

# Student Learning Outcomes for Math

2010-2011

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**Title:** Ability to demonstrate an acceptable level of mastery of mathematical skills and concepts

**Description:** Ability to demonstrate an acceptable level of mastery of mathematical skills and concepts. The Major Field Test (MFT) will be used to assess student mastery of mathematical skills and concepts.

**Budget:** \$0.00

**Core Competencies:** 1,2,3,4,5

**25% Online:**

**50% Online:**

**Core Competencies:** 1,2,3,4,5

**How Often:** Every year

**Assessed this Year?** Yes

**Responsibility:** Department Chair

**Participation:** Mathematics Major Committee

**Direct Assessments**

MFT

**Indirect Assessments**

<b>Results:</b>	The Major Field Test (MFT) was used to assess student mastery of mathematical skills and concepts. MFT scores for students graduating between July 2010 and June 2011 were used in this assessment. The distribution of Mathematics MFT Exam scores was as follows: 2 students had scores of 152, 2 had scores of 149, 2 had scores of 137, and 1 scored 125. Careful comparison with the distribution of the norm population indicates that the distribution of scores for our students falls below the median of the norm population. On one hand, 4 out of 7 scores (57.1%) fell within a one-standard deviation interval (138 to 174) about the norm population mean. On the other hand, our limited norm population percentile information indicates that the 152 score is approximately the 40th percentile, the 149 score is approximately the 35th percentile, the 137 score is approximately the 10th percentile, and the 125 score falls below the 5th percentile. These considerations indicate that our mathematics majors are not performing as well as the norm population on average. (See attachments)
<b>Curriculum:</b>	None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.
<b>Actions:</b>	None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.
<b>Improvements:</b>	None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

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<b>Title:</b>	Ability to communicate mathematical ideas with clarity and accuracy in a logical, well organized format
<b>Description:</b>	Ability to communicate mathematical ideas with clarity and accuracy in a logical, well organized format. An assessment of this learning outcome will be conducted in MA 471W, Applied Mathematics. MA 471 is a course that includes an emphasis on writing. This course is a capstone course that is designed to draw upon a wide range of mathematical skills in the solution of applied problems. A well-defined writing assignment will be used to assess this learning outcome.
<b>Budget:</b>	\$0.00
<b>Core Competencies:</b>	1
<b>25% Online:</b>	

**50% Online:****Core Competencies:**

1

**How Often:** Every year**Assessed this Year?** Yes**Responsibility:** MA 471 Instructor**Participation:** Mathematics Major Committee**Direct Assessments**

Final Exam

Project Assessment

**Indirect Assessments**

**Results:** This learning outcome was assessed in MA 471W, Applied Mathematics, during the fall of 2010. MA 471 is a capstone course that is designed to draw upon a wide range of mathematical skills in the solution of applied problems. Since MA 471 also emphasizes writing skills, several writing assignments are typically included in the course. A well-defined writing assignment was used to assess this learning outcome. This assignment was constructed and assessed by the current instructor. The assessment was conducted using a six point rubric where students were scored on a 10-point scale. Assessments were conducted for each of the twelve students in this class with the following results: overall organization, average = 9.3; writing skills, average = 7.9; ability to explain and present the problem, average score = 8.3; ability to select proper mathematical tools, average = 9.7; ability to apply tools correctly, average = 8.7; ability to present findings, average 7.8. (See attachments)

**Curriculum:** None to date. The Mathematics Major Committee will consider these

findings during the fall of 2011.

**Actions:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

**Improvements:** Professional writing skills will be addressed in the Department's Quality Enhancement Plan: Research Literacy.

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**Title:** Ability to apply inductive and/or deductive reasoning skills in the development of rigorous mathematical arguments

**Description:** Ability to apply inductive and/or deductive reasoning skills in the development of rigorous mathematical arguments. MA 451, Introduction to Analysis, is the logical, senior-level course for embedded assessment of reasoning skills in the development of rigorous mathematical arguments. Well-defined assignments or exam items where each student develops his/her own mathematical proofs will be used to assess this learning outcome.

**Budget:** \$0.00

**Core Competencies:** 2,4

**25% Online:**

**50% Online:**

**Core Competencies:** 2,4

**How Often:** Every year

**Assessed this Year?** Yes

**Responsibility:** MA 451 Instructor

**Participation:** Mathematics Major Committee

**Direct Assessments**

Final Exam

**Indirect**

## Assessments

**Results:** MA 451, Introduction to Analysis, is the logical, senior-level course for embedded assessment of reasoning skills in the development of rigorous mathematical arguments. An assessment was conducted during the spring of 2011. A well-defined exam item where each student developed his/her own mathematical proof was used to assess this learning outcome. This item was constructed and assessed by the current instructor. (See attachments) Enrollment in the spring of 2011 consisted of fifteen students. Five of the fifteen students scored 100% on the test item while four scored 90%, two scored 80%, one score 50%, one scored 20% and two made no attempt. A problem similar to this one had been done in class by one of the students. The test question was made moderately different in order to keep students from simply memorizing a proof word for word. This was done in an effort to see which students could understand the idea of the proof as well as present this idea properly in his/her own words. Students who have scored 20% or less on the problem have either been historically weak mathematics students who may have transferred in several of the fundamental mathematics courses or students who have not taken very many of the upper level (theoretical) mathematics courses prior to taking this class.

**Curriculum:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

**Actions:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

**Improvements:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

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**Title:** Ability to draw upon a wide range of mathematical skills in the solution of applied problems

**Description:** Ability to draw upon a wide range of mathematical skills in the solution of applied problems. MA 471W, Applied Mathematics, is a natural course for assessing the abilities of undergraduate mathematics majors to apply a wide range of mathematical skills in developing one or more solutions to applied problems. Individual student performance on applied problems including exam items and/or other assignments will be the basis for assessing this learning outcome.

**Budget:** \$0.00

**Core Competencies:** 2,4,5

**25% Online:**

**50% Online:**

**Core Competencies:** 2,4,5

**How Often:** Every year

**Assessed this Year?** Yes

**Responsibility:** MA 471 Instructor

**Participation:** Mathematics Major Committee

**Direct Assessments**

Final Exam

Project Assessment

**Indirect Assessments**

**Results:** MA 471W, Applied Mathematics, is a natural course for assessing this learning outcome. An assessment of individual student performance on one applied problem was the basis for assessing this learning outcome. This assessment was conducted by the current instructor during the fall of 2010. The assessment was conducted using a five-point rubric where students were scored on a 10-point scale. Assessments were conducted for each of the twelve students in this class with the following results: ability to analyze situation, average = 10.0; ability to find maximal cliques for graph, average = 10.0; ability to construct correct bar graph, average score = 10.0; ability to develop and to solve linear programming problem, average = 9.0; ability to

analyze and to summarize findings, average = 4.1. (See attachments)

**Curriculum:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

**Actions:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.

**Improvements:** None to date. The Mathematics Major Committee will consider these findings during the fall of 2011.