### Mathematics

#### Freshman Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 1371 Calculus I</td>
<td>Math 1372 Calculus II (1371)</td>
</tr>
<tr>
<td>(placement into course, or pre-req)</td>
<td></td>
</tr>
<tr>
<td>Phys 1301W Intro Physics I</td>
<td>Phys 1302W Intro Physics II (1301, &amp;Math 1372)</td>
</tr>
<tr>
<td>(Math 1371)</td>
<td></td>
</tr>
<tr>
<td>Lib Ed or Writ 1301/1401</td>
<td>Lib Ed or Writ 1301/1401</td>
</tr>
<tr>
<td>Liberal Education course</td>
<td>Liberal Education course</td>
</tr>
<tr>
<td>CSE 1001: 1st Yr Experience</td>
<td></td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 2373 Lin Alg/Diff Eq. (1372)</td>
<td>Math 2374 Multiv. Calculus</td>
</tr>
<tr>
<td></td>
<td>(1372)</td>
</tr>
<tr>
<td>Phys 2503 or 2303 Physics III (1301 offered Fall; 2303 offered Spring)</td>
<td></td>
</tr>
<tr>
<td>(1302, Math 1372)</td>
<td></td>
</tr>
<tr>
<td>CSci Requirement</td>
<td></td>
</tr>
<tr>
<td>Open Elective</td>
<td>Open Elective</td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>UD Math Algebra or Analysis</td>
<td>UD Math Algebra or Analysis</td>
</tr>
<tr>
<td></td>
<td>(placement into course, or pre-req)</td>
</tr>
<tr>
<td>UD Math Algebra or Analysis</td>
<td>UD Math Algebra or Analysis</td>
</tr>
<tr>
<td></td>
<td>(placement into course, or pre-req)</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>Technical Elective</td>
</tr>
<tr>
<td></td>
<td>(If needed to reach 120 credits)</td>
</tr>
<tr>
<td>Liberal Education course</td>
<td>Open Elective</td>
</tr>
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</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
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<tbody>
<tr>
<td>UD Math Elective</td>
<td>UD Math Elective</td>
</tr>
<tr>
<td></td>
<td>(If needed to reach 120 credits)</td>
</tr>
<tr>
<td>Open Elective (If needed to reach 120 credits)</td>
<td>Open Elective</td>
</tr>
<tr>
<td></td>
<td>(If needed to reach 120 credits)</td>
</tr>
</tbody>
</table>

### About This Plan

- This plan is not a contract. Curriculum can change.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by &) are listed below the course number and title. UD requires admission to the major prior to enrollment.
- Students can take either the CSE-only or University-wide versions of the math course (Math 1371/1271, 1372/1272, 2373/2243, 2374/2263).
- Double boxed courses, along with one of two courses with a dashed outline, are required for application to this major.
- Liberal Education and Writing requirements with an (*) will be fulfilled by taking courses required for this major at UM-TC.

### Applying to your Major

Students who have completed the required courses for admission to this major and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at z.umn.edu/csemajorapp.

### University Degree Requirements

All students must complete the following Writing & Liberal Education requirements, as noted on their APAS report. See link for full Core & Theme names: z.umn.edu/liberaleducation

### Writing Requirements:

- **University Writing:**
  - Writ 1301/1401 or equivalent

- **Writing Intensive (WI):**
  - Two: 1xxx or 2xxx level **
  - One: 3/4/5xxx level (in major)*
  - One: 3/4/5xxx level (any dept.)

### Liberal Education

**Cores:**
- Bio
- Phy*
- His
- SocS
- Ltr
- All
- Mth*

**Themes:**
- Civ
- DSJ
- Env
- GP
- TS

### Total Credits Needed for Degree: 120

### Department Contact Information

- Website: www.math.umn.edu/undergrad/
- Undergraduate Office Phone: 612-625-4848
- Undergraduate Office: 127 Vincent Hall
- Director of Undergraduate Studies: Bryan Mosher
- Email: mosher@math.umn.edu
- Department Advising: ugrad@math.umn.edu

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**Liberal Education**

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<tr>
<td>Bio</td>
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</tr>
<tr>
<td>SocS</td>
<td>GP</td>
</tr>
<tr>
<td>Ltr</td>
<td>TS</td>
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What can I do with a major in mathematics?

Mathematicians use mathematical theory, computational techniques, algorithms, and the latest computer technology to solve economic, scientific, engineering, physics, and business problems. Mathematical work is largely theoretical or applied.

Theoretical mathematicians advance mathematical knowledge by developing new principles and recognizing previously unknown relationships between existing principles of mathematics. Although these professionals seek to increase basic knowledge without necessarily considering its practical use, such pure and abstract knowledge has been instrumental in producing or furthering many scientific and engineering achievements. Many theoretical mathematicians are employed as university faculty, dividing their time between teaching and conducting research.

Applied mathematicians use theories and techniques to formulate and solve practical problems in business, government, engineering, and the physical, life, and social sciences. For example, they may analyze the most efficient way to schedule airline routes between cities, the effects and safety of new drugs, the aerodynamic characteristics of an experimental automobile, or the cost-effectiveness of alternative manufacturing processes. Applied mathematicians working in industrial research and development may develop or enhance mathematical methods when solving a difficult problem. Some mathematicians, called cryptanalysts, analyze and decipher encryption systems designed to transmit military, political, financial, or law enforcement-related information in code.

**Employers (sample listing)**

- Accenture
- Intel Corporation
- LSS Data Systems
- Traders
- Allianz Life
- Fast Enterprises, LLC
- ING
- Lockheed Martin
- Allina Hospitals & Clinics
- Express Scripts
- Garmin International
- US Bank
- Microsoft Corporation
- Towers Watson
- Securian Financial
- Cray Inc.
- Bose Corporation
- Goodrich Corporation
- St. Jude Medical
- Zimmer, Inc.
- Deloitte Consulting

**Industries (sample listing)**

- Ecology/environmental research
- Manufacturing
- Product reliability
- Clinical trials
- Public health
- Sports
- Management
- Agriculture
- Insurance
- Consulting
- Education
- Pharmaceuticals
- Government
- Business
- Research
- Banking
- Biostatistics
- Computer information
- Financial services
- Statistics
- Technology

**Positions (sample listing)**

**Actuary:** Deals with the financial impact of risk and uncertainty. Actuaries mathematically evaluate the likelihood of events and quantify the contingent outcomes to minimize loss.

**Financial Analyst:** Provides guidance to businesses and individuals making investment decisions and assess the performance of stocks, bonds, commodities, and other types of investments.

**Personal Financial Advisor:** Manages and assesses the financial needs of individuals and assists them with investments, tax laws, and insurance decisions.

**Mathematician:** Uses mathematical theory, computational techniques, algorithms, and the latest computer technology to solve economic, scientific, engineering, and business problems.

**Insurance Sales Agent:** Sells one or more types of insurance, such as property and casualty, life, health, disability, and long-term care.

**Insurance Underwriter:** Decides whether insurance is provided and under what terms. Insurance underwriters identify and calculate the risk of loss from policyholders, establish who receives a policy, determine the appropriate premium, and write policies that cover the risk.

**Statistician:** Applies mathematical and statistical knowledge to the design of surveys and experiments.

**Database Administrator:** Works with database software to develop and implement ways to manage and store data.

**Market/Survey Researcher:** Gathers information and statistical data to help companies understand what types of products customers want and determines who will buy them and at what price.

**Operations Research Analyst:** Helps managers make better decisions and solve problems by applying mathematical modeling methods to develop, interpret, and implement information.

**Economist:** Studies how society distributes resources to produce goods and services. Economists conduct research to develop forecasts on a wide variety of issues, including energy costs, inflation, interest rates, exchange rates, business cycles, taxes, employment levels, and more.

**Math Teacher/Professor:** Fosters the intellectual mathematical development of students.

*Examples From: The Occupational Outlook Handbook*

*Some positions may require an advanced degree.*