Mission Statement

Changes

1. Complete some Program Outcomes that were not completed in 2008-2009, such as writing in-house Senior Test, calibrating and using an in-house Placement Test, and launching a Departmental website. Continue other Program Outcomes, such as strengthening ties to alumni.

2. Look to increase majors' practice with writing and presenting mathematical work, outside just the Capstone course - discuss including presentations in other upper-level courses perhaps. This may be especially crucial in the intermediate courses that teach proof-writing skills, 366 in particular but also 313 and 320 to some degree. It is natural for students to be a little weak when learning these skills for the first time, but we want them more proficient by the time they reach 499.

3. Senior surveys and Alumni surveys give little useful data, since non-response is a serious problem. However, we need to add to or modify the wording of PO #4, and its measures, to at least allow use of survey data to see student and alumni preparedness for math-related post-graduate options.

4. Various changes to course-level SLOs, program-level SLOs, etc., are being considered and implemented. See the Process Review section for more detail.

5. The faculty are discussing many ideas to combat student apathy in the lower classes. We believe apathy, more than lack of ability, is behind poor performance (and poor evaluations) in many of these classes. Younger students may need some prompting to keep pace with material, and not put off studying till the last minute. To that end, we may implement new testing structures, such as using weekly quizzes, or pop quizzes, to encourage students to stay up-to-date. Experiments with such structures in the past year, and by faculty in other disciplines, appear to have been beneficial to students. We may also try some of the new online homework management systems, which provide instant grading on online assignments tied to the book, giving students more opportunities for feedback without burdening faculty with excess grading. The key is to find the proper balance between feedback to students, workload for faculty, and classroom time devoted to teaching rather than testing.

Recommendations

1. (a) Major revision of SLOs for MATH 175 - they do not fit the broad coverage of the course. May present topics in a different order in the course, to maximize usefulness of topics to students.

(b) Revision of other course-level SLOs to better match course content and emphasis, and to make sure faculty are in agreement on what the SLOs mean, what types of questions best measure these skills, etc.

(c) Clarify ties between course-level SLOs and Program-level SLOs, to simplify future assessment process.

2. Add some sort of benchmarks that we are aiming for - saying merely "embedded test questions" as a measure, doesn't say what we hope to see in the results of those questions.

3. Rethink how data is collected for COMP 105 - look for a simpler scheme, and also one that extracts data only on our majors. This is also an issue in Calculus I and II, but not so vital, since most students there are at least in the sciences, and these are rarely taken as electives.

4. Consider adding a program goal on motivating lower-level students, whether majors or not, to do the work necessary to succeed. Currently considering teaching-style changes, and class-structure changes that will allow more student feedback without over-burdening faculty. There is discussion of using pop quizzes and/or online homework management systems.

Comments
Goal Number 1

Develop a Placement Test to better place students in the appropriate first math class.

Report Comments
Written in Spring 2009. Will be calibrated in Fall 2009, by administering in beginning math classes, and comparing results to Math ACT scores and course grades, to determine appropriate cutoff scores. Hope to use the placement test Fall 2010, if not sooner. Will probably use as a secondary measure, with ACT Math score still the primary measure.

Goal Measures Combined

- Either done or not

Frequency

Goal Number 2

Develop a Departmental website to organize useful information for prospectives, majors, advisors, faculty and alumni

Report Comments
In progress. Webspace allotted. Dr. Anzur is developing this website as part of his departmental service.

Goal Measures Combined

- Either done or not

Frequency

Goal Number 3

Replace the MFT by an in-house Senior Test - can see exact questions asked, and pool data from several years to get a large enough sample for meaningful analysis

Report Comments

Goal Measures Combined

- Either done or not

Frequency
### Goal Number 4
Find more reliable and useful ways to measure how well our alumni are prepared for graduate school or the job market

**Report Comments**
Senior surveys and Alumni surveys give little useful data, since non-response is a serious problem. We need to add / modify the wording of this PO, and its measure, to allow use of survey data to see student and alumni preparedness for math-related post-graduate options.

The faculty are also trying to informally increase communication with alumni, and have written a small newsletter which they hope to print twice per year. It will include an alumni news section. Also, we are seeking invited speakers, especially alumni, to talk about their careers and how they have used their math major.

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**Frequency**

### Goal Number 5
Develop a long-range plan and goal list, anticipating growth in the college enrollment, and further strengthening the major

**Report Comments**
No action yet taken. Will be discussed at Summer 2009 departmental meeting.

**GoalMeasuresCombined**

• Departmental discussion and analysis of data

**Frequency**

yearly
### Goal Number 1

Demonstrate understanding of calculus concepts including limits, derivatives and integrals, and be able to compute these.

**Report Comments**

See appendix for data. 
There was no Senior Test administered, and MATH 351 was not yet offered. 
Data on this SLO come from 251 and 252 Calculus course final exams.

Satisfactory items:
1. students do well consistently on calculation-based questions, especially from early in the term.
2. consistency across instructors on how the early material is tested.

Items to work on:
1. Student weaknesses in areas that require more creative thought (word problems), more steps to complete, or more abstract concepts.
2. Consistency among faculty on how SLOs are interpreted - in Calculus I, SLO #8 might apply to one specific narrow type of problem, or to a broad category of problems - one professor cited 20 points worth of assessment on this SLO, and another had 0 points.

**Goal Measures Combined**

- Embedded test questions in MATH 251, Calculus I
- Embedded test questions in MATH 252, Calculus II
- Embedded test questions in MATH 351, Calculus III
- Senior Test

**Frequency**

Every year.

### Goal Number 2

Construct a variety of proofs such as induction, direct, contradiction, contraposition, and ability to recognize logical fallacies.

**Report Comments**

See appendix for data. 
313 and 366 serve as intro classes for developing proof-writing skills. 
Most categories showed satisfactory results.

Improvement needed
1. In 313 SLO 2 (Sets) and SLO 6 (Graphs). May just need to spend more time on these.
2. In 366 SLO 2 (proof techniques - the goal of the course!) and SLO 4 (application of proof techniques to key areas of math).

We also submitted data from 411, which is a required proof-oriented class for Math with Certification majors. Weaknesses here in later topics. We may revise course coverage and SLOs, since the coverage goals may be overly ambitious for 1 semester.

**Goal Measures Combined**

- Embedded test questions in MATH 313, Discrete Mathematics
- Embedded test questions in MATH 366, Introduction to Abstract Mathematics

**Frequency**

Every year.
Goal Number 3
Conduct directed research and present results orally and in writing to a mathematically knowledgeable audience.

Report Comments
See appendix.

Main weakness is that students do not start early enough on Capstone projects - probably due to lack of experience and uncertainty how to proceed. We may include presentations in other courses in future, to give students more practice.

Goal Measures Combined
- MATH 499, Senior Capstone, faculty collectively grade papers and presentations.

Frequency
Every year.

Goal Number 4
Apply a variety of mathematical concepts and techniques to problems in the natural world.

Report Comments
See appendix.

Note we did not yet offer 351.

Data from other courses shows weaknesses in problems that require multiple steps or creative thinking (related rates, or other problems that require set-up and creative integration techniques). Scores were sometimes deceptively high when an instructor only had students set up an integral, not work it out. This reduced the process to a simple mechanical one - not really comparable to the multi-step problems.

Goal Measures Combined
- Embedded test questions in MATH 251, Calculus I
- Embedded test questions in MATH 252, Calculus II
- Embedded test questions in MATH 351, Calculus III
- Embedded test questions in MATH 320, Linear Algebra

Frequency
Every year.

Goal Number 5
Demonstrate basic skills with computers and technology

Report Comments
See appendix.

A lesson was provided on SLO#3, on graphing calculators, but no questions or projects assessed this - oversight.

Otherwise, there is some need for improvement of student performance in all areas. *It should be noted that only some students in this course are Math majors - by far most are other majors.*

It is worth rethinking assessment means, to simplify data collection, and to measure for Math majors only.

Goal Measures Combined
- Embedded test questions and/or projects in COMP 105, Computer Literacy

Frequency
Every year.
Program SLO #1 - Demonstrate understanding of calculus concepts including limits, derivatives and integrals, and be able to compute these.

Measures - Embedded test questions in 251, 252, 351; also Senior Test (not written yet)

Details - We did not write an in-house Senior Test this year.

We also did not yet offer MATH 351, our new 4-hour Multivariable Calculus class.

However, we have gathered data on the course-level SLOs for 251 and 252, below, from which we draw conclusions on Program SLO #1

In particular, 251 SLO#4 (related rates), and 252 SLO#1 (areas, volumes, work), #5 (arclength, surface area), and #6 (parametric and polar curves)

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Program SLO #2 - Construct a variety of proofs such as induction, direct, contradiction, and contraposition, and recognize logical fallacies.

Details - This year, we offered 313, 366, and 411 in the Spring. Data below from Course SLOs.

We also added 401 and 411 to the requirements for Math, to begin in 2009-2010, so will update that curriculum map for next year.

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Mathematics Assessment Report Appendix, 2008-2009
Data on Program Outcomes and Program-level SLOs

Program SLO #3 - Conduct directed research and present results orally and in writing to a mathematically knowledgeable audience.

Measures - Math 499 Capstone, faculty collectively grade papers and presentations.

Details - Below is the data from our 5 seniors, averages of the ratings from the 3 professors. "Poor" = 1 and "Superior" = 5.

The weakest area still seems to be "thoroughness of research". The students still do not consistently make an early start on their projects. This year we added a due date for an abstract, but we may need more deadlines throughout the term, more drafts, more practice presentations, etc.

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**Mathematics Assessment Report Appendix, 2008-2009**

Data on Program Outcomes and Program-level SLOs

Program SLO #4 - Apply a variety of mathematical concepts and techniques to problems in the natural world.

**Measures** - Embedded test questions in MATH 251, 252, 351, 320

**Details** - Data below from Course SLOs.

We did not yet offer MATH 351

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<td>Class avg as %</td>
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Program SLO #5 - 5. Demonstrate basic skills with computers and technology.

Measures - Embedded test questions and/or projects in COMP 105

Details - Course-level SLOs listed below.

PLEASE NOTE - most of these students were not Math majors. We hope to devise a scheme which is simpler to use, and which measures for our majors only.

<table>
<thead>
<tr>
<th>Class</th>
<th>Prof.</th>
<th>Term</th>
<th># stdts</th>
<th>Course SLO #1</th>
<th>SLO #2</th>
<th>SLO #3</th>
<th>SLO #4</th>
<th>SLO #5</th>
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<td>Sp 09</td>
<td>64</td>
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<td># stdts w/ 75%+</td>
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<td>@ 75%+</td>
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Class avg -->
Class avg as %