

Department of Mathematics and Statistics; UAF

Annual Student Learning Outcomes Assessment

Academic Years: 2012-13, 2013-14

Degrees: BA/BS Mathematics

Every two years the Department of Mathematics and Statistics (DMS) evaluates student learning outcomes and, more generally, the effectiveness of the undergraduate degree program in mathematics. The objectives and procedures are outlined in the attached Assessment Plan. During the current cycle we have implemented (1) ETS Major Field Test for all Senior Seminar students; (2) Exit surveys given to all Senior Seminar students and reviewed by the Assessment Committee; (3) Transcript check of recent graduates by the department chair and assessment committee.

Intended Objective/Outcome	Assessment Criterion/ Procedure	Implementation
Our students will attain mastery of core mathematical concepts at the baccalaureate-level comparable to those at other institutions.	We will give the ETS Major Fields Test in Mathematics to majors, preferably close to graduation.	Every spring the instructors of Math 490 and Stat 454 will require all students to take the Major Field Test in Mathematics. The Assessment Committee will review test results and discuss any needed changes.

Status:

Twelve students enrolled in Senior Seminar in Spring of 2013 took the Major Fields Test in Mathematics. Comparisons with students taking the test nationally yield the following data: In 2013 two students scored in the top 5% of students nationwide¹, five more in the top 20%, and all of our students scored in the top 50%. Our institutional mean score was in the top 8%. The University also receives an institutional mean percent correct in each of five categories: Calculus, Algebra, Routine, Nonroutine and Applied. Our students scored in the top 10% in each of Calculus, Algebra and Routine problems, we scored in the top 15% in Nonroutine problems and in the top 25% in Applied problems.

Six students enrolled in Senior Seminar in Spring of 2014 took the Major Fields Test in Mathematics. One of our students scored in the top 4%, with a total of two students in the top 10%. Two more students scored in the top 30% and five of the six students scored in the top 50% when compared to students nationwide. Our institutional mean score places our students in the top 5% nationwide. Our institutional mean scores in the topic areas placed our students in the top 3% in of Algebra, 4% in Routine Areas, 1% in Nonroutine areas, in the top 10% in Calculus and in the top 15% in Applied problems.

These scores confirm that our program is successful and operating at or above national standards.

¹ Scoring in the top $n\%$ means that we did better than $(100-n)\%$ of tracked US institutions. So a score in the top 5% means that we did better than 95% of reporting institutions.

Intended Objective/Outcome	Assessment Criterion/ Procedure	Implementation
Our students will have opportunities to develop the necessary skills to achieve their career goals in mathematics.	A) Exit survey. B) Tracking of recent graduates.	Every spring the instructors of Math 490 and Stat 454 will require all students to take the DMS Exit Survey. The Assessment Committee will review the results and discuss any needed changes. Faculty will be surveyed annually regarding recent graduates. A list of graduates will be maintained.

Status:

Students enrolled in Senior Seminar in Spring of 2013 and 2014 were given the DMS Exit Survey. Copies of the 2013 surveys have been lost, so better document management systems for the DMS Exit Survey needs to be implemented.

RESULTS OF THE SPRING 2014 EXIT SURVEYS

We had four respondents. All four have jobs lined up post graduation in math related fields. One each at Conoco Philips, Amazon, Microsoft and Terrasound. Half of the students reported having regular advising in the department with a particular faculty member in the department. This suggests additional work should be done to make sure all majors are receiving consistent advising. Several students expressed a desire to have taken an undergraduate graph theory course. While we offer that topic as part of our undergraduate combinatorics course it does suggest providing a suitable option at that level might find an audience.

Students surveyed rated their preparation in Calculus, Proofs, Abstract Algebra, Linear Algebra and Real Analysis in terms of their confidence that they are adequately prepared in those subject areas from Neutral to Strongly Agree (no statements of disagreement were recorded). They were similarly polled about their satisfaction with Advising, Availability of Math Elective Courses, Course Scheduling and Instructional Quality. Students who had reported being engaged with regular department advising rated it highly, with the remainder being non-committal (typical of this was the student who wasn't planning on obtaining a math degree until the 2012-2013 academic year and so hadn't been actively involved in the program as a degree seeking student until the 2013-2014 academic year). Instructional quality was generally highly rated, however there was some concern about course scheduling. In particular, that Numerical Analysis conflicts with many required engineering courses.

In general, the survey results reflect a high degree of satisfaction with the program.

TRACKING OF RECENT GRADUATES

Faculty and staff were surveyed about recent graduates. During the review period 18 students graduated from the program. Of those, eight are currently enrolled in or have completed a graduate degree program in a mathematics or teaching related field, with one more pursuing a degree in veterinary science. Two more have plans to pursue a graduate degree in the near future, one of which is in a math related area.

One is employed as a teacher in the Denali Borough School District. Four more have been hired to work in math related areas in industry as mentioned in the results of this spring's exit surveys. One is working

at the UAF library, and one as a fishing boat captain. At the time of this report's preparation, information was unavailable on the status of six of our alumni.

Intended Objective/Outcome	Assessment Criterion/ Procedure	Implementation
We will monitor the effectiveness and implementation of our program requirements.	Transcript check of recent graduates.	The Assessment Committee will annually review transcripts of recent graduates to determine if students are able to complete their degrees in a timely manner and address any problems.

Status:

The Assessment Committee carried out a review of the transcripts of the students who graduated in the last two years. Five of the students completed a standard undergraduate program in four years; however, one of those students obtained his first degree in Computer Science and came back four years later to complete the single additional course necessary to obtain a BS in mathematics while pursuing studies in accounting. Four more students took an additional 1-2 years to complete their programs, but either completed two or more majors or degrees. We had three transfer students who completed their degrees in three or fewer years. The remaining three students took longer to complete than one might expect; these included a transfer student who struggled to pass some required courses and so took three years to complete a degree that would have been otherwise possible to complete in two, a traditional student who struggled academically and took five years, and a student who changed major late in his career to mathematics resulting in a five year path to his initial degree, and has since spent two more years obtaining a Computer Science degree.

In reviewing these transcripts, our opinion is that thirteen (72%) finished in the expected timeline given their academic goals, two more (11%) completed in a reasonable timeline given their late decisions to declare a math major. Three students (16%) took longer than expected because they struggled with MATH 215 (Introduction to Proofs) or one of the two required courses that require MATH 215 as a prerequisite. These are the most difficult courses in our curriculum, so it is not surprising to see some students falter when taking them. We note, however, that these three students were able to complete their degrees with only one additional year in the program.

Overall, it is our opinion that the mathematics and statistics majors as currently implemented are working well for our students and do not provide any unnecessary impediments to completion.