The mathematics named option programs allow students to develop a deep understanding of how the subject relates to other areas of human inquiry. The requirements for these programs feature mathematics courses with topics inspired by and commonly applied to problems in these associated fields. Though often paired with a second major in a related area, these programs function well alone and are suited to any mathematics student with a variety of interests. Students interested in a named option program are recommended to meet with an advisor to navigate the various plans and courses available to them. Advising information can be found on the [BA or BS pages](http://guide.wisc.edu/undergraduate/letters-science/mathematics/mathematics-ba/#advisingandcareerstext).

The named options do not support honors in the major.

## REQUIREMENTS

The Mathematics for Data and Risk Analysis program requires 10 distinct courses for at least 30 credits as described below. Note that while some courses may be used to fulfill more than one requirement it is still considered only a single course and may only contribute once to the total course count. Finally, only one course from each of the following groupings may be used to fulfill course and credit requirements: Intro Linear Algebra (MATH 320, MATH 340, MATH 341, MATH 375), Intro Differential Equations (MATH 319, MATH 320 or MATH 376), and Intro Probability (MATH/STAT 309 or MATH/STAT 431).

### Core Math Requirement (minimum of six distinct MATH courses for at least 18 credits)

- **Linear Algebra**
  - MATH 320: Linear Algebra and Differential Equations
  - or MATH 340: Elementary Matrix and Linear Algebra
  - or MATH 341: Linear Algebra
  - or MATH 375: Topics in Multi-Variable Calculus and Linear Algebra

- **Probability (Complete at least one)**
  - MATH/STAT 431: Introduction to the Theory of Probability
  - or MATH/COMP SCI 309: Introduction to Probability and Mathematical Statistics I
  - MATH 531: Probability Theory

- **Statistics**
  - MATH/STAT 310: Introduction to Probability and Mathematical Statistics II
  - or STAT 312: Introduction to Theory and Methods of Mathematical Statistics II

### Intermediate Mathematics Requirement (complete at least one)

### Advanced Mathematics Requirement (select one)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 321 &amp; MATH 322</td>
<td>Applied Mathematical Analysis and Applied Mathematical Analysis</td>
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</tr>
<tr>
<td>MATH 341</td>
<td>Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 375</td>
<td>Topics in Multi-Variable Calculus and Linear Algebra</td>
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</tr>
<tr>
<td>MATH 421</td>
<td>The Theory of Single Variable Calculus</td>
<td></td>
</tr>
</tbody>
</table>

### Elective to reach required six courses and 18 credits

Select one or more from:

- MATH/COMP SCI 513: Numerical Linear Algebra
- MATH/COMP SCI 514: Numerical Analysis
- MATH 519: Ordinary Differential Equations
- MATH 521: Analysis I
- MATH 522: Analysis II
- MATH/COMP SCI/ISY E/STAT 525: Linear Optimization
- MATH 531: Probability Theory
- MATH 535: Mathematical Methods in Data Science
- MATH 540: Linear Algebra II
- MATH 541: Modern Algebra
- MATH 542: Modern Algebra
- MATH 605: Stochastic Methods for Biology
- MATH 619: Analysis of Partial Differential Equations
- MATH 627: Introduction to Fourier Analysis
- MATH 629: Introduction to Measure and Integration
- MATH/ISY E/OTM/STAT 632: Introduction to Stochastic Processes
- MATH 635: An Introduction to Brownian Motion and Stochastic Calculus

Remaining courses/credits may be selected from:

- MATH 319: Techniques in Ordinary Differential Equations
- MATH 321: Applied Mathematical Analysis
- MATH 322: Applied Mathematical Analysis
- MATH 376: Topics in Multi-Variable Calculus and Differential Equations
- MATH 415: Applied Dynamical Systems, Chaos and Modeling
- MATH 421: The Theory of Single Variable Calculus
- MATH/COMP SCI/ISY E 425: Optimization
FOOTNOTES

1. Students taking STAT 312 to satisfy the Statistics requirement will not be able to use this course towards the six courses/18 credits of MATH courses.
2. This course must be distinct from the advanced mathematics requirement.
3. The courses which follow may have prerequisites outside of this program.
4. Any MATH course from the elective list above may be used in lieu of any of the following courses.
5. This includes any course with a MATH prefix (or cross-listed with MATH) regardless of its appearance in the tables above and any non-MATH course explicitly listed in the tables above.
6. This includes any MATH course (including those crosslisted with MATH) which are numbered 307 and above, regardless of its appearance in the tables above, as well as only those non-MATH course which appear in the tables above and have the advanced LAS attribute.
7. This includes any MATH course (and those crosslisted with MATH) numbered 307 and above.

FOUR-YEAR PLAN

SAMPLE FOUR-YEAR PLAN

This Sample Four-Year Plan is a tool to assist students and their advisor(s). Students should use it—along with their DARS report, the Degree Planner, and Course Search & Enroll tools—to make their own four-year plan based on their placement scores, credit for transferred courses and approved examinations, and individual interests. As students become involved in athletics, honors, research, student organizations, study abroad, volunteer experiences, and/or work, they might adjust the order of their courses to accommodate these experiences. Students will likely revise their own four-year plan several times during college.

In general, your four year plan in mathematics should be organized along the following sequence: 1) Calculus, 2) Linear Algebra, 3) Required Intermediate level course, 4) Additional intermediate level courses as needed, 5) Required advanced level course, 6) Additional advanced level courses.

FRESHMAN

Fall | Credits | Spring | Credits
--- | --- | --- | ---
MATH 221 | 5 | MATH 222 | 4
Literature Breadth | 3 | Literature Breadth | 3
Communication A | 3 | Ethnic Studies | 3
Foreign Language if required | 4 | Foreign Language (if required) | 4
Total | 15 | 14

SOPHOMORE

Fall | Credits | Spring | Credits
--- | --- | --- | ---
MATH 234 | 4 | MATH Required Linear Algebra | 3
Humanities Breadth | 3 | MATH required Probability | 3
Communication B | 3 | Humanities Breadth | 3

RESIDENCE AND QUALITY OF WORK

• 2.000 GPA on all MATH courses and courses eligible for the major.
• 2.000 GPA on at least 15 credits of upper level credit in the major.
• 15 credits in MATH in the major taken on the UW-Madison campus.
<table>
<thead>
<tr>
<th>Physical Science Breadth</th>
<th>3 Physical Science Breadth</th>
<th>3</th>
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<tbody>
<tr>
<td>Elective</td>
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**Junior**

<table>
<thead>
<tr>
<th>Fall</th>
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<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH required Statistics</td>
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<td>Required Intermediate MATH</td>
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</tr>
<tr>
<td>Data/Risk course</td>
<td>3</td>
<td>Data/Risk course</td>
<td>3</td>
</tr>
<tr>
<td>Social Sciences Breadth</td>
<td>3</td>
<td>Social Science Breadth</td>
<td>3</td>
</tr>
<tr>
<td>Biological Sciences Breadth</td>
<td>3</td>
<td>Biological Sciences Breadth</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>Elective</td>
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</tr>
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</tbody>
</table>

**Senior**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Advanced MATH Elective</td>
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<tr>
<td>Data/Risk course</td>
<td>3</td>
<td>Data/Risk course</td>
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</tr>
<tr>
<td>Social Science Breadth</td>
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<td>Social Science Breadth</td>
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</table>

Total Credits 120

1 Students should declare their major upon the successful completion of this course.