OUTCOMES ASSESSMENT FOR ACADEMIC PROGRAMS

2008-09 PHASE 3 REPORT

Academic Program: Mathematics

Graduate  M.S.

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*Note: See the “Assessment Revisited: A Guide to De-Cluttering the Assessment Process” for definitions of mission, goals, objectives, and student learning outcomes.

NMSU MISSION: New Mexico State University is the state’s land-grant university, serving the educational needs of New Mexico’s diverse population through comprehensive programs of education, research, extension education, and public service.

ACADEMIC PROGRAM MISSION: The draft departmental mission statement is: The Department of Mathematical Sciences provides core education in numeracy and quantitative topics that prepares graduate and undergraduate students to be knowledgeable and responsible citizens of the world. It does this by conducting research, scholarship, and teaching, including teaching service courses for other programs, to fulfill the land grant mission of the university.

GOALS: The program strives to produce Master’s students with a strong mathematical background, who are able to use mathematics to solve a wide range of problems and to communicate effectively their work, allowing them to pursue a Ph.D. in mathematics, graduate work in related fields, teach mathematics, or employ their mathematical expertise in business and industry.

OBJECTIVES: Students who complete the M.S. in Mathematics will have a broad knowledge of mathematical ideas sufficient to allow them to pursue careers in a wide range of areas, including mathematics, science, engineering, and business. They will be able to form clear and complete mathematical arguments. They will be able to communicate mathematics competently through both written and oral communication.

DIRECT STUDENT LEARNING OUTCOME (1 outcome is required): Students who complete the M.S. in Mathematics will be able to write a mathematical proof.

INDIRECT STUDENT LEARNING OUTCOME (this is optional):

WHAT EVIDENCE WILL BE USED TO ASSESS THE IDENTIFIED DIRECT STUDENT LEARNING OUTCOME? Students will be assessed during the final Master’s oral exam. The main components of the exam are testing of students’ knowledge of the core mathematical
subjects of the Master’s program and of their mathematical reasoning ability. One demonstrates mathematical reasoning through the writing of mathematical proofs. While answering questions, students write sufficient numbers of proofs during the exam for faculty to accurately gauge their ability to write proofs. Questionnaires will be given to members of student Master’s exam committees. Faculty will rate numerically students’ aptitude.

METHOD OF DATA COLLECTION: Office staff will distribute questionnaires to faculty, who will then provide the evidence and return it back to the staff. This will be done each semester, at the time of a student taking their Master’s final exam. All students taking their Master’s final exam will be assessed. More detail about the questionnaires is in the previous paragraph.

HOW, AND BY WHOM, WILL THE EVIDENCE BE QUANTIFIED? Faculty will rate a student between 1 and 5 on the question “Does the student’s performance indicate the ability to write a mathematical proof?” on a written form, based on their performance in answering questions during their Master’s final exam. Office staff will tabulate the data, producing an average rating of aptitude on the learning outcome. Numerical ratings correspond to the following levels of performance: 1 = bad, 2 = poor, 3 = satisfactory, 4 = good, 5 = excellent.

WHAT LEVEL OF PERFORMANCE IS CONSIDERED EVIDENCE THAT THE STUDENTS ARE LEARNING THE INTENDED OBJECTIVE? The learning outcome will be graded on a five point scale, with 5 the highest value. We consider that a 3 or higher (satisfactory or better) will constitute evidence that students are learning the objective.

WHAT NUMBER OR PERCENTAGE OF STUDENTS OBTAINING A STATISFACTORY LEVEL OF PERFORMANCE IS SUFFICIENT TO DETERMINE THE PROGRAM IS PROVIDING THE NECESSARY COMPONENTS IN AN EFFECTIVE WAY TO MEET PROGRAM EXPECTATIONS? We feel that if 2/3 of student s are assessed a score of 3 or higher on the questionnaire, then this is a satisfactory level of performance sufficient to determine that the program is effective in meeting our expectations.

WITH WHOM WILL FINDINGS OF THE ASSESSMENT PROCESS BE SHARED? WHEN? HOW? The department’s Graduate Studies Committee, together with the Department Head, will first discuss the assessment findings, and consider initial recommendations program change. The committee will then discuss the findings in a department meeting midway in the spring semester to allow all faculty to be aware of the findings and to make suggestions for program revision. Outcome assessment reports will be posted on departmental websites, allowing other university stakeholders access to the information.

DATA ASSESSMENT TOOK PLACE: The department revised the Master’s final exam questionnaires in Spring 2009, adding the question listed above. The data below comes from Spring 2009 exams.
NUMBER OF STUDENTS WHO PARTICIPATED IN THE ASSESSMENT PROCESS: 5.

STUDENT SCORES: Three examiners scored each student; scores below are averages of all the examiners. The five scores are 3, 4, 4, 3.67, 4.33.

PERCENTAGE OF STUDENTS PERFORMING SATISFACTORY: 100%.

DOES THE PERCENTAGE OF STUDENTS PERFORMING SATISFACTORY MEET THE DEPARTMENT’S STATED BENCHMARK? Yes. Our benchmark was 67%, and we exceeded that.

INTERPRETATION/FUTURE PLANS: At this point the data indicates that the Master’s program is producing students who are able to write valid mathematical proofs, one of our desired outcomes. However, the number of students assessed is small, and more data is needed to accurately measure the quality of our program. While I feel our assessment process is adequate, there is one change I feel it is worth us considering at this point. Besides the Master’s exam questionnaire, we also survey course instructors on student performance. Including this data as part of our assessment will give us a larger data sample with which to base program change decisions.