MATHEMATICS B.A. - 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

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
Mathematics Core Courses		23
Mathematics Electives		23
Science Requirement		18
Language/Computer Science Requirement		3
Requirements for the Applied Mathematics Concentration (usually fulfilled with courses that count towards the Upper-Division Mathematics Requirement)		
Total Hours		**67**

Degree Specific Credits: 67

Required Cumulative GPA: 2.0

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.)

Mathematics Core Courses

Code	Title	Hours
Complete 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-

Mathematics Electives

Rule: Complete 23 credits in this category.

Notes:

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

Elective Courses

Notes:

1. Students completing a minor in another subject or a second major need take only 6 courses.
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
Complete 7 courses from the following list; at least 3 of them must be at the 400 level		
M 274	Introduction to Differential Equations	
M 301	Teaching Mathematics with Technology	
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 NonEuclidean 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	
M 485	Graph Theory	
STAT 341	Introduction to Probability and Statistics	
or STAT 342	Probability and Simulation	

STAT 421	Probability Theory
STAT 422	Mathematical Statistics
STAT 452	Statistical Methods II

Minimum Required Grade: C-

Elective Computer Labs and Independent Study Courses

Rule: Computer labs and independent study courses from the following list are optional; if taken (0-2 credits), they count toward the total number of credits required for the Mathematics Elective requirement.

Code	Title	Hours
M 275	Differential Equations Computer Lab	1
M 363	Linear Optimization Laboratory	1
M 392	Independent Study	1-9
M 418	Partial Differential Equations Computer Lab	1
M 492	Independent Study	1-9
STAT 457	Computer Data Analysis I	1
STAT 458	Computer Data Analysis II	1

Minimum Required Grade: C-

Science Requirement

Notes:

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.

Code	Title	Hours
Complete 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).		**18**
Total Hours		**18**

Minimum Required Grade: C-

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.

Code	Title	Hours
Complete one of the following courses:		**3**
CSCI 126	Computation in the Sciences with Calculus	
CSCI 150	Introduction to Computer Science	
CSCI 151	Interdisciplinary Computer Science I	
CSCI 152	Interdisciplinary Computer Science II	
Total Hours		**3**

Minimum Required Grade: C-

Requirements for the Applied Mathematics Concentration

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

Applied Mathematics Option: Core Courses

Code	Title	Hours
Complete all of the following courses:		
M 274	Introduction to Differential Equations	3
M 412	Partial Differential Equations	3
Total Hours		**6**

Minimum Required Grade: C-

Applied Mathematics Option: Elective Courses

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

Code	Title	Hours
Complete two of the following courses:		**7-8**
M 414	Deterministic Models	
M 440	Numerical Analysis	
M 445	Statistical, Dynamical, and Computational Modeling	
M 472	Introduction to Complex Analysis	
Total Hours		**7-8**

Minimum Required Grade: C-