APPLIED MATHEMATICS

This degree concentration differs from the BA in Mathematics without a concentration only in the Concentration Requirements.

Bachelor of Arts - Mathematics; Applied Mathematics Concentration

College of Humanities & Sciences

Degree Specific Credits: 67

Required Cumulative GPA: 2.0

Catalog Year: 2018-2019

Note on degree specific credits: The degree specific credits are much lower for double-majors and for students completing an additional minor (in another subject):

• 42 credits for students completing a second major, and
• 46 credits for students completing a minor.

Note on the GPA requirement:

1. A cumulative GPA of 2.0 is required for all courses used to fulfill major requirements.
2. In addition, a cumulative GPA of 2.0 is required for all mathematical sciences courses used to fulfill major requirements. (Mathematical sciences courses are those with a prefix of M or STAT.)

General Education Requirements

Information regarding these requirements can be found in the General Education Section (http://catalog.umt.edu/academics/general-education-requirements) of the catalog.

Summary

Code | Title | Hours
--- | --- | ---
M 171 | Calculus I | 4
or M 181 | Honors Calculus I | 4
M 172 | Calculus II | 4
or M 182 | Honors Calculus II | 4
M 210 | Introduction to Mathematical Software | 3

M 221 | Introduction to Linear Algebra | 4
M 273 | Multivariable Calculus | 4
M 300 | Undergraduate Mathematics Seminar | 1
M 307 | Introduction to Abstract Mathematics | 3

Total Hours 23

Minimum Required Grade: C-

Upper-Division Mathematics Requirement

Rule: Complete 23 credits in this category.

Note:

1. Students completing a minor (in another subject) need take only 20 credits.
2. Students completing a second major need take only 18 credits.

Upper-Division Elective Courses

Note:

1. Students completing a minor in another subject or a second major need take only 6 courses (totaling 18 credits or more).
2. Residency Requirement: At least 4 of the courses in this category must be taken at UM-Missoula (only 3 if M 307 is taken at UM-Missoula).
3. Note that STAT 451 does not count toward this requirement.
4. In addition to counting towards this requirement, M 429 (History of Mathematics) is also an advanced college writing course. Most Mathematics majors use M 429 to meet the advanced college writing general education requirement.

Code | Title | Hours
--- | --- | ---
M 301 | Mathematics Technology for Teachers | 
M 311 | Ordinary Differential Equations and Systems | 
M 325 | Discrete Mathematics | 
M 326 | Number Theory | 
M 361 | Discrete Optimization | 
M 362 | Linear Optimization | 
M 381 | Advanced Calculus I | 
M 412 | Partial Differential Equations | 
M 414 | Deterministic Models | 
M 429 | History of Mathematics | 
M 431 | Abstract Algebra I | 
M 432 | Abstract Algebra II | 
M 439 | Euclidean and Non-Euclidean Geometry | 
M 440 | Numerical Analysis | 
M 445 | Statistical, Dynamical, and Computational Modeling | 
M 461 | Data Science Analytics | 
M 462 | Theoretical Basics of Big Data Analytics and Real Time Computation Algorithms | 
M 472 | Introduction to Complex Analysis | 
M 473 | Introduction to Real Analysis |
Requirements for the Applied Mathematics Concentration

Rule: Complete the following subcategories. 13-14 total credits required.

Applied Mathematics Option: Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 311</td>
<td>Ordinary Differential Equations and Systems</td>
<td>3</td>
</tr>
<tr>
<td>M 412</td>
<td>Partial Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Hours: 6

Minimum Required Grade: C-

Applied Mathematics Option: Elective Courses

Note: In addition, M 381 and M 485 are also recommended.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 414</td>
<td>Deterministic Models</td>
<td></td>
</tr>
<tr>
<td>M 440</td>
<td>Numerical Analysis</td>
<td></td>
</tr>
<tr>
<td>M 445</td>
<td>Statistical, Dynamical, and Computational</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Modeling</td>
<td></td>
</tr>
<tr>
<td>M 472</td>
<td>Introduction to Complex Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 7-8

Minimum Required Grade: C-

Science Requirement

Rule: Complete 18 credits in at most 3 areas selected from Astronomy (ASTR), Biology (BIO*), Chemistry (CHMY), Computer Science (CSCI, except CSCI transfer work), Economics (ECNS), Forestry (FORS, WILD), Geosciences (GEO), Management Information Systems (BMIS), and Physics (PHSX).

Note:

1. Students completing a minor (in another subject) or a second major are exempt from this requirement.
2. Transfer courses listed on the transcript as "CSCI TR*" may include course work in other areas such as Computer Applications (CAPP) and therefore do not count towards this requirement unless a student successfully petitions the Department of Mathematical Sciences.

Minimum Required Grade: C-

Foreign Language/Computer Science Requirement

Rule: Either complete the General Education Requirement "Group III: Modern and Classical Language" (not the symbolic systems exception), or take one course from the following list.

Note: Students completing a second major are exempt from this requirement.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 100</td>
<td>Intro to Programming</td>
<td>3</td>
</tr>
<tr>
<td>CSCI 126</td>
<td>Computation in the Sciences with Calculus</td>
<td></td>
</tr>
<tr>
<td>CSCI 135</td>
<td>Fund of Computer Science I</td>
<td></td>
</tr>
<tr>
<td>CSCI 136</td>
<td>Fund of Computer Science II</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 3

Minimum Required Grade: C-