MATHEMATICS B.A.

This degree is the BA in Mathematics without a concentration. Students can add one or more of the concentrations in Applied Mathematics, Combinatorics & Optimization, Pure Mathematics, or Statistics to this degree by fulfilling the respective Concentration Requirements (achieved by taking specific Upper-Division Elective Courses). Typically, students declare one of these four concentrations during their sophomore or junior year. Note that the requirements for the Mathematics Education concentration are extensive and differ substantially from the requirements for the other concentrations. Students interested in Mathematics Education are encouraged to declare this concentration as early as possible, preferably during their first year at UM.

Bachelor of Arts - Mathematics

College Humanities & Sciences

Degree Specific Credits: 67

Required Cumulative GPA: 2.0

Catalog Year: 2017-2018

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

- 41 credits for students completing a second major, and
- 46 credits for students completing a minor.

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

Mathematics Core Courses 23
Upper-Division Mathematics Requirement 23
Upper-Division Elective Courses
Upper-Division Elective Computer Labs
Science Requirement 18
Advanced College Writing Requirement (usually fulfilled with a course that counts towards the Upper-Division Mathematics Requirement)
Foreign Language/Computer Science Requirement 3

Total Hours 67

Mathematics Core Courses

Rule: Take all of the following courses.

M 171 Calculus I 4
or M 181 Honors Calculus I
M 172 Calculus II 4
or M 182 Honors Calculus II
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: Take 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.

Minimum Required Grade: C-

23 Total Credits Required

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.

Take 7 courses from the following list; at least 3 of them must be at the 400 level

- 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 Practical Big Data 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
- M 485 Graph Theory
- STAT 341 Introduction to Probability and Statistics
- STAT 421 Probability Theory
- STAT 422 Mathematical Statistics
STAT 452  Statistical Methods II
Minimum Required Grade: C-

Upper-Division Elective Computer Labs
**Rule:** Computer labs from the following list are optional; if taken (0-2 credits), they count toward the total number of credits required for the Upper-Division Mathematics Requirement.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 317</td>
<td>Ordinary Differential Equations Computer</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Lab</td>
<td></td>
</tr>
<tr>
<td>M 363</td>
<td>Linear Optimization Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>M 418</td>
<td>Partial Differential Equations Computer</td>
<td>1</td>
</tr>
<tr>
<td>STAT 457</td>
<td>Computer Data Analysis I</td>
<td>1</td>
</tr>
<tr>
<td>STAT 458</td>
<td>Computer Data Analysis II</td>
<td>1</td>
</tr>
</tbody>
</table>
Minimum Required Grade: C-

**Science Requirement**
**Rule:** Take 18 credits in at most 3 areas selected from astronomy (ASTR), biology (BIO*), chemistry (CHMY), computer science (CSCI, except CSCI TR*), 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-
18 Total Credits Required

**Advanced College Writing Requirement**
**Rule:** Take 1 of the following 2 courses, or any other approved Advanced College Writing course.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 429</td>
<td>History of Mathematics</td>
</tr>
<tr>
<td>or M 499</td>
<td>Senior Thesis</td>
</tr>
</tbody>
</table>
Total Hours 3
Minimum Required Grade: C-

**Foreign Language/Computer Science Requirement**
**Rule:** Either complete the General Education Requirement Group III: Modern and Classical Language or take one course from the following list.

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCI 100</td>
<td>Intro to Programming</td>
</tr>
<tr>
<td>CSCI 135</td>
<td>Fund of Computer Science I</td>
</tr>
<tr>
<td>CSCI 136</td>
<td>Fund of Computer Science II</td>
</tr>
<tr>
<td>CSCI 250</td>
<td>Computer Mdlng/Science Majors</td>
</tr>
</tbody>
</table>
Total Hours 3
Minimum Required Grade: C-

**GPA Requirement**
**Note:**
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.)