

**Minnesota State University Moorhead
2006-2007 Assessment Report Cover Sheet**

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Note: All programs will complete this form.

Academic Program: B.A.'s and B.S.'s in Mathematics

Department: Mathematics

College: Social and Natural Sciences

Date: October 12, 2006

1. Name(s) of Department Assessment Coordinator and/or Assessment Committee Members

Ellen Hill, Chair of Committee

Jim Hatzenbuhler

Kristine Montis

Ari Wijetunga

2. List of All Student Learning Outcomes. (List all outcomes, placing an asterisk (*) by the outcomes you are assessing this year.)

- *1. Students should understand the theory and applications of calculus and linear algebra.
- *2. Students should develop the capacity for rigorous analytical thought and the ability to communicate ideas in a precise manner.
- *3. Students should possess an awareness of the abstract nature of theoretical mathematics and the ability to write proofs.
- *4. Students should possess an understanding of the breadth of the mathematical sciences and their deep interconnecting principles.
- *5. Students should be able to solve multi-step problems and perform complex tasks.
- *6. Students should develop the ability to detect basic mathematical structures (patterns) and make generalizations from them.

3. Signatures

Department Chair or Program Director

Dean or Director

Required Attachments:

1. Assessment Reporting Forms
2. Records of department meetings when Assessment Report was discussed and approved.

Minnesota State University Moorhead
2006-2007 Assessment Reporting Form

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Instructions: Complete, print, and save a copy of this page for each student learning outcome being assessed during the following two year period.

Academic Program: B.A.'s and B.S.'s in Mathematics

1. Learning outcome assessed (please include the number of the outcome to correspond with the list on the cover sheet).

1. Students should understand the theory and applications of calculus and linear algebra.

2. Assessment measure used for this learning outcome.

ETS Major Field Test in Mathematics
Success on the Society of Actuaries Exam I

3. Expected Student Performance (from assessment plan)

None is prescribed. We study the results for trends and react accordingly.

4. Actual Results (attach additional information, if necessary)

In comparison to the other institutions taking the Major Field Test in Mathematics, our students were at the 15th to 20th percentiles in the "Calculus" subscore for the last two years. For the "Algebra" subscore, which includes both linear algebra and abstract algebra, our students were at the 55th percentile in 2004/2005 and at the 20th percentile in 2005/2006. (We note that due to small numbers, a large year-to-year variability is not unexpected.)

Although we are not happy with these scores, we do note that we have a larger number of transfer students than the comparison group (40% for the two years, compared to 25% for all students taking the test). We also have students with lower self-reported GPA's, both overall and within the major. The combination of these GPA values with the low percentile rankings we take as an indication that we are recognizing that our students are not performing at the level that we wish them to perform as we assess individual students in the classrooms.

Three of four students who attempted the Society of Actuaries Exam I passed the exam.

5. Proposed action in response to results. (Please note if improvements can be made with existing department resources. If improvements cannot be made with existing department resources, consider applying for an Instructional Improvement Grant.)

The department has decided to focus on our calculus sequence during this academic year. Thus far the department voted to change the format in Calculus I and II from four lectures per week to three lectures and two hour-long labs per week. These proposed changes will be submitted to

APAC for approval. Pending approval, the specifics of what will be done within the sequence will be decided as part of our Work Plan that will be developed during the Spring semester.

Minnesota State University Moorhead
2006-2007 Assessment Reporting Form

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Instructions: Complete, print, and save a copy of this page for each student learning outcome being assessed during the following two year period.

Academic Program: B.A.'s and B.S.'s in Mathematics

1. Learning outcome assessed (please include the number of the outcome to correspond with the list on the cover sheet).

2. Students should develop the capacity for rigorous analytical thought and the ability to communicate ideas in a precise manner.

2. Assessment measure used for this learning outcome.

Survey in capstone courses and ETS Major Field Test in Mathematics
Success on the Society of Actuaries Exam I

3. Expected Student Performance (from assessment plan)

None is prescribed. We study the results for trends and react accordingly.

4. Actual Results (attach additional information, if necessary)

In comparison to the other institutions taking the Major Field Test in Mathematics, our students were at the 10th percentile in the "Non-Routine Problems" subscore for the last two years.

For the questions on the capstone surveys, the students are ranked on a scale of 1 to 9 where 1 is "very poor", 5 is "adequate", and 9 is "excellent". For the question regarding rigorous analytical thought, the students were given a mean score of 5.96 in 2004/2005 and 6.76 in 2005/2006. For the question regarding the communication of ideas in a precise manner, the students were given mean scores of 6.20 and 6.74, respectively.

Three of the four students who attempted the Society of Actuaries Exam I passed the exam.

5. Proposed action in response to results. (Please note if improvements can be made with existing department resources. If improvements cannot be made with existing department resources, consider applying for an Instructional Improvement Grant.)

None at this times. The department has chosen to focus on Calculus at this time, which is one of the fundamental sequences in the curriculum (Math SLO #1).

Minnesota State University Moorhead
2006-2007 Assessment Reporting Form

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Instructions: Complete, print, and save a copy of this page for each student learning outcome being assessed during the following two year period.

Academic Program: B.A.'s and B.S.'s in Mathematics

1. Learning outcome assessed (please include the number of the outcome to correspond with the list on the cover sheet).

3. Students should possess an awareness of the abstract nature of theoretical mathematics and the ability to write proofs.

2. Assessment measure used for this learning outcome.

Survey in capstone courses

3. Expected Student Performance (from assessment plan)

None is prescribed. We study the results for trends and react accordingly.

4. Actual Results (attach additional information, if necessary)

Awareness of the abstract nature of theoretical mathematics and the ability to write proofs are difficult things to assess in students. However, these skills are not only highly intertwined with each other, to the point of being difficult to separate, they are also highly intertwined with the critical thinking skills and thought processes that are inherent in the other student learning outcomes. Therefore, all of the questions on the capstone surveys in some way touch on this student learning outcome.

For the questions on the capstone surveys, the students are ranked on a scale of 1 to 9 where 1 is "very poor", 5 is "adequate", and 9 is "excellent".

For the question regarding rigorous analytical thought, the students were given a mean score of 5.96 in 2004/2005 and 6.76 in 2005/2006.

For the question regarding the communication of ideas in a precise manner, the students were given mean scores of 6.20 and 6.74, respectively.

For the question regarding the understanding of the breadth of the field, the students were given mean scores of 5.78 and 6.58, respectively.

For the question regarding the understanding of the deep interconnecting principles in mathematics, the students were given mean scores of 5.60 and 6.48, respectively.

For the question regarding the ability to solve multistep problems, the students were given mean scores of 5.90 and 6.62, respectively.

For the question regarding the ability to perform complex tasks, the students were given mean scores of 5.88 and 6.52, respectively.

For the question regarding the ability to detect basic mathematical patterns, the students were given mean scores of 5.72 and 6.44, respectively.

For the question regarding the ability to generalize from basic mathematical structures, the students were given mean scores of 5.44 and 6.26, respectively.

5. Proposed action in response to results. (Please note if improvements can be made with existing department resources. If improvements cannot be made with existing department resources, consider applying for an Instructional Improvement Grant.)

None at this times. The department has chosen to focus on Calculus at this time, which is one of the fundamental sequences in the curriculum (Math SLO #1).

Minnesota State University Moorhead
2006-2007 Assessment Reporting Form

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Instructions: Complete, print, and save a copy of this page for each student learning outcome being assessed during the following two year period.

Academic Program: B.A.'s and B.S.'s in Mathematics

1. Learning outcome assessed (please include the number of the outcome to correspond with the list on the cover sheet).

4. Students should possess an understanding of the breadth of the mathematical sciences and their deep interconnecting principles.

2. Assessment measure used for this learning outcome.

Survey in capstone courses

3. Expected Student Performance (from assessment plan)

None is prescribed. We study the results for trends and react accordingly.

4. Actual Results (attach additional information, if necessary)

For the questions on the capstone surveys, the students are ranked on a scale of 1 to 9 where 1 is "very poor", 5 is "adequate", and 9 is "excellent". For the question regarding the understanding of the breadth of the field, the students were given mean scores of 5.78 and 6.58, respectively. For the question regarding the understanding of the deep interconnecting principles in mathematics, the students were given mean scores of 5.60 and 6.48, respectively.

5. Proposed action in response to results. (Please note if improvements can be made with existing department resources. If improvements cannot be made with existing department resources, consider applying for an Instructional Improvement Grant.)

None at this times. The department has chosen to focus on Calculus at this time, which is one of the fundamental sequences in the curriculum (Math SLO #1).

Minnesota State University Moorhead
2006-2007 Assessment Reporting Form

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Instructions: Complete, print, and save a copy of this page for each student learning outcome being assessed during the following two year period.

Academic Program: B.A.'s and B.S.'s in Mathematics

1. Learning outcome assessed (please include the number of the outcome to correspond with the list on the cover sheet).

5. Students should be able to solve multi-step problems and perform complex tasks.

2. Assessment measure used for this learning outcome.

Survey in capstone courses and ETS Major Field Test in Mathematics
Success on the Society of Actuaries Exam I.

3. Expected Student Performance (from assessment plan)

None is prescribed. We study the results for trends and react accordingly.

4. Actual Results (attach additional information, if necessary)

In comparison to the other institutions taking the Major Field Test in Mathematics, our students were at the 10th percentile in the "Non-Routine Problems" subscore for the last two years and at the 35th percentile in 2004/2005 and the 45th percentile in 2005/2006 in the "Applied Problems" subscore. (We note that due to small numbers, a large year-to-year variability is not unexpected.)

Although we are not happy with these scores, we do note that we have a larger number of transfer students than the comparison group (40% for the two years, compared to 25% for all students taking the test). We also have students with lower self-reported GPA's, both overall and within the major. The combination of these GPA values with the low percentile rankings we take as an indication that we are recognizing that our students are not performing at the level that we wish them to perform as we assess individual students in the classrooms. Three of the four students who attempted the Society of Actuaries Exam I passed the exam.

For the questions on the capstone surveys, the students are ranked on a scale of 1 to 9 where 1 is "very poor", 5 is "adequate", and 9 is "excellent". For the question regarding the ability to solve multistep problems, the students were given mean scores of 5.90 and 6.62, respectively. For the question regarding the ability to perform complex tasks, the students were given mean scores of 5.88 and 6.52, respectively.

Three of the four students who attempted the Society of Actuaries Exam I passed the exam.

5. Proposed action in response to results. (Please note if improvements can be made with existing department resources. If improvements cannot be made with existing department resources, consider applying for an Instructional Improvement Grant.)

None at this times. The department has chosen to focus on Calculus at this time, which is one of the fundamental sequences in the curriculum (Math SLO #1).

Minnesota State University Moorhead
2006-2007 Assessment Reporting Form

(An electronic version of this form can be accessed at <http://www.mnstate.edu/assess>)

Instructions: Complete, print, and save a copy of this page for each student learning outcome being assessed during the following two year period.

Academic Program: B.A.'s and B.S.'s in Mathematics

1. Learning outcome assessed (please include the number of the outcome to correspond with the list on the cover sheet).

6. Students should develop the ability to detect basic mathematical structures (patterns) and make generalizations from them.

2. Assessment measure used for this learning outcome.

Survey in capstone courses and ETS Major Field Test in Mathematics

3. Expected Student Performance (from assessment plan)

None is prescribed. We study the results for trends and react accordingly.

4. Actual Results (attach additional information, if necessary)

In comparison to the other institutions taking the Major Field Test in Mathematics, our students were at the 10th percentile in the "Non-Routine Problems" subscore for the last two years and at the 35th percentile in 2004/2005 and the 45th percentile in 2005/2006 in the "Applied Problems" subscore. (We note that due to small numbers, a large year-to-year variability is not unexpected.)

Although we are not happy with these scores, we do note that we have a larger number of transfer students than the comparison group (40% for the two years, compared to 25% for all students taking the test). We also have students with lower self-reported GPA's, both overall and within the major. The combination of these GPA values with the low percentile rankings we take as an indication that we are recognizing that our students are not performing at the level that we wish them to perform as we assess individual students in the classrooms.

For the questions on the capstone surveys, the students are ranked on a scale of 1 to 9 where 1 is "very poor", 5 is "adequate", and 9 is "excellent". For the question regarding the ability to detect basic mathematical patterns, the students were given mean scores of 5.72 and 6.44, respectively. For the question regarding the ability to generalize from basic mathematical structures, the students were given mean scores of 5.44 and 6.26, respectively.

5. Proposed action in response to results. (Please note if improvements can be made with existing department resources. If improvements cannot be made with existing department resources, consider applying for an Instructional Improvement Grant.)

None at this times. The department has chosen to focus on Calculus at this time, which is one of the fundamental sequences in the curriculum (Math SLO #1).