Department of Mathematics

1. Overview of 2010 Curriculum Proposals:

The Mathematics Department proposes to change the title of its existing B.A. Option in Mathematics to a single B.S. Major, and reduce the number of Related Areas (sub-options) to fit better with existing faculty resources. Under the B.A. structure, there are five (5) Related Areas in the Mathematics Option. Under the proposed B.S. structure, this would be reduced to three Options. This streamlined B.S. Major in Mathematics would continue to allow students the flexibility to pursue their goals of graduate study, careers in applied mathematical fields and careers in Secondary Education through options and combined majors.

The proposed major could be used in three different modes. First, students could take the major by itself without any additional minors, majors or options. Students following this track are expected to complete a thesis in mathematics once they have completed the bulk of their coursework. This may be thought of as a "liberal arts" track that leaves students room for taking electives from a broad range of disciplines. Second, students may choose to complete one of three proposed options in Mathematical Biology, Mathematical Ecology, or Mathematical Geology. Students following this track are also expected to complete a thesis for their capstone experience. Finally, students may elect to complete a double major in Mathematics and Secondary Education. Students completing a double major with Secondary Education would not be expected to complete a thesis. Instead, they would complete a semester of student teaching. All of these student choices make use of existing coursework taught by existing faculty.

EXISTING PROGRAM:	PROPOSED PROGRAM:
BA: Mathematics Option	BS: Mathematics
Related Areas:	Option Areas:
1. Mathematical Biology	1. Mathematical Biology
2. Mathematical Ecology	2. Mathematical Ecology
3. Mathematical Geology	3. Mathematical Geology
4. Mathematical Physics	
5. Pure Mathematics	

Date Received_____
By_____

Curriculum Proposal Form

☐ Department or Program Approval
Date _____ Initials _____

☐ General Education Committee (if appropriate)
Date _____ Initials _____

Proposed as Gen Ed Course? ___Yes ___No

Gen Ed Category:

Course Fee Attached to Any Course?

___No ___Yes (Completed Course Fee Request Form attached)

If course Number/Name with Lab Fee is changing, previous course Number/Name:

Curriculum Committee Use Only

Proposal Tabled_____
　　　　　　　　　Date　　　　　*Initials*

Approved_____
　　　　　　　　　Date　　　　　*Initials*

Rejected_____
　　　　　　　　　Date　　　　　*Initials*

Withdrawn_____
　　　　　　　　　Date　　　　　*Initials*

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Faculty Senate
Approval_____
　　　　　　　　　Date　　　　　*Initials*

Provost Approval_____
　　　　　　　　　　Date　　　　*Initials*

Chancellor Approval_____
　　　　　　　　　　Date　　　　*Initials*

Type of Proposal (check all that apply)

☐ Program Requirement Change
☐ Course Number Change
☐ Course Title Change
☐ Course Credit Change
☐ Course Description Change
☐ Prerequisite Change
☐ Delete Course from Catalog
☐ New Course
☒ Other (describe): Repackaging of old BA Mathematics Option degrees and related areas in Mathematical Biology, Mathematical Ecology, Mathematical Geology, Mathematical Physics, and Pure Mathematics into BS: Mathematics Degree with options in Mathematical Biology, Mathematical Ecology, and Mathematical Geology. The BA Option in Mathematics and Related Areas will go into moratorium.   A mechanism by which students may seek a double major in B.S. Mathematics and B.S. Secondary Education is also built into this proposal.

For Curriculum Committee Use Only:

Submitted by: Eric S. Wright.
Department (Program) contact person: Eric S. Wright

Succinct Statement of Proposed Change: Currently, students may seek the following degrees related to mathematics:
1. B.A. Mathematics Option (with related areas in Mathematical Biology, Mathematical Ecology, Mathematical Geology, Mathematical Physics, and Pure Mathematics).
2. B.S. Secondary Education Mathematics Major.

The Mathematics Department proposes to repackage these degrees into a single B.S. Mathematics degree. This degree may be used in three different modes. First, students may take the degree by itself without any additional

minors, majors or options. Students following this track are expected to complete a thesis in mathematics for their capstone experience. This may be thought of as a "liberal arts" track that leaves students with room for taking electives from a broad range of disciplines. Second, students may choose to complete one of three options in Mathematical Biology, Mathematical Ecology, or Mathematical Geology. Students following this track are also expected to complete a thesis for their capstone experience. Finally, students may elect to complete a double major in Mathematics and Secondary Education. These students will not be expected to complete a thesis for their capstone experience because their required semester of student teaching will play this role.

Provide assessment information supporting the request (rationale):
The existing B.A. Degree with an option in Mathematics (and its associated related areas) is out of compliance with the standards for B.A. Degrees in the Montana University system. This proposal repackages these degrees and related areas into a MUS standards-compliant B.S. Degree with options. No new courses are needed for this change. In addition, this restructuring constitutes a simplification of the Math Department's degree offerings. We are reducing the number of degrees from two (B.A. Option in Mathematics and B.S. Secondary Education – Mathematics) to one (B.S. Mathematics) and we are replacing five related areas (Mathematical Biology, Mathematical Ecology, Mathematical Geology, Mathematical Physics, and Pure Mathematics) with the three options in Mathematical Biology, Mathematical Ecology, and Mathematical Geology. This simplification should make the degree offerings of the Department of Mathematics more transparent to students.

Attach new or revised information as it should appear in the Catalog
The new course summary for the B.S. Mathematics Major and its three options in Mathematical Biology, Mathematical Ecology, and Mathematical Geology is attached at the end of this document.

Transferability Considerations (if any):
Since there are no new courses required for the restructuring of the Mathematics degrees, no transferability considerations are anticipated.

Effects, if any, of this proposal on any of our degree programs.
This proposal is offered in collaboration with the following departments:
- *Education:* The Education department is concurrently offering a curriculum proposal that allows for a single B.S. Degree to be taken in conjunction with various content degrees (including the proposed B.S. Mathematics degree). Dr. Delena Norris-Tull has been preparing the relevant curriculum proposals for the B.S. Secondary Education degree. The double major structure will replace the existing B.S. Secondary Education Mathematics major. However, since this is accomplished via a redistribution of courses, no effect upon the Education department is expected in terms of staffing, course rotation, etc.
- *Biology and Environmental Science:* The Mathematical Biology, Mathematical Ecology, and Mathematical Geology options make use of existing courses in the rotation from Biology, Geology, Chemistry, and Environmental science. Since these options constituted a simple repackaging of existing related areas, no effect upon Biology or Environmental Sciences in anticipated in terms of staffing, course rotation, etc.

Resource Implications (if applicable):

STAFFING:
Who will teach course(s)?
All courses for the repackaged B.S. Mathematics major and its options are existing courses that will be taught in the same rotation by the same faculty that currently teach them.

Effect on faculty member's workload?
None.

OTHER (Library, etc.):

None.

Date_____

Date_____

Date:_____

B.S. Major in Mathematics Credit Summary: 120 Credits

General Education Mathematics Courses		
Course #	*Course Title*	*Credits*
STAT 121 / MATH 131	Probability	4
General Education Credit Total		**31-32**

Mathematics Major Core Courses		
Course #	*Course Title*	*Credits*
M 171 / MATH 201	Calculus I	4
M 172 / MATH 202	Calculus II	4
M 273 / MATH 203	Calculus III	4
M 210 / MATH 210	Computer Mathematics	4
Select one of the following three courses		4
STAT 217 / MATH 232 STAT 422 / MATH 333 STAT 233 / MATH 233	Intermediate Statistical Concepts Mathematical Statistics Biostatistics	
M 221 / MATH 260	Introduction to Linear Algebra	4
M274 / MATH 311	Introduction to Differential Equations	4
M 329 / MATH 341	Modern Geometry	4
M 343 / MATH 343	Foundations of Mathematics	4
Upper Division Courses and Thesis Credits for the B.S. Major in Mathematics		
Select three of the following courses. At least one must be M 414 or STAT 433.		12
M 414 / MATH 401 STAT 433 / MATH 433 M 472 / MATH 441 M 472 / MATH 442 M 431 / MATH 443 M 444 / MATH 444	Deterministic Modeling Stochastic Modeling Advanced Calculus I Introduction to Complex Analysis Abstract Algebra Advanced Number Theory	
M 499 / MATH 498	Senior Project/Thesis (unless taking a secondary ed double major)	0-4
Core Mathematics Credits Total		**48-52**

Options or Electives	

In addition to completing the core mathematics courses, B.S. Mathematics Students have three paths available to them:
   3. *B.S. Mathematics students may choose to complete the Mathematical Biology, Mathematical Ecology, or Mathematical Geology Option. Any remaining credits may be filled with any college level catalog course.*
   4. *B.S. Mathematics students may elect to double major in B.S. Secondary Education (see page XXX). Students taking this path are not required to complete a thesis. Their capstone experience is considered to be their student teaching.*
   5. *B.S. Mathematics students may elect to use all remaining credits to either construct their own course of study in the mathematical sciences or to pursue other interests.*
	32-37

Options for the B.S. Mathematics Degree.

B.S. in Mathematics - Mathematical Biology Option

General Education Science Courses		
Course #	*Course Title*	*Credits*
BIO 111	Biology I	4
CHMY 141 / CHEM 131	College Chemistry I	4
General Education Credit Total		**31-32**

Mathematical Biology Option Courses *Use these courses towards your B.S. Mathematics Major Elective credits.*		
Course #	*Course Title*	*Credits*
CHMY 143 / CHEM 131	College Chemistry II	4
CHMY 321 / CHEM 331	Organic Chemistry I	4
BIO 255	Cell Biology	4
BIO 343	Genetics	4
BIO 450	Evolution	4
Select two of the following courses.		8
BIO 262 BIO 425 STAT 331 / MATH-BIO 331 CHMY 323 / CHEM 332 CHEM 441	Microbiology Molecular Biology Bioinformatics Organic Chemistry II Biochemistry[1]	
Credit Total		**28**

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[1]   CHEM 441: Biochemistry requires CHEM 332 Organic Chemistry as a prerequisite. Therefore, students who choose to take CHEM 441 should also elect to take CHEM 332.

B.S. in Mathematics - Mathematical Ecology Option

General Education Science Courses		
Course #	*Course Title*	*Credits*
BIO 111	Biology I	4
CHMY 141 / CHEM 131	College Chemistry I	4
General Education Credit Total		**31-32**

Mathematical Ecology Option Courses		
Course #	*Course Title*	*Credits*
BIO 112	Biology II	4
BIO 255	Cell Biology	4
STAT 335 / MATH-BIO 332	Advanced Field Statistics for Rapid Assesment	4
BIO 343	Genetics	4
BIO 450	Evolution	4
BIO 471	Wildlife Ecology & Management	4
Select one of the following courses.		4
BIO 222 BIO 270 BIO 273 BIO 355 BIO 473 BIO 475 BIO 479	Invasive Species Conservation Biology Entomology Systematic Botany Orinthology Mammalogy Vertebrate Zoology	
Credit Total		**28**

B.S. in Mathematics - Mathematical Geology Option

General Education Science Courses		
Course #	*Course Title*	*Credits*
Choose one of the following two courses		4
GEO 101 / GEOL 101 GEO 103 / GEOL 150	Introduction to Physical Geology Introduction to Environmental Geology	
CHMY 141 / CHEM 131	College Chemistry I	4
General Education Credit Total		**31-32**

Mathematical Ecology Option Courses		
Course #	*Course Title*	*Credits*
CHEM 143 / CHEM 132	College Chemistry II	4
GEO 226 / GEOL 226	Rocks, Minerals, & Resources	4
GEO 315 / GEOL 330	Structural Geology	4
GEO 378 / GEOL 378	Surficial Processes	4
GEO-CHMY 431 / CHEM-GEOL 431	Environmental Geochemistry	4
GEO 309 / GEOL 432	Sedimentation and Stratigraphy	4
GEO 421 / GEOL 480	Hydrology	4
Credit Total		**28**