

Department of Mathematics and Statistics

Assessment Plan

Spring 2007

1 Program Learning Outcomes

The Department of Mathematics and Statistics approved a set of learning outcomes in 2006. The outcomes are:

- Goal 1 Students will learn the fundamental principles underlying the major areas of mathematics and statistics.
- Goal 2 Students will develop and utilize effective written, oral, and computer communication skills in a mathematical and statistical setting.
- Goal 3 Students will develop a more in depth understanding of an area in mathematics or statistics through selection of coursework to satisfy their chosen options.
- Goal 4 Students will develop a broad appreciation for mathematics and statistics both as a discipline and as a tool for solving real world problems.
- Goal 5 Students will be able to read and write mathematical proofs.
- Goal 6 Successful students, upon graduation, will be ready for graduate studies or careers in teaching, industry, or public agencies.

2 Course Learning Outcomes

The course learning outcomes for each assessed course will initially be based on the course goals and outlines currently on file in the math office. The outcomes may then be revised each year based on the assessment results. The current course outcomes are attached in Appendix A.

3 Assessment Cycle

We adopt a three-year assessment cycle.

- In year 1, we will assess the Core 300-400 level courses, particularly MAT 310, 314, 417, 428, and STA 241.
- Year 2 will be devoted to the option courses for each of the three options. The committee will select at least three courses to assess, keeping in mind the need for a variety of courses over the years in all three options the math department offers.
- In year 3, we will examine the credential and teacher prep courses, along with the 200 level Core courses for the major.

Because the lower division classes are being assessed by the Area B1 General Education Assessment Committee and the graduate classes are being assessed by the Graduate Committee of the department, we choose not to include these classes in our assessment cycle at this time. We will request copies of those annual assessment reports and review them each year to determine if any further action is warranted.

4 Assessment Procedures

1. Exit Surveys

A survey will be given to all graduating seniors. Through this survey we hope to learn which parts of our program work well and what can be improved. Furthermore, we can collect data on overall student satisfaction, length of time to graduation, and future career or professional plans of our students. These surveys should be given a few weeks before graduation. A draft of the exit survey is attached as Appendix B. We anticipate that the survey may be revised yearly as we determine which information is most useful in improving the department

2. Portfolios

Student portfolios will be compiled by the faculty teaching the classes in the current assessment cycle. For example, in year 1, professors teaching MAT 310, 314, 417, 428, and STA 241 will prepare portfolios. To assemble the portfolios, the instructors will make copies of at least two class assignments (e.g. homework, exams, quizzes, projects)

that address the chosen learning outcomes for that course. Then, for each assignment, the instructor will photocopy six samples of student work. The six samples should represent a broad spectrum of student ability and achievement. The instructor should also highlight relevant portions of the work and, if possible, briefly indicate which of the learning outcomes are or are not being met.

The Committee will design a rubric to assist the instructors in evaluating student work. The rubric may change as the outcomes being assessed change. A sample rubric may be found in Appendix C.

At the end of the quarter the instructor will fill out an evaluation form for the course based on a learning outcomes questionnaire customized for the course. The course outcomes questionnaire is developed with input from instructors currently teaching the course. The Committee will use the portfolios and the course outcomes list to measure student learning in that course relative to the Learning Outcomes. It is possible that in this assessment, the Committee will choose to re-assess the work from the portfolios according to that cycle's rubric.

3. Faculty Discussion

At the end of each yearly assessment cycle, a meeting will be called with the faculty who have taught the selected classes being assessed that year. Copies of the student portfolios, instructor questionnaires, and course learning outcomes will be distributed to facilitate the discussion. The group will discuss which learning outcomes were met, which were not, and what steps could be recommended to improve those classes. We will also discuss whether the course outlines and learning outcomes should be revised. A member of the Assessment Committee will attend the meeting and take notes to be compiled into a report on the meeting.

5 Data Analysis

The data generated by the assessment procedure will be gathered into three forms: a summary of the student exit surveys, folders containing the portfolios of student work, and a written report on the faculty assessment meeting.

To summarize the surveys, the assessment committee will read them and decide what the most common comments seem to be. The committee will then write a summary of the surveys. This summary should give the overall

flavor of the students' state of mind and attitude toward the math department. The summary may also list suggestions which would be practical and useful for the department to implement. At this time, the department may also decide whether the survey needs to be revised to provide better feedback.

The student work portfolios will be analyzed first by the instructor teaching the class, and then again by the assessment committee. The committee will consider the sample student work with an eye on the specific course outcomes for that course. We wish to emphasize that this will in no way be used to evaluate or criticize the individual instructor. This is especially important as we want a representative sample of student work, not just work from the best and brightest students. The Assessment Committee will analyze the work according to a rubric developed for the class and fill out an evaluation form summarizing whether the course met the goals and whether the goals for the course should be altered.

Finally, a member of the Assessment Committee will attend the meetings for faculty discussion of the classes at the end of the year. The committee member will take notes or minutes of the meeting and type them up into a report.

6 Feedback and Program Evolution

Each year, the assessment procedure will generate three pieces of information: the summary of the exit surveys, the folder of student work portfolios, and the report on the faculty discussion of the classes being assessed. Furthermore, the assessment committee will write a final report summarizing these three components and making any recommendations the committee deems necessary. This report will be forwarded to the department as a whole, to the chair, and to the Curriculum Committee. In addition, all of these materials will be stored in a filing cabinet in the math department office. They will be accessible to any interested faculty member and may assist instructors in preparing to teach these courses in the future.

7 Timeline

Prior to each quarter	the assessment committee will instruct the faculty on the procedures to be followed for assembling and evaluating student portfolios
At the end of each quarter	the committee will collect the work from the faculty teaching the selected courses
By the 6th week of spring quarter	the faculty meeting will be held to discuss that year's assessment results
Between the 6th and 10th weeks of spring quarter	the exit survey will be distributed to graduating seniors

Appendix A – The Course Learning Outcomes

Appendix B – The Exit Survey for the Department of Mathematics and Statistics

Please fill out this survey. The information in the survey is needed for review and assessment of the Mathematics and Statistics undergraduate program.

1. What is your general impression of the Bachelor's degree program in Mathematics and Statistics?

2. What did you like best about the program?

3. What would you change about the program?

4. If someone were considering majoring in mathematics or statistics at Cal Poly Pomona, what advice would you give them?

5. Please rate the undergraduate program in terms of how well it helped you to achieve the following student learning outcomes (1=poor, 5=excellent):

Learning the fundamental principles underlying the major areas of mathematics and statistics	1	2	3	4	5
Developing and utilizing effective written, oral, and computer communication skills in a mathematical and statistical setting	1	2	3	4	5
Developing a more in depth understanding of an area in mathematics or statistics through selection of coursework to satisfy your chosen option	1	2	3	4	5
Developing a broad appreciation for mathematics and statistics both as a discipline and as a tool for solving real world problems	1	2	3	4	5
Learning to read and write mathematical proofs	1	2	3	4	5
Being ready for graduate studies or careers in teaching, industry, or public agencies	1	2	3	4	5

6. I entered the department as:

- A new freshman
- A transfer from another CSU
- A transfer from a CA community college
- A transfer from another university
- switched from another CPP major [Which one? _____]

7. The total amount of time I have taken to graduate is:

_____quarters/semesters (circle one) before transferring
to Cal Poly; and
_____quarters at Cal Poly

If the number of quarters taken to graduate is more than you expected, what is the reason for the delay? (e.g. trouble getting needed classes, took time off, had to retake classes, switched majors, etc.)

8. While at Cal Poly, I was employed an average of _____hours per week.

9. What are your plans after graduation?

- Teaching
- Government Employment
- Corporate Employment
- Graduate School
- Other
- Don't Know yet

Please describe your post-graduation plans in further detail:

Appendix C – Sample Rubric for Evaluating the Student Portfolios

Instructor Name:

Course:

Description of Assignment:

OUTCOME	4	3	2	1
Learn the fundamental principles underlying the class	Knows the appropriate definitions, theorems, or techniques, and uses them as required	For the most part, uses the material taught in class correctly but with minor mistakes	Has serious errors in understanding of the course content	Does not know the course content at all
Use effective communication skills	Well-written, clear, and uses appropriate sentence construction	Fairly clear, but with some mistakes that do not affect the accuracy	Significant mistakes that make it difficult to read or understand	Mistakes that render the work incomprehensible
Know the difference between a valid and an invalid argument	Does not use invalid arguments and can recognize valid and invalid arguments	Mostly recognizes invalid arguments	Frequently tries to make arguments which are invalid, does not recognize mistakes	Does not understand the difference between valid and invalid arguments
Develop problem-solving skills	Student can do non-trivial problem solving, uses imagination and initiative to solve difficult problems	Shows some spark, but gets stuck on difficult problems	Can do only routine problems	No problem solving skills