Mathematics - Master of Science

Current Compliance Year: 2023-2024
Mid-Cycle Review

Recent Recommendations

Feedback will include recommendations from the last Expedited Review or from your most recent review by your school or college. You may not see any feedback or recommendations until you have completed your first full or mid-cycle review.

Response to Previous Recommendations (if any):

The short recommendations from the previous evaluation are "increase enrollment" and "increase graduation" rates.
- We are good at graduating students in 2 to 2.5 years, and all students who made satisfactory progress and have sat for the comprehensive exams have graduated.
- Enrollments are limited by the number of teaching assistantships.
- We started an accelerated BS Math/MS Math program in 2021 and have two students in the program (one finishing Spring 2024 and one starting in Spring 2024).
- The new Applied and Computational Mathematics Graduate Certificate increases enrollment in masters courses that support this degree.
- Our enrollments have been fairly steady for the last 25 years, with the exception of a peak in ~2014.
- The department has started sending out yearly fliers to all institutions that are members of the Mathematical Association of America to help recruit graduate students. Nationwide, recruiting for masters-level students is challenging.

Student Learning Outcomes

The previous Student Learning Outcomes Assessment has been submitted as its own report. Going forward you will use the following prompts to discuss the success of your most recent SLOA plan and address your assessment activities since your last SLOA report (typically the past two years or since your last program review).

Learning outcomes feedback from last review:

Feedback will be provided once you have completed a full or mid-cycle review.

Discuss your SLOA findings, changes you are making and what you hope to see as a result:

The SLOA for the MS Mathematics is well designed to match our program and we do not have short-term plans for modification. The 4 objectives/outcomes are that our students will 1) attain technical ability suitable for their professional goals, 2) master core mathematical concepts, 3) possess professional communication and presentation skills, and 4) obtain employment or further education according to their goals. These are in line with the national norms.
Regarding (1) and (2), in the 2020-2023 period 6 MS Math students have passed their comprehensive exams. This exam, for which samples are publicly posted, is a department effort, with each student choosing three topics (2 of which must be core), and then multiple faculty members construct and grade each exam. [Artifacts: Record of chosen comprehensive exams and results; instructions.]
Items (1) and (3): Public presentation of written projects and theses allowed the faculty to assess the written and oral communication skills of graduates as satisfactory. Records of performance are stored with the graduate school through the Project/Thesis Defense Report and Project/Thesis approval forms. All students who submitted projects and theses in the period under review passed.

Item (4): of the 3 MS Math graduates in the period, all proceeded to further graduate education, one in a PhD math degree, one for an MS statistics degree, and one MS computer science.

Discuss the curricular changes made based on assessing your SLO. If you haven't made any curricular changes, please explain why not and address what you did notice in the review, including strengths of your curriculum through the assessment of your outcomes:

Two major curricular changes have occurred in the 2020-2023 period: 1. Creation of the BS/MS accelerated mathematics program. 2. Creation of the Applied and Computational Mathematics Graduate Certificate. These complement the main MS Mathematics program by increasing enrollment in the MS degree and by increasing enrollment in graduate-level mathematics courses.
In fact, a significant purpose of many of the MS-level courses taught by the department, especially those that serve as electives for the MS math degree (esp MATH 614, 615, 660, 661, 663), is as service courses to graduate students across CNSM. The new ACM certificate allows such non-math students to receive official acknowledgment of their advanced preparation, an incentive that then feeds back to the MS math degree program by increasing otherwise-small classroom sizes.
An additional curricular change is the addition of an open-to-all-students applied mathematical seminar offered in the spring semester. The Spring 2022 (machine learning) and Spring 2023 (scaling of solver algorithms) seminars were well-attended.
The most substantial curricular discussion concerns the structure of the MS comprehensive exam. The written format and grading of the current exam is regarded as fair and appropriate, and suitable for determining student competence at the graduate level. However, it is observed that the current exam is too aligned with the graduate-level courses, and not a broader test of comprehension of advanced undergraduate-level mathematics. Generally, the department agrees that this broader-but-less-advanced knowledge goal is suitable for a revised comprehensive exam. Discussion is ongoing among faculty, but alternative sample exams have not been drafted.

Are communication outcomes embedded in the SLOA Plan?

As of 2017 all Baccalaureate programs were required to embed the communication outcomes within their SLOA Plans, this is optional for non-Baccalaureate programs.

Embedded

Student Success

To access the Student Success Dashboard please sign into a UA computer with VPN connection (if not on campus). You will need your UA credentials and it is best accessed with the most updated version of Chrome, Edge, Firefox or Safari browsers; Internet Explorer is not supported. You will need to filter the data to see your programs. If you need assistance in finding the data for your programs, please contact your data liaison or Julia Manfredini in the PAIR office.

Data Liaisons

Each school or college has a team of Data Liaisons to help you analyze the data provided in the portal and may be able to help you see your data in multiple contexts. You can find a list of data liaisons on the resources page for Program Review.

The college or school level committee will also have access to this data with the goal that by providing these visualizations data availability will be increased.

Data supplied within the dashboard linked below is intended for Academic Program Review and not for any other purpose.

Student Success Data Dashboard

Previous Feedback

Feedback will be provided once you have completed a full or mid-cycle review.

Student Success Data Trends: (please indicate the trends that apply to your program)

Decline in majors,Decline in degrees awarded,Equity gaps

If equity gaps were found in any of your disaggregated student success data, please explain how you plan to address those gaps. Please contact your data liaison or make an appointment with Julia Manfredini to learn more about analyzing your data.

Because of the overall low number of students, determining actual trends in equity gaps (or anywhere else in the data) is challenging. For example, 100% of the students who graduated with MS Mathematics in the last three years were [redacted] and [redacted] (one [redacted]), but the number of students who were graduating was 1 or 2. Our current students are also all [redacted] and mostly [redacted]. We admit [redacted] regularly to the program, but they often either accept a different offer or accept but do not come. A better recruitment strategy would be helpful. In addition, we sometimes admit students who look promising but have a weak background, and they are not always successful in the program. We have been successful in international recruitment, with recent students from Ukraine, Sri Lanka, Bangladesh, Mexico. We recently have had challenging recruitment years (since COVID); increased successful recruitment should help address some of the student success data challenges.

Optional Data Explanation

Feel free to share more of your thoughts on the data provided.

With numbers so low, we are hesitant to discuss "trends." Limitations in the number of applications, and in the number of TAships available, have contributed to keeping our numbers low.
Data analysis is problematic because there are very small numbers of students in the sample.
There is a national trend towards fewer applications at the MS level.
Also, it would be very helpful if the Data Dashboard could filter by program on all panels in the dashboard, not just the GIP, degree % panel.

High Impact Practices

According to the AAC&U, High-Impact Educational Practices "have been widely tested and have been shown to be beneficial to college students from many backgrounds." UAF is particularly interested in Undergraduate Research and/or Scholarly Activity because it is one of our mission fulfillment indicators, but all of these researched High-Impact Educational Practices should be reflected in your program's student learning outcomes and curriculum.

Previous Feedback

Feedback will be provided once you have completed a full or mid-cycle review.

High-Impact Practices Used in this Program

Please use the following fields to discuss how your program is using the high-impact practices, successes and known issues and solutions, or ways you are considering incorporating them in the future. If you are not using any of the high-impact practices listed, please use the "Other or None of These," filed to share what your program is doing to help students be successful.

High Impact Practices that currently apply to your program:

Collaborative Assignments & Projects

Undergraduate Research

Diversity/Global Learning

ePortfolios

First-Year Seminars & Experiences

Writing-Intensive Courses

Service-Learning and/or Community-based Learning

Internships

Capstone Courses & Projects

Other or None of these (explain)

This is a graduate program so the undergraduate-inspired metrics do not apply. The best measure of "high impact" is that our graduates are obtaining positions that apply their skills including secondary education, advanced technology/software development, and PhD admission.

Submission

Submitter & Collaborator Names

Leah Berman
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Submitter Email

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College or School Review Committee

The college or school committees set the tone for helping each program feel seen during this process. We have provided you with strength-based feedback tags to attach to this program review. Please select as many as applicable.

Overall Recommendations

Increase enrollment,Increase graduates

Explanation of Recommendations

The review panel acknowledges the time and effort that went into preparing the mid-cycle program review for the Mathematics MS program. The review panel appreciates that the program provided a strong discussion of the SLOA plan and an overview/discussion on student success data.

Learning Outcomes Feedback

Requires Minor Revision

Student Learning Outcomes Assessment Feedback (tags)

Missing active verbs

Student Learning Outcomes Assessment Feedback (narrative)

The program provided 4 SLOs for the Mathematics MS SLOA plan. The review panel offers the following recommendations to improve upon the program's SLOAs:
- SLO #s1-3 are appropriate as measures of student learning.
- The program might consider revising the outcomes to include more "action" words. It is difficult to assess things like "understand" or "recognize." "Identify", "explain", or "analyze" are clearer outcomes to assess. https://tips.uark.edu/blooms-taxonomy-verb-chart/
- SLO # 4 is a program outcome and not tied to student learning.
- With regard to SLO #4, the program is encouraged to retain this measure of outcome assessment for their own internal tracking purposes (just not use it as part of program review). Post-graduation activities, such as graduate school/job placement and article publication, are not considered an assessment of student learning and are instead program outcomes.
- Per guidance from the NWCCU for accreditation purposes, they recommend that degree programs have between 3-5 SLOs per program.

The review panel appreciates the program's discussion of the SLOAs and identifying the M.S. comprehensive exam information. Outcomes assessment is intended to be a collaborative learning experience for the program or department. This is an opportunity to share results and discuss how to enhance the students' experiences and make curricular decisions based on the results of assessments. We have favorably noted the curricular changes made and how they may help to increase enrollment, and we look forward to learning more about the restructuring of the MS comprehensive exam in the next program review cycle.

Following NWCCU guidance, SLOA plans must emphasize "closing the loop" and continuous improvement, ensuring each SLO within the plan is assessed individually to verify alignment with program objectives. If a SLO fails to produce the expected assessment outcome, adjustments to SLO language, substantial changes to the SLO, or revisions to data collection rubrics are necessary to ensure alignment and facilitate program improvement.

Student Success & Equity Feedback

The program noted a decline in majors and a decline in degrees awarded, however the number of majors in 2023 (5) is the same as in 2019. The review panel agrees that program numbers are small, which makes it difficult to identify trends but the program could have reflected on things like an increase (albeit small) in [redacted] students and [redacted] students.
For the full program review, the review panel seeks the program's plan for recruiting [redacted] and minority students and supporting them in program persistence and degree completion.

High-Impact Practices Feedback

There are no high impact practices identified, although it seems reasonable that there must be some. If not, please consider incorporating some, as they have been shown to increase student engagement and success. In addition to identifying HIPs, a thorough narrative should be provided for each HIP and examples of activities and/or products derived from those HIPs by the students engaged in the HIP. While the AAC&U's high-impact practices are intended for undergraduate programs, it is useful to consider whether there are equivalent practices that would foster graduate student engagement and success, such as cohort or community building, active mentorship, or professional development opportunities.

UNIVERSITY OF ALASKA FAIRBANKS

Student Learning Outcomes Assessment Plan

Mathematics M.S. Degree

College of Natural Sciences and Mathematics

Adopted May 2014

Expanded Statement of Institutional Purpose	Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
MISSION STATEMENT: **We shall provide a high quality mathematics education responsive to the needs of individual students and the diverse population of Alaska**	Our students will attain a level of technical ability and knowledge to prepare for thesis work and to achieve their professional goals.	Students will demonstrate their progress through course work and annual committee meetings.	The student and the student's committee will meet annually to assess student progress toward the stated objective. Progress reports will be sent to the Assessment Committee who will review them and identify concerns.
	Our students will master core mathematical concepts.	All students are required to pass four core courses and pass a collection of exams covering a subset of core areas.	Every spring, comprehensive exams will be given graded and discussed by the math faculty. A summary of the results will be prepared by the Assessment Committee.
GOAL STATEMENT: **To assure that our graduates attain a solid understanding of mathematics and are adequately prepared to succeed in the job market or advanced study.**	Communication and presentation skills are consistent with professional standards.	**Oral component**: For all students, the quality of the student's public oral thesis defense will be evaluated by a survey of department members in attendance. For students placed in the classroom, at least one permanent faculty member will observe the student each semester and write a brief description to be submitted to the Assessment Committee. **Written component**: All students must submit a written project or thesis.	The Assessment Committee will review the results of the survey and any reports of classroom observations. Every three years, the Assessment Committee will evaluate the quality of recent theses.
	Students will obtain employment in their chosen field, continue on to further education, or otherwise meet personal objectives for completing the degree.	Tracking of recent graduates.	Faculty will be surveyed annually regarding recent graduates. A list of graduates will be maintained.

Submitted by: Jill Faudree