Program/Degree Requirement Change (Major/Minor)

**Program Identification:**

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Mathematics - Statistics Option</th>
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<tbody>
<tr>
<td>Degree Level:</td>
<td>B.S.</td>
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<td>(i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)</td>
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**A. Change in Degree Requirements:** (Brief statement of program/degree changes and objectives)

The Department of Mathematics and Statistics proposes to eliminate the B.S. degree in Statistics because of low enrollment and revise the statistics option in the Mathematics baccalaureate program to continue to offer a similar statistics program. This proposal revises the statistics option in the mathematics program. A separate document proposes to eliminate the Statistics B.S. program. Also this rewrite includes changes to MATH 490 and MATH 215.

**B. Current Requirements as it Appears in the Catalog:**

Major--B.A. or B.S. Degree

1. Complete the following pre-major requirement:
   - Students must be ready to matriculate into MATH 200X before they will be allowed to declare mathematics as their major.

2. Complete the general university requirements.

3. Complete the B.A. or B.S. degree requirements. (As part of the B.S. degree requirements, complete PHYS 103X and PHYS 104X, or PHYS 211X and PHYS 212X.)

4. Complete the following program (major) requirements:*  
   - MATH 200X--Calculus**--4 credits
   - MATH 201X--Calculus**--4 credits
   - MATH 202X--Calculus--4 credits
   - MATH 215--Introduction to Mathematical Proofs--2 credits
   - MATH 314--Linear Algebra--3 credits
   - MATH 401W--Advanced Calculus--3 credits
   - MATH 405W--Abstract Algebra--3 credits
   - MATH 490O--Senior Seminar--1 credits

5. Complete 21 additional credits of electives.* Acceptable elective courses include any MATH course at the 300-level or above, any STAT course at the 300-level or above, and CS 201. At least 15 credits must be MATH courses. [For exceptions see below.]** The following are some suggest elective packages:
   - a. Pure math electives:
     - MATH 305--Geometry--3 credits
MATH 307--Discrete Mathematics--3 credits
MATH 402--Advanced Calculus--3 credits
MATH 404--Topology--3 credits
Additional elective credits--9 credits

b. Applied math electives:
MATH 302--Differential Equations--3 credits
MATH 421--Applied Analysis--4 credits
MATH 422--Introduction to Complex Analysis--3 credits
MATH 460--Mathematical Modeling--3 credits
Complete two of the following:
MATH 307--Discrete Mathematics--3 credits
MATH 310--Numerical Analysis--3 credits
MATH 402--Advanced Calculus--3 credits
STAT 300--Statistics--3 credits
Additional elective credits--3 credits

c. Requirements for mathematics teachers (grades 7 - 12):****
CS 201--Computer Science I--3 credits
MATH 305--Geometry--3 credits
MATH 306--Introduction to the History and Philosophy of Mathematics--3 credits
STAT 300--Statistics (3) or MATH 371--Probability and MATH 408--
Mathematical Statistics (6)--3-6 credits
Two courses chosen from:
MATH 302--Differential Equations (3)
MATH 307--Discrete Mathematics (3)
MATH 310--Numerical Analysis (3)
MATH 460--Mathematical modeling (3)--6 credits
Additional elective credits--3 credits

d. Statistics concentration electives:
MATH 371--Probability--3 credits
MATH 408--Mathematical Statistics--3 credits
MATH 460--Mathematical Modeling--3 credits
STAT 300--Statistics--3 credits
STAT 401--Regression and Analysis of Variance--4 credits
Additional elective credits--6 credits

6. Minimum credits required--120 credits

* Student must earn a C grade or better in each course.
** Satisfies core or B.A. or B.S. degree requirements.
*** In some cases, courses with strong mathematical content from other disciplines may be
used as electives. Such an elective package must be approved by an advisor in the math and
statistics department. The requirement that at least 15 credits be math courses still applies.
****We strongly recommend that prospective secondary science teachers seek advising from
the UAF School of Education early in your undergraduate degree program, so that you can be
appropriately advised of the state of Alaska requirements for teacher licensure. You will
apply for admission to the UAF School of Education's post-baccalaureate teacher preparation
program, a one-year intensive program, during your senior year.
Note: All mathematics majors--including double majors--must have an advisor from the
Mathematical sciences department.
Note: In addition to meeting all the general requirements for the specific degree, certain mathematics courses are required of all mathematics majors. (At least 12 approved mathematics credits at the 300-level or above must be taken while in residence on the Fairbanks campus.) All electives must be approved by the department.

**Minor**

1. Complete the following:
   - Math F200X—Calculus I—4 credits
   - Math F201X—Calculus II—4 credits
   - Math F202X—Calculus III—4 credits
   - At least 9 additional credits from MATH F215, STAT F300, any F300- or F400-level MATH course; or electives approved by a mathematics advisor—9 credits

2. Minimum credits required—21 credits

*Note: Courses completed to satisfy this minor can be used to simultaneously satisfy other major or general distribution requirements.*

**Statistics**

**Minor**

1. Complete the following:
   - STAT F200X—Elementary Probability and Statistics (3) or STAT F300—Statistics (3)—3 credits
   - STAT F401—Regression and Analysis of Variance—4 credits
   - MATH F371—Probability*—3 credits
   - MATH F408—Mathematical Statistics—3 credits
   - MATH, STAT or STAT related course work**—3 credits

2. Minimum credits required—16 credits

* MATH F371 requires MATH F200X, F201X and F202X as prerequisites.

** e.g., BA F360, GEOS F430, ANTH F424, MATH F460, etc.

*Note: Courses completed to satisfy this minor can be used to simultaneously satisfy other major or general distribution requirements.*

*Note: Fisheries majors selecting the research option need only complete MATH F371 and MATH F408 in addition to their fisheries requirements to obtain a minor in statistics.*

C. **PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES:**
(Underline new wording strike-through-old-wording and use complete catalog format)

**Major—B.A. or B.S. Degree**

1. Complete the following pre-major requirement:
   a. Students must be ready to matriculate into MATH 200X before they will be allowed to declare mathematics as their major.

2. Complete the general university requirements including residential and upper division credit requirements.

3. Complete the B.A. or B.S. degree requirements. (As part of the B.S. degree requirements, complete PHYS 103X and PHYS 104X, or PHYS 211X and PHYS
4. Complete the following program (major) requirements:*
   MATH 200X--Calculus**--4 credits
   MATH 201X--Calculus**--4 credits
   MATH 202X--Calculus--4 credits
   MATH 215--Introduction to Mathematical Proofs--2 3 credits
   MATH 314--Linear Algebra--3 credits
   MATH 401W--Advanced Calculus--3 credits
   MATH 405W--Abstract Algebra--3 credits
   MATH 4900--Senior Seminar--1 credits

5. COMPLETE ONE OF THE FOLLOWING OPTIONS:
   
   a. MATHEMATICS OPTION REQUIREMENTS:
      
      MATH 401W--Advanced Calculus--3 credits
      
      MATH 405W--ABSTRACT ALGEBRA--3 CREDITS
      MATH 4900--SENIOR SEMINAR--2 CREDITS
      
      And complete 21 additional credits of electives.* acceptable elective courses
      include any MATH or STAT course at the 300-level or above, any stat course at
      the 300-level or above, and CS 201. At least 15 credits must be MATH or STAT
      courses. [for exceptions see below.**] the following are some suggested elective
      packages:
      
      1. Pure math electives:
         MATH 305--Geometry--3 credits
         MATH 307--Discrete Mathematics--3 credits
         MATH 402--Advanced Calculus--3 credits
         MATH 404--Topology--3 credits
         Additional elective credits--9 credits
      
      2. Applied math electives:
         MATH 302--Differential Equations--3 credits
         MATH 421--Applied Analysis--4 credits
         MATH 422--Introduction to Complex Analysis--3 credits
         MATH 460--Mathematical Modeling--3 credits
         Complete two of the following:
         MATH 307--Discrete Mathematics--3 credits
         MATH 310--Numerical Analysis--3 credits
         MATH 402--Advanced Calculus--3 credits
         STAT 300--Statistics--3 credits
         Additional elective credits--3 credits
      
      3. Requirements for mathematics teachers (grades 7 - 12):****
         CS 201--Computer Science I--3 credits
         MATH 305--Geometry--3 credits
         MATH 306--Introduction to the History and Philosophy of
         Mathematics--3 credits
         STAT 300--Statistics (3)
or MATH 371--Probability and MATH 408--Mathematical Statistics (6)--3-6 credits
Two courses chosen from:
   MATH 302--Differential Equations--3 credits
   MATH 421--Applied Analysis--4 credits
   MATH 422--Introduction to Complex Analysis--3 credits
   MATH 460--Mathematical Modeling--3 credits
Complete two of the following:
   MATH 307--Discrete Mathematics--3 credits
   MATH 310--Numerical Analysis--3 credits
   MATH 402--Advanced Calculus--3 credits
   STAT 300--Statistics--3 credits
Additional elective credits--3 credits

b. STATISTICS OPTION REQUIREMENTS:

Complete the following 29 credits:

   MATH 401W--Advanced Calculus--3 credits OR
   MATH 405W--Abstract Algebra--3 credits
   MATH 371--Probability--3 credits
   MATH 408--Mathematical Statistics--3 credits
   STAT 300--Statistics--3 credits
   STAT 401--Regression and Analysis of Variance--4 credits
   STAT 402--Scientific Sampling--3 credits
   STAT 454--Consulting Seminar--1 credit
   ENGL 314W,O--Technical Writing--3 credits
   CS 201 Computer Programming I--3 credits OR
   NRM 338 Introduction to Geographic Information Systems -- 3 credits
Additional advisor approved elective credits 300 level or above--3 credits

6. Complete 21 additional credits of electives.* Acceptable elective courses include any MATH course at the 300-level or above, any STAT course at the 300-level or above, and CS 201. At least 15 credits must be MATH courses. [For exceptions see below.***] The following are some suggest elective packages:

a. Pure math electives:
   MATH 305--Geometry--3 credits
   MATH 307--Discrete Mathematics--3 credits
   MATH 402--Advanced Calculus--3 credits
   MATH 404--Topology--3 credits
   Additional elective credits--9 credits

b. Applied math electives:
   MATH 302--Differential Equations--3 credits
   MATH 421--Applied Analysis--4 credits
   MATH 422--Introduction to Complex Analysis--3 credits
   MATH 460--Mathematical Modeling--3 credits
Complete two of the following:
   MATH 307--Discrete Mathematics--3 credits
   MATH 310--Numerical Analysis--3 credits
   MATH 402--Advanced Calculus--3 credits
   STAT 300--Statistics--3 credits
Additional electives—3 credits

e. Requirements for mathematics teachers (grades 7—12):****

CS 201—Computer Science I—3 credits
MATH 305—Geometry—3 credits
MATH 306—Introduction to the History and Philosophy of Mathematics—3 credits
STAT 300—Statistics (3) or MATH 371—Probability and MATH 408—Mathematical Statistics (6)—3-6 credits
Two courses chosen from:
MATH 302—Differential Equations (3)
MATH 307—Discrete Mathematics (3)
MATH 310—Numerical Analysis (3)
MATH 460—Mathematical modeling (3)—6 credits
Additional elective credits—3 credits

d. Statistics concentration electives:
MATH 371—Probability—3 credits
MATH 408—Mathematical Statistics—3 credits
MATH 460—Mathematical Modeling—3 credits
STAT 300—Statistics—3 credits
STAT 401—Regression and Analysis of Variance—4 credits
Additional elective credits—6 credits

7. Minimum credits required—120 credits

* Student must earn a C grade or better in each course.
** Satisfies core or B.A. or B.S. degree requirements.
*** In some cases, courses with strong mathematical content from other disciplines may be used as electives. Such an elective package must be approved by an advisor in the math and statistics department, DEPARTMENT OF MATHEMATICS AND STATISTICS. The requirement that at least 15 credits be math courses still applies.

**** We strongly recommend that prospective secondary science teachers seek advising from the UAF School of Education early in your undergraduate degree program, so that you can be appropriately advised of the state of Alaska requirements for teacher licensure. You will apply for admission to the UAF School of Education’s post-baccalaureate teacher preparation program, a one-year intensive program, during your senior year.

Note: All mathematics majors—including double majors—must have an advisor from the mathematical sciences department, DEPARTMENT OF MATHEMATICS AND STATISTICS.

Note: In addition to meeting all the general requirements for the specific degree, certain mathematics courses are required of all mathematics majors. (At least 12 approved mathematics credits at the 300-level or above must be taken while in residence on the Fairbanks campus.) All electives must be approved by the department.

Math Minor

1. Complete the following:
   Math 200X—Calculus—4 credits
   Math 201X—Calculus—4 credits
   Math 202X—Calculus—4 credits
   At least 9 additional credits from MATH 215, STAT 300, any 300- or 400-level
MATH course; or electives approved by mathematics advisor--9 credits

2. Minimum credits required--21 credits

Note: Courses completed to satisfy this minor can be used to simultaneously satisfy other major or general distribution requirements.

Statistics Minor

1. Complete the following:

MATH 200X--Calculus--4 credits
MATH 201X--Calculus--4 credits
MATH 202X--Calculus--4 credits
STAT F200X--Elementary Probability and Statistics (3)
   or STAT F300--Statistics (3)--3 credits
STAT F401--Regression and Analysis of Variance--4 credits
MATH F371--Probability--3 credits
MATH F408--Mathematical Statistics--3 credits
MATH, STAT or STAT-related course work**--3 credits

2. Minimum credits required--46 25 credits

** MATH F371 requires MATH F200X, F201X and F202X as prerequisites.

*** e.g., BA F360, GEOS F430, ANTH F424, MATH F460, etc.

Note: Courses completed to satisfy this minor can be used to simultaneously satisfy other major or general distribution requirements.

Note: Fisheries majors selecting the research option need only complete MATH F371 and MATH F408 in addition to their fisheries requirements to obtain a minor in statistics.

D. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

We do not anticipate any significant change in the budget, facilities/space, or faculty with this change. A proposal to eliminate the B.S. program in Statistics has been submitted because of low enrollments. This proposal makes statistics an option in the mathematics major. Statistics courses are largely service courses for other departments so little impact is anticipated.

E. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

Because a proposal to eliminate the B.S. program in Statistics is being submitted simultaneously with this proposal, the requirements for the new option and the old BS program are quite similar, and enrollments in this program have been small so we do not anticipate any significant impact on other departments.

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.

See attached assessment plan

STAT 454, the 1 credit Consulting Seminar, will be used as a capstone course for students completing the Statistics option of the baccalaureate in Mathematics. This course is stacked with STAT 654, where graduate students provide statistical consulting for UAF students and faculty.
E. **IMPACTS ON PROGRAMS/DEPTS:**

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F. **IF MAJOR CHANGE – ASSESSMENT OF THE PROGRAM:**

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STAT 454, the 1 credit Consulting Seminar, will be used as a capstone course for students completing the Statistics option of the baccalaureate in Mathematics. This course is stacked with STAT 654, where graduate students provide statistical consulting for UAF students and faculty.

**JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

A proposal to eliminate the B.S. program in Statistics is being submitted simultaneously with this proposal because of small enrollments. This proposal makes statistics an option in the mathematics baccalaureate degree program. The requirements for the new option and the old B.S. program are very similar but the new mathematics option has more of the mathematics baccalaureate requirements, e.g., MATH 401 OR 405.


**APPROVALS:**

<table>
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<tr>
<th>Signature, Chair, Program/Department of:</th>
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<tbody>
<tr>
<td></td>
<td>Anthropology &amp; Statistics</td>
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<tr>
<th>Signature, Chair, College/School Curricul Council for:</th>
<th>Date 3/16/10</th>
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<td>CNSM</td>
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**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

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<thead>
<tr>
<th>Signature, Chair, UAF Faculty Senate Curriculum Review Committee</th>
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