Mathematics - Doctor of Philosophy

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 review are "increase enrollment" and "increase graduation" rates.
The analysis given below summarizes the program's accomplishments from 2020-2023. The MATH PhD program has succeeded in graduating PhD students: 1 student in spring 2020, and 3 students in calendar year 2022. All students choosing to stay in the program have graduated within the typical time span nationally. (One chose to switch to a math education PhD program elsewhere.) However, the replacement rate for graduate students has not kept up: the fall PhD enrollment numbers were: Fall 2021: 4, Fall 2022: 2, and Fall 2023: 1.
The target enrollment of active PhD students in MATH at UAF is about 1-3 each year, due to department size and current resources. National (decreasing) trends in graduate enrollments, perhaps related to COVID, are reflected by decreased enrollment in our program. Given the limited scope of our PhD program, we consider it quite successful. Recent graduates have obtained prestigious post-doctoral positions and academic jobs.
The Department of Mathematics and Statistics is small at UAF; the PhD program makes up a very small proportion of its expansive focus (undergraduate service courses, excellent undergraduate and graduate academic experiences within the major, engaging in cutting edge research, etc.). To expand the PhD program requires increased financial support in the form of additional faculty hired for supervision of theses and additional TAships for students. (In Mathematics, the overwhelming majority of graduate students nationally are supported by TAships, with graduate student responsibilities and training in teaching undergraduate service courses.)

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 PhD in Mathematics is appropriate; we do not have immediate plans to amend it.
The 4 outcomes are: 1) attain a high level of research and teaching professional experience; 2) learn foundational math; 3) develop math communication skills; and 4) obtain employment either in the Math profession or following the student's interests. These are in line with national norms.
Item (1) assessed through committee reports and Thesis/Dissertation approval forms, stored with the Graduate School; all students passed.

Item (2): assessed through PhD Qualifying Examinations and graduate coursework. All students passed their qualifying exams and coursework. [Artifacts included]
Item (3) Public presentation of written projects and theses, as well as a public Advancement to Candidacy talk, 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 passed.
Item (4): recent graduates have obtained employment at Oregon State, Virginia Tech, and Roth Professional Solutions (industry). An earlier graduate has recently moved to a tenure-track position at Cal State San Bernardino, and was awarded an NSF research grant.

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:

The curriculum for the Math PhD degree includes coursework designed for the MS program, close faculty supervision in further study in the research area, a substantial research project, and training in teaching through a TAship. While additional advanced coursework would be desirable, this is not possible under current financial constraints.

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

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.

With numbers low, equity gaps are difficult to identify, particularly by racial or ethnic criteria; our data would be excluded from an analysis of disaggregated data due to inadequate sample size. Recent graduates have had a good gender balance, with half of the last 4 graduates [redacted]. also international recruiting: Over the last 8 years we have had PhD stduents from Iran, Mexico, China, Ukraine, and Bangladesh, as well as from the United States.

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." It is important to remember that UAF can only support a very small number of PhD students because of its size, number of TAships available for recruiting, and limited curriculum.

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 high-caliber post-doctoral and academic positions.

Submission

Submitter & Collaborator Names

Leah Berman
Elizabeth Allman
John Rhodes
Gordon Williams
Sergei Avdonin
Alexei Rybkin

Submitter Email

lwberman@alaska.edu

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 submitting the mid-cycle program review for the Mathematics PhD program. We understand that this is a small program and that the program would benefit from additional faculty and funding to support TAs. 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 PhD 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. For the full program review, which occurs in two years, (a) please do not include students' names or other identifiers to avoid disclosing FERPA protected information, (b) please include artifacts and rubrics that directly assess the intended objectives/outcomes, for example upload any progress report rubrics.

With respect to curricular changes, we have noted that the curriculum for the PhD degree includes coursework designed for the MS program, close faculty supervision in further study in the research area, a substantial research project, and training in teaching through a TAship, and that additional advanced coursework is desirable, but is not possible under current financial constraints.

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 that equity gaps are difficult to identify due to inadequate sample size. They also noted the program having a good gender balance as well as success with recruiting international students.

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 Ph.D. Degree

College of Natural Sciences and Mathematics

Adopted May 2018

Expanded Statement of Institutional Purpose	Intended Objectives/Outcomes	Assessment Criteria and Procedures	Implementation (what, when, who)
MISSION STATEMENT: **We shall provide high quality advanced mathematics education and training responsive to the needs of individual students, the diverse population of Alaska, and the national and international mathematics communities.** **GOAL STATEMENT:** **To assure that our graduates attain a solid understanding of mathematics, are adequately prepared to succeed in the job market, and can perform as professional mathematicians.**	Our students will attain a level of technical ability and knowledge to carry out independent mathematical research, to succeed as educators in a classroom setting, and to achieve other mathematical professional goals.	Students will demonstrate progress through course work, independent research, and annual committee meetings.	The student and the student's committee will meet annually to assess student progress toward the stated objectives. Progress reports will be available to the Assessment Committee who will review them and identify concerns.
	Students will master foundational mathematical concepts and learn in depth the area of the dissertation.	Students are required to pass at least four graduate courses related to their area of study and to pass Ph.D. comprehensive exams. Written progress reports of the outcome of the Ph.D. comprehensive exams are stored in the DMS office.	The Assessment Committee will review written reports of examination outcomes and identify concerns.
	Communication and presentation skills are consistent with professional standards.	**Oral component**: For advancement to candidacy, a student will give an oral presentation outlining progress towards solving a research problem. A student will also orally defend the dissertation. Written progress reports of these presentations composed by the student's committee will be filed in the DMS office. For students placed in a classroom, at least one	The Assessment Committee will review the results of the examinations and any reports of classroom observations. Every three years, the Assessment Committee will evaluate the quality of recent theses.

Submitted by: Elizabeth Allman

		permanent faculty member will observe the student each semester and write a brief assessment. **Written component:** All students must submit a written dissertation.	
	Students will obtain employment in their chosen field, 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: Elizabeth Allman