Northern Arizona University
Department of Mathematics & Statistics
Assessment Plan

Assessment Plan Development Process
The departmental Planning Committee met to discuss the Liberal Studies and Assessment guidelines and to reaffirm the program gas developed in conjunction with the recently completed departmental program review. The Planning Committee then formulated a plan for assessing those program goals, including appropriate timelines and the feedback loop. The committee presented the recommended assessment plan to the faculty for input and approval. Once finalized, the assessment plan was forwarded to the Liberal Studies and Assessment Office.

Program Goals
The department strives to provide high quality programs and instruction as amplified below. In addition, the department endeavors to provide high quality advising to all students in departmental programs.
A. To deliver top quality baccalaureate and master's programs in mathematics, mathematics education, statistics, and actuarial science, students must be given the proper training and experiences that allow them to
   1. Develop the skills necessary to communicate clearly and in professional fashion (both verbally and in written form) to specialists and non-specialists using proper terminology and structure;
   2. Develop a solid, balanced, contemporary foundation in mathematics, statistics, mathematics education or actuarial science, including confidence in the use of mathematics and statistics and an awareness of concepts and advances of recent and current interest;
   3. Develop the ability to use mathematics, statistics, mathematics pedagogy, or actuarial science to solve a wide range of basic problems;
   4. Develop the ability to reason using the methods of the discipline;
   5. Develop the ability to integrate knowledge and to use multiple perspectives to model simple realistic situations (or design curricula and delivery systems) and to solve related problems;
   6. Develop an active approach to learning including the abilities to read disciplinary material in order to learn on their own and to use technology to experiment with functions and procedures;
   7. Develop a context for disciplinary content and applications, including typical settings for the appearance of different concepts and methods in other disciplines and an appreciation for the development of the concepts and methods; and
   8. Develop the skills necessary for successful entry into careers in the mathematical sciences and mathematics education or to pursue advanced study in their area and related areas.
B. To deliver courses and instruction of the highest quality, the department must
   1. Provide courses at all levels that
a. develop conceptual understanding,
b. challenge students to undertake demanding mathematical reasoning,
c. exhibit high expectations and standards, and
d. provide value to students for general understanding study of other topics, and applications;
2. Make wide, effective use of technology in courses;
3. Uphold ethical standards in academic matters (e.g., advising, copyrights, honesty, and fairness in grading); and
4. Uphold uncompromising standards of excellence in teaching.

Assessment of Program Goals, Including Timeline and Feedback

To determine the degree to which the department is achieving its program goals, the following assessment methods will be used.

A. Undergraduate Education
1. N40orCourses
   a. Exit Interviews-All students who graduate with a major in mathematics, mathematics education, statistics, or actuarial science will undergo an exit interview with the department chair. The interview protocol will include a questionnaire that allows students to comment on the quality, appropriateness, and effectiveness of their courses, instructors, and advisor. It will also allow them to comment on the strengths and weaknesses of the program and their suggestions for program changes. The results of the exit interviews will be periodically summarized by the department chair and forwarded to the appropriate instructor and to the departmental planning committee and undergraduate education committee for review and action.
   b. Capstone Experience--AU students majoring in mathematics, mathematics education, statistics, or actuarial science will undergo a capstone experience. This experience is intended to be summative and will involve the integration of all previous required coursework. Results from the capstone experiences will be judged against the departmental program goals by the department chair or designated representatives. A summary will be forwarded to the departmental planning committee and undergraduate education committee for review and action.
   c. Results of Student Performance on National Exams and Competitions-Each year student performance on national exams and competitions (e.g., Putnam Exam Mathematical Contest in Modeling, and Society of Actuaries exams) will be summarized by the department chair or designated representatives and forwarded to the departmental planning committee for review and appropriate action.
   d. Alumni Survey-Every two years, an alumni survey will be conducted by the undergraduate education committee to determine the extent to which they have been able to find suitable employment. The survey will also inquire about the appropriateness and effectiveness of the training they received at NAU. Results will be distributed to the faculty and to the departmental planning committee and undergraduate curriculum and policy committee for review and action.
2. Service Courses
Faculty Interviews/Survey-Faculty members in areas serviced by the department (e.g., chemistry, biology, engineering, business, education) will be interviewed and/or surveyed by the undergraduate education committee to determine the extent to which their students are properly prepared in mathematics. Results will be forwarded to the departmental planning committee and undergraduate curriculum and policy committee for review and action.

3. Liberal Studies Foundation Course (MAT114 Quantitative Reasoning)
The undergraduate education committee will send a survey to a sample of MAT114 students two years after they have completed the course. The survey will collect data on the effectiveness of MAT114 in preparing students to appropriate use quantitative reasoning. In addition, faculty members in departments whose students generally enroll in MAT114 will be interviewed and/or surveyed to determine the extent to which their students are properly prepared in mathematics. Results will be forwarded to the departmental planning committee and undergraduate curriculum and policy committee for review and action.

B. Graduate Education
1. Major programs
a. Oral Exam/Thesis Survey-Upon completion of the student's oral exam or thesis defense, the chair of the exam committee, with input from other committee members, will fill out a survey. The survey will attempt to assess a variety of program goals, especially those related to students' ability to effectively communicate and master mathematical concepts. The results of the survey will be forwarded to the departmental planning committee and graduate curriculum and policy committee for review and action.

b. Exit Interviews-AU students who graduate with a major in mathematics, mathematics education, statistics, or actuarial science will undergo an exit interview with the department chair. The interview protocol will include a questionnaire that allows students to comment on the quality, appropriateness, and effectiveness of their courses, instructors, and advisor. It will also allow them to comment on the strengths and weaknesses of the program and their suggestions for program changes. The results of the exit interviews will be periodically summarized and forwarded to the appropriate instructor and to the departmental planning committee and graduate curriculum and policy committee for review and action.

c. Alumni Survey-Every two years, an alumni survey will be conducted by the graduate operations committee to determine the extent to which they have been able to find suitable employment. The survey will also inquire about the appropriateness and effectiveness of the training they received at NAU. Selected employers will also be surveyed about their impressions of the knowledge and skill level of the NAU graduates they employ. Results will be distributed to the faculty and to the departmental planning committee and graduate curriculum and policy committee for review and action.
2. Graduate Teaching Assistant Evaluation
   Each year graduate teaching assistants will be evaluated to determine the extent to which the departmental goal of providing high quality instruction is being met. This will be accomplished using student course evaluations and mentor class observation reports. Results will be summarized by the GTA coordinator and department chair and will be forwarded to all appropriate departmental committees for review and action.