

Annual Report for Academic Year 2007-2008

Department of Mathematics and Statistics Student Learning Outcomes Assessment for MS, MAT, PhD Degrees in Mathematics

INTENDED OUTCOMES OBJECTIVES	ASSESSMENT CRITERIA	IMPLEMENTATION PROCEDURES (what, when, who)
1) Our curriculum will be comparable to national standards	Compare our program to University of Idaho, University of Wyoming, and University of North Dakota.	Every three years, the members of the Graduate Committee from mathematics will compare our program to the three specified institutions and give a report on their findings to the assessment committee to include in the annual report.

Status: The graduate math assessment committee did not compare curricula this academic year. This was last done as part of our department's self assessment in 2005-2006.

The department did, however, adopt new formal rules for the operation of the Ph.D. program (see attached). Previously, the MS and Ph.D. written exams were the same, and the progression of Ph.D. students through the program was governed by ad hoc decisions by the students' committees. The new rules are intended to clarify the operation of the program, but are also necessary to be able to assess the success of the program in the future. Since these new rules will not apply to any current Ph.D. student, however, they will not have an immediate impact on assessment.

While there was discussion of modifying the operation of the MS/MAT program, no decision has been reached on that. Discussion will continue next year.

2) Our students will master a core of mathematical concepts.	All students are required to take and pass four core courses. In order to graduate, all students must take and pass a collection of exams on core subjects.	Every spring, comprehensive exams will be given, graded, and discussed by the majority of the math faculty. A summary of the results will be prepared by the members of the Graduate Committee from mathematics to be included in the yearly assessment report.
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Student performance in core subjects was adequate overall, with no reported structural problems. The two entering graduate students did take a significant portion of their course load as advanced undergraduate classes, but this was probably appropriate based on their particular backgrounds. Neither of these students attempted the comprehensive exams.

Three students in their second year took the comprehensive exams, with each passing two of the three topics. Each will be given one opportunity to retake the failed exam next fall in order to complete the exam requirement. Overall performance on passed exams was seen as adequate, but not outstanding.

Student 1: Graph theory – P, Real Analysis – P, Complex Analysis – F

Student 2: Graph theory – P, Real Analysis – P, Complex Analysis – F

Student 3: Graph theory – P, Real Analysis – F, Complex Analysis – P

The standing departmental policy of requiring students pass at least 2 of the 3 exams at one time, with a routine granting of a second chance for the third, may be contributing to students focusing on studying only 2 of the 3 subjects. Faculty discussions have occurred on possibly restructuring the exam system to address this. There is also some interest in making the exams more oriented toward fundamental background material and moving them earlier into the student's time studying here. However, we have not yet reached a consensus, and should continue discussions next year.

<p>3) Our students will have the opportunity to develop the skills necessary to achieve their career goals in mathematics.</p>	<p>alumni survey</p>	<p>Every May, alumni surveys will be sent to all students who graduated with a degree in mathematics two years prior. The returned surveys will be summarized by the assessment committee in the annual report the following spring.</p>
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Status: The surveys were apparently not sent out in 2007, so there is no information to summarize. During the summer of 2008, we will send surveys to all those who graduated in the academic years 2004--05 and 2005--06.

Examinations in the Mathematics Ph.D. Program

The Mathematics Ph.D. program seeks to produce mathematicians with both a solid knowledge of core mathematical fields and expertise in a more focused area of research. Because of constraints on curricular offerings in a small department, achieving these goals requires the program be structured so that much of the necessary learning is undertaken independently, with faculty guidance. A system of examinations both encourages appropriate study and ensures adequate student performance.

In progressing toward the Ph.D. degree students will undergo three sets of examinations, with different purposes.

- A. Written comprehensive exams, to ensure a broad doctoral-level understanding of mathematics in at least three areas. The breadth of these exams will be defined by the mathematics graduate faculty following national norms, and can be expected to span multiple courses and/or exceed formal curricular offerings at UAF.
- B. An oral comprehensive exam, to ensure a deeper understanding of those parts of mathematics broadly relevant to the student's area of research focus. The breadth of this exam will be defined by the student's graduate committee, and will typically require the student undertake substantial independent study.
- C. An oral thesis defense, at which the student is examined on his or her own research and mathematics directly related to it.

Normally, these shall occur in the second, fourth, and fifth years following admission to the Ph.D. program.

A. Written comprehensive exams:

1. The exams will consist of three two-hour exams in different topic areas. The three exams need not be taken in the same semester. An exam period, set by the Mathematics graduate committee, will occur once each semester, and normally fall in September and February.
2. The specific choice of the exam areas will be made by the student in consultation with his or her graduate committee. Two of the areas must be chosen from Algebra, Real Analysis, and Topology, and those exams will cover material as described on departmentally-approved study syllabi. The third area need not be in this list, but the material tested must attain a depth comparable to that of the other exams. A study syllabus for this exam will be set by two faculty members who agree to author and grade the exam.
3. Each exam will be jointly authored and independently graded by two faculty members. Grades of 'Pass' and 'Fail' will be assigned by consensus of the graders, and student will be informed of results within two weeks of the end of the exam period.
4. To pass the comprehensive written exams, a student must pass all three exams. A student who attempts and fails an exam will be allowed only one additional opportunity to pass that exam. (If a student substitutes a different topic area for this additional exam opportunity, only one attempt will be allowed on the new topic.)

5. A student who has not passed the exams by the end the third year in the Ph.D. program, may not remain in the program.

B. Oral comprehensive exam:

1. The oral exam will be scheduled and organized by the student's advisor, but conducted by the student's entire graduate committee. Each committee member is expected to prepare and ask several questions. Other departmental faculty may participate if they wish.
2. A study syllabus for the oral exam will be set by the student's graduate committee. This syllabus is created when the student 'advances to candidacy' for the Ph.D., but modifications can occur with committee approval.
3. As required by UAF policy, an outside examiner must be present for the oral exam. The advisor will be responsible for arranging an examiner through the graduate school.
4. A 'Pass' or 'Fail' grade will be assigned by consensus of the student's committee at the conclusion of the exam, and immediately communicated to the student.
5. A student who fails the oral exam may make one additional attempt to pass within one year of the failure. A student who has failed twice, or who has not passed the exam by the end of the sixth year in the Ph.D. program, may not remain in the program.

C. Thesis defense:

1. The thesis defense will begin with a publicly-announced presentation by the student at which the student's graduate committee is present. After a period for audience questions, the committee and other departmental faculty who wish will further question the student privately. Questions should be relevant to the student's research.
2. As required by UAF policy, an outside examiner must be present for the thesis defense. The advisor will be responsible for arranging an examiner through the graduate school.
3. A grade of 'Pass,' 'Conditional Pass,' or 'Fail' will be assigned by consensus of the committee, and will include both an assessment of performance during the defense and of the written thesis document. The grade will be immediately communicated to the student. Conditions for converting a 'Conditional Pass' to a 'Pass' will be set by the committee.