeling and Simulation | 3

**Required Data Science Project**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 4800</td>
<td>Undergraduate Research in Computer Science</td>
</tr>
<tr>
<td>or MATH 4990</td>
<td>Undergraduate Research in Mathematics</td>
</tr>
<tr>
<td>or PHYSICS 3000</td>
<td>Undergraduate Research in Physics</td>
</tr>
</tbody>
</table>

### Total Hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS ED 1320</td>
<td>Fundamentals of Programming</td>
</tr>
<tr>
<td>CS 1510</td>
<td>Introduction to Computing</td>
</tr>
</tbody>
</table>

| Total Hours  | 52-56

* MATH 1420 has a prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.
Mathematics Minor

Required

Mathematics:

MATH 1420  Calculus I  *  
MATH 1421  Calculus II  
MATH 2500  Linear Algebra for Applications  

Electives

Mathematics:

ACT SCI 4739/5739  Topics in Actuarial Science, Topics in Actuarial Science: Long-Term Actuarial Mathematics  
MATH 2422  Calculus III  
MATH 2900  Discrete and Argumentative Mathematics  
MATH 3410/5410  Dynamical Systems: Chaos Theory and Fractals  
MATH 3422/5422  Differential Equations  
MATH 3430/5430  Partial Differential Equations  
MATH 3440/5440  Numerical Analysis  
MATH 3530/5530  Combinatorics  
MATH 3600/5600  Euclidean Geometry  
MATH 3610/5610  Modern Geometries  
MATH 3630/5630  Differential Geometry  
MATH 3640/5640  History of Mathematics  
MATH 3751  Probability and Statistics  
MATH/STAT 3752  Introduction to Probability  
MATH 4420/5420  Advanced Calculus I  
MATH 4421/5421  Advanced Calculus II  
MATH 4460/5460  Introduction to Complex Analysis  
MATH 4500/5500  Modern Algebra I  
MATH 4501/5501  Modern Algebra II  
MATH 4510/5510  Elementary Number Theory  
MATH 4615/5615  Geometric Transformations  
MATH 4641/5641  Topology I  
STAT 3775/5775  Introduction to Mathematical Statistics  
STAT 3776/5776  Regression Analysis  
STAT 4777/5777  Statistical Quality Assurance Methods  
STAT 4779/5779  Applied Multivariate Statistical Analysis  

Total Hours  23  

*  MATH 1420 has prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.

Mathematics Minor-Teaching

This minor leads to endorsement #143: 5-12 Mathematics.

Required

Mathematics:

MATH 1420  Calculus I  *  

Mathematics Minor (K-8)-Teaching

This minor leads to endorsement #142: K-8 Mathematics.

Required

Mathematics:

MATH 1204  Mathematical Reasoning  
MATH 2204  Mathematical Reasoning for Elementary Teachers II  
MATH 3204  Mathematical Reasoning for Elementary Teachers III  

Total Hours  33-34  

*  MATH 1420 has prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.

Notes: For departmental approval to student teach, a student in the program must satisfy the University requirements to student teach and the following specific departmental requirements:

1) Must earn a C– or better in MATH 1420, MATH 1421, MATH 2500, MATH 2900, MATH 3302, MATH 3600, MATH 4500, and STAT 1772 or STAT 1774 or MATH 3304.

2) MATH 3302 is offered credit/no credit only effective Fall 2019 and beyond, and student must pass this course.

3) Must earn a grade of C or higher in MATH 2303 and MATH 3304.

4) Must complete all of the courses in the minor with a minor grade point average of 2.50 or higher.

*  MATH 1420 has prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.

Mathematics Minor (K-8)-Teaching

This minor leads to endorsement #142: K-8 Mathematics.

Required

Mathematics:

MATH 1204  Mathematical Reasoning  
MATH 2204  Mathematical Reasoning for Elementary Teachers II  
MATH 3204  Mathematical Reasoning for Elementary Teachers III  

Total Hours  33-34  

*  MATH 1420 has prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.

Notes: For departmental approval to student teach, a student in the program must satisfy the University requirements to student teach and the following specific departmental requirements:

1) Must earn a C– or better in MATH 1420, MATH 1421, MATH 2500, MATH 2900, MATH 3302, MATH 3600, MATH 4500, and STAT 1772 or STAT 1774 or MATH 3751.

2) MATH 3302 is offered credit/no credit only effective Fall 2019 and beyond, and student must pass this course.

3) Must earn a grade of C or higher in MATH 2303 and MATH 3304.

4) Must complete all of the courses in the minor with a minor grade point average of 2.50 or higher
MATH 3211  Introduction to Algebraic Thinking for Elementary Teachers  3
MATH 3212/5212  Introduction to Geometry and Measurement for Elementary Teachers  3
MATH 3213/5213  Topics in Mathematics for Grades K-8  3
MATH 3214/5214  Problem Solving in Mathematics for Elementary Teachers  3

Computer Science:
CS ED 1310  Programming Environments for Elementary Education  3

Total Hours  24

Statistics and Actuarial Science Minor

Complete one of the following emphases

Actuarial Science emphasis:  14
MATH 1420  Calculus I  4
MATH 1421  Calculus II  4
ACT SCI/MATH 3780  Mathematics of Finance  3
MATH/STAT 3752  Introduction to Probability  3

Statistics emphasis  12
STAT 1772  Introduction to Statistical Methods  3
STAT 3771/5771  Applied Statistical Methods for Research  3
STAT 4772/5772  Statistical Computing I  3
STAT 4782/5782  Statistical Computing II  3

Electives  9
Select three courses from the following or from the emphasis not chosen:
ACT SCI 3731  Actuarial Examination Preparation  3
ACT SCI 4785/5785  Introduction to Financial Engineering  3
ACT SCI 4735/5735  Actuarial Mathematics  3
ACT SCI 4788/5788  Loss Models  3
MATH 2422  Calculus III  4
MATH 2500  Linear Algebra for Applications  3
STAT 3775/5775  Introduction to Mathematical Statistics  3
STAT 3776/5776  Regression Analysis  3
STAT 3778/5778  Spatial Data Analysis  3
STAT 4773/5773  Design and Analysis of Experiments  3
STAT 4777/5777  Statistical Quality Assurance Methods  3
STAT 4779/5779  Applied Multivariate Statistical Analysis  3

Total hours  21-24

* MATH 1420 has a prerequisite of satisfactory score on mathematics placement exam or subsequent remediation.

Master of Arts Degree Programs

Major in Mathematics

The major in Mathematics is available in three emphases: Mathematics, Secondary Teaching, and Community College Teaching.

Only graduate courses (course numbers 5000 or above) will apply to a graduate degree, even if the undergraduate course number (4999 or less) is listed. No exceptions will be made.

The Mathematics emphasis is available on the thesis and non-thesis options. A minimum of 36 hours is required for the thesis option, including 6 hours of MATH 6299 and a minimum of 15 additional hours of 6000-level course work. A minimum of 33 hours is required for the non-thesis option, including a minimum of 3 hours of MATH 6299 and a minimum of 15 additional hours of 6000-level course work.

The Secondary Teaching emphasis is offered on a non-thesis option only; a minimum of 30 hours, including a minimum of 18 hours of 6000-level course work is required.

The Community College Teaching emphasis is offered on a non-thesis option only; a minimum of 30 hours, including a minimum of 15 hours of 6000-level course work is required.

Students interested in this program must submit a completed Application for Admission to Graduate Study and should refer to their MyUNIverse Student Center To-Do list or contact the Department of Mathematics for other application requirements. Graduate information and application for graduate admission can be found at https://admissions.uni.edu/application.

The Graduate Record Examination (General Test) is not required for admission to the program.

Courses taken to satisfy B.A. requirements may not be repeated to count toward the graduate program.

Successful completion of a final written comprehensive examination is required for the non-thesis option on the Mathematics emphasis only.

Mathematics Emphasis

Required
Mathematics:
MATH 3630/5630  Differential Geometry  3
or MATH 4615/5615 Geometric Transformations
MATH 6420  Mathematical Analysis I  3
MATH 6460  Complex Analysis I  3
MATH 6500  Abstract Algebra I  3
Select at least two of the following:  6
MATH 6421  Mathematical Analysis II
MATH 6461  Complex Analysis II
MATH 6501  Abstract Algebra II
Research:  3 or 6
MATH 6299  Research
Thesis option (6 hours)
Non-thesis option (3 hours)

Electives 12

Mathematics:
Select 12 hours from any of the courses listed above that were not used for the requirements there or from among the following:

- ACT SCI 4739/5739: Topics in Actuarial Science; Topics in Actuarial Science: Long-Term Actuarial Mathematics
- MATH 3425/5425: Differential Equations
- MATH 3430/5430: Partial Differential Equations
- MATH 3440/5440: Numerical Analysis
- MATH 3530/5530: Combinatorics
- MATH 3640/5640: History of Mathematics
- MATH/STAT 3752: Introduction to Probability
- MATH 4421/5421: Advanced Calculus II
- MATH 4460/5460: Introduction to Complex Analysis
- MATH 4501/5501: Modern Algebra II
- MATH 4641/5641: Topology I
- MATH 6201: Foundations of Mathematics Education
- MATH 6381: Current Research in Mathematics Education
- MATH 6225: Teaching and Learning Mathematics
- MATH 6209: Mathematics Curriculum and Assessment
- MATH 6410: Foundations of Calculus
- MATH 6670: Non-Euclidean Geometry

Total hours thesis option 36
Total hours non-thesis option 33

Secondary Teaching Emphasis

The Secondary Teaching emphasis is designed for secondary school mathematics teachers interested in developing a deeper background in mathematics and pedagogy to enhance teaching and increase student learning.

Required
Mathematics Education:
- MATH 6201: Foundations of Mathematics Education
- MATH 6381: Current Research in Mathematics Education
- MATH 6209: Mathematics Curriculum and Assessment
- MATH 6225: Teaching and Learning Mathematics
- MATH 6236: Equity and Mathematics Education

Total Hours 30

Community College Teaching Emphasis
The Community College Teaching emphasis is designed to serve those seeking to prepare for a career in community college teaching or working professionals in the field who are seeking career advancement.

Required
Mathematics Education:
- MATH 6201: Foundations of Mathematics Education
- MATH 6381: Current Research in Mathematics Education
- MATH 6225: Teaching and Learning Mathematics
- MATH 6209: Mathematics Curriculum and Assessment
- MATH 6504: Advanced Linear Algebra
- MATH 6370: Applied Linear Statistical Methods
- MATH 6770: Non-Euclidean Geometry
- MATH 6410: Foundations of Calculus

Total Hours 30

Major in Mathematics for the Elementary and Middle Grades (K-8)
This major is intended for teachers interested in mathematics for the elementary and middle grades (K-8) and for mathematics specialists and supervisors. Teacher licensure is a prerequisite for completing the program approval process for this major. Normally, candidates will have at least 2 years teaching experience.

Mathematics:
- MATH 6371: Probability and Statistical Inference
- MATH 6370: Applied Linear Statistical Methods

Select one course from the following:
- MATH 6212: Foundations of Algebraic Reasoning
- MATH 6504: Advanced Linear Algebra

Select One Course from the Following:
- MATH 6215: Foundations of Geometric Reasoning
- MATH 6670: Non-Euclidean Geometry

Select One Course from the Following:
- MATH 6410: Foundations of Calculus
- MATH 6205: Teaching Rational Numbers and Proportionality

Total Hours 30
Students interested in this program must submit a completed Application for Admission to Graduate Study and should refer to their MyUNIverse Student Center To-Do list or contact the Department of Mathematics for other application requirements. Graduate information and application for graduate admission can be found at https://admissions.uni.edu/application.

The Graduate Record Examination (General Test) is not required for admission to the program.

Only graduate courses (course numbers 5000 or above) will apply to a graduate degree, even if the undergraduate course number (4999 or less) is listed. No exceptions will be made.

This major is available on the non-thesis option only; a minimum of 30 hours is required. A minimum of 15 hours of 6000-level course work is required.

### Required

<table>
<thead>
<tr>
<th>Mathematics Education:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 6201</td>
<td>Foundations of Mathematics Education</td>
</tr>
<tr>
<td>MATH 6205</td>
<td>Teaching Rational Numbers and Proportionality</td>
</tr>
<tr>
<td>MATH 6212</td>
<td>Foundations of Algebraic Reasoning</td>
</tr>
<tr>
<td>MATH 6215</td>
<td>Foundations of Geometric Reasoning</td>
</tr>
<tr>
<td>MATH 6381</td>
<td>Current Research in Mathematics Education</td>
</tr>
<tr>
<td>MATH 6227</td>
<td>Data Analysis, Probability, and Discrete Mathematical Reasoning</td>
</tr>
<tr>
<td>MATH 6225</td>
<td>Teaching and Learning Mathematics</td>
</tr>
<tr>
<td>MATH 6236</td>
<td>Equity and Mathematics Education</td>
</tr>
<tr>
<td>MATH 6216</td>
<td>Number and Operations</td>
</tr>
<tr>
<td>MATH 6209</td>
<td>Mathematics Curriculum and Assessment</td>
</tr>
</tbody>
</table>

**Total Hours** 30

### Professional Science Master’s Degree Program

#### Major in Industrial Mathematics

The Professional Science Master’s Degree in Industrial Mathematics is designed to prepare students for a career in industry. The curriculum combines a business and experiential component with advanced course work.

Students interested in this program must submit a completed Application for Admission to Graduate Study and should refer to their MyUNIverse Student Center To-Do list or contact the Department of Mathematics for any other application requirements. Graduate information and application for graduate admission can be found at https://admissions.uni.edu/application.

The Graduate Record Examination (General Test) is not required for admission to the program.

Only graduate courses (course numbers 5000 or above) will apply to a graduate degree, even if the undergraduate course number (4999 or less) is listed. No exceptions will be made.

This major is a non-thesis program. A minimum of 30 hours is required. A minimum of 12 hours of 6000-level course work is required.

No comprehensive examination is required for this non-thesis option.

Requirements for admission to the program include the completion of a bachelor’s degree with a GPA of 3.00 or higher and successful completion of the following university-level courses:

#### Prerequisite Courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1420</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1421</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2422</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2500</td>
<td>Linear Algebra for Applications</td>
<td>3</td>
</tr>
<tr>
<td>STAT 1772</td>
<td>Introduction to Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>CS 1130</td>
<td>Visual BASIC Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 1160</td>
<td>C/C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 1510</td>
<td>Introduction to Computing</td>
<td>4</td>
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</table>

One course in computer programming (or equivalent):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 6250</td>
<td>Strategic Planning and Organization Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 6262</td>
<td>Cross-Functional Operations</td>
<td>3</td>
</tr>
<tr>
<td>FIN 3130/5130</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 3160/5160</td>
<td>Principles of Investments</td>
<td>3</td>
</tr>
<tr>
<td>FIN 6266</td>
<td>Financial Management and Markets</td>
<td>3</td>
</tr>
<tr>
<td>TECH 3024/5024</td>
<td>Solid Modeling and Additive Manufacturing for Design</td>
<td>3</td>
</tr>
<tr>
<td>TECH 3147</td>
<td>Computer Aided Manufacturing</td>
<td>3</td>
</tr>
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</table>

**Electives from the following:** 21

**Required Core:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 6745</td>
<td>Deterministic Operations Research</td>
<td>3</td>
</tr>
<tr>
<td>MATH 6747</td>
<td>Discrete-Event System Simulation</td>
<td>3</td>
</tr>
<tr>
<td>MATH 6796</td>
<td>PSM Capstone Project</td>
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</tr>
</tbody>
</table>

**Marketing:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 4170/5170</td>
<td>Marketing Strategy</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 6170</td>
<td>Marketing Management</td>
<td>3</td>
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</tbody>
</table>

**Management:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 6250</td>
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<td>3</td>
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</tbody>
</table>

**Finance:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
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<td>3</td>
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<tr>
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</table>

**Technology:**

<table>
<thead>
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<th>Course Title</th>
<th>Hours</th>
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</thead>
<tbody>
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<td>TECH 3024/5024</td>
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<td>3</td>
</tr>
<tr>
<td>TECH 3147</td>
<td>Computer Aided Manufacturing</td>
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</tr>
</tbody>
</table>

**Mathematics:**
### Statistical Computing Certificate

**Required:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 3771/5771</td>
<td>Applied Statistical Methods for Research</td>
<td>3</td>
</tr>
<tr>
<td>STAT 4772/5772</td>
<td>Statistical Computing I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 4782/5782</td>
<td>Statistical Computing II</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives:** 6 hours from the following

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 3776/5776</td>
<td>Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 3778/5778</td>
<td>Spatial Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 4773/5773</td>
<td>Design and Analysis of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>STAT 4779/5779</td>
<td>Applied Multivariate Statistical Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Any other courses with the consent of the mathematics department

**Total Hours** 15

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### Program Certificates

The University of Northern Iowa makes available, in addition to traditional programs, the opportunity for students to earn program certificates. Program certificates provide an alternative to programs leading to a degree, a major, or a minor; they certify that an individual has completed a program approved by the university. For information on the following certificates, contact the Department of Mathematics or the Office of the Registrar, which serves as the centralized registry.