

# Ohlone College

## Program Review Report

### 1. Program Description and Scope:

1. *Review Type:* Instructional Disciplines
2. *Program/Departments:* Mathematics (17000)
3. *Authority Code:* 47-Dean, Humanities, Social Sciences, & Mathematics
4. *External Regulations:* Yes\_\_ No X
5. *Provide a brief narrative that describes the instructional program/discipline.*

The primary function of the Mathematics program is to serve students in the completion of their General Education math requirements. In addition, the department plays a fundamental role in serving the Natural, Life, and Physical Science majors' mathematical needs, both with transfer and non-transfer level courses. It also serves the needs of other majors with courses such as Statistics, Finite Math, and Business Calculus.

6. *Describe how the program specifically serves students, faculty and staff.*

For the purpose of program review, the Math Program has been divided up into three areas with a team of faculty working on each. The Developmental Math group seeks to improve the mathematical skills of students so that they are at the minimal high school exit requirement. The BLAST group focuses on students taking math courses in Business, Liberal Arts, and Statistics. The STEM group focuses on students taking math courses intended for science, engineering and math majors. In addition, the Math Learning Center provides tutoring services for all levels of mathematics, for the Engineering and Physics departments, and for the occasional student from other schools.

7. *Describe how the program addresses current needs and applies current technologies.*

The department currently owns licenses for the mathematical software MATLAB and Mathematica and teaches computer-based Statistics courses using Microsoft Excel and Fathom. New methods used by Statistics faculty include a computer program that randomly generates problems and data, a multiple-choice program, web-based instruction through CourseCompass, modules that show how to use Excel, recorded lectures that can be downloaded from the internet to a computer or ipod, workbook based Statistics emphasizing student discovery of statistical concepts, and the use of Turning Point software to do a general assessment of the students. Self-paced Basic Math classes have been offered at Ohlone for many years. In addition, the department offers self-paced sections of all levels of Algebra using instructional software. Students in these classes can work at their own pace and, if they do not finish by the end of the semester, complete the material the next term.

8. *Discuss the impact of the program on the college and/or other programs.*

The department generates approximately 10% of the total FTES of the college. As a result, the health of the department directly affects the college as a whole. Since we do not have many students majoring in math, we are considered a service department. We provide the mathematical training for highly technical majors such as physics. We also provide the introductory statistical training for students majoring in social sciences, such as psychology, political science, and history.

9. *Discuss the impact of the program on the community and the impact of the community on the program.*

We have a single, but substantial effect on the community. We provide the mathematical background needed for all but the most technical careers and professions. For careers such as engineering, we provide the basis for the additional mathematical training that will be obtained in a university.

### 2. College Mission

1. *Core Values, Goals & Objectives:*

#### **Core Values**

- We provide life long learning opportunities for students, college personnel and the community.
- We open access to higher education and actively reach out to underserved populations.
- We maintain high standards in our constant pursuit of excellence.

2. *Discuss how the program supports the college mission, vision and one or more of the college values.*

The department directly supports the mission statement by providing a complete set of courses allowing students to learn mathematics for basic skills, career entry, university transfer, and personal enrichment.

3. *Discuss how the program supports one or more of the college goals. Include all relevant program accomplishments and commendations.*

GOAL 2: The department integrates current and appropriate technology in our courses. For example,

rather than teaching a traditional paper-and-pencil calculus curriculum, we have increasingly incorporated professional level software such as Mathematica and MATLAB into the curriculum. For students studying statistics, we have modified the course so that a majority of students will incorporate Microsoft Excel into their coursework. Knowledge of Excel will be beneficial to almost anyone working in a modern setting. In the developmental math area, self-paced algebra courses are offered using Hawkes Learning Systems. Software provides tutoring to help with homework assignments. In addition, students can create their own review quizzes and tests to help them prepare for in-class tests. GOAL 3: The department offers a Success in Algebra Learning Community. In addition, BSI (Basic Skills Initiative) faculty are developing a Prealgebra course which will be offered in Fall 2010. This course will follow Basic Math and will provide additional foundation for those students entering Ohlone with weak Basic Math skills.

4. *Discuss how the program supports one or more of the college objectives. Include all relevant program accomplishments and commendations.*

With regard to student satisfaction, the department has invested large amounts of time and effort in coordinating with courses in the lab sciences and engineering so that students can complete their full range of lower division courses in a minimal number of semesters.

### 3. SLO Assessment

#### 1. Program SLO - Demonstrate an improved attitude towards math.

1. Indicate program assessment strategies used.

1. Performance Assessment
2. Skills Assessment

2. *Discuss how SLO and selected assessment strategies relate to best practices or relevant performance standards in your area.*

Student attitude is reflected in many ways: enrollment, attendance, behavior, homework completion, grades. During the last program review, a survey was created and administered to students in the developmental math classes. Since then, the Basic Skills Initiative has been developed in the state, and faculty are actively involved in this effort. Assessment strategies reflect standards 1-2 through 1-7 as mentioned in "Crossroads" an AMATYC (American Math Association of Two-Year Colleges) publication.

3. *Describe revisions in curriculum or teaching strategies used to promote student success that were made since last program review.*

Students who have a positive attitude towards math and who believe that they can be successful have much better outcomes. In these difficult economic times, financial pressures, increased work schedules and family obligations are adding additional pressures. Faculty are working in a variety of areas to help keep these dreams alive, to make math education less stressful, more accessible and affordable so that students have the best chance for success. Since the last program review, the department has put in place a number of strategies. The number of department meetings has been increased from once to twice per month to provide more opportunity for discussion of program review. CURRICULUM: A Learning Community "Success in Algebra" is now offered every semester. We created a new course, Introduction to MATLAB, a requirement in several Engineering majors at UC and CSU. The Basic Skills group is creating a new PreAlgebra course which will be offered in Fall 2010. Both Basic Math and Prealgebra will include study skills and embedded tutoring components. SCHEDULING: The department has increased its efforts to improve student access to upper level courses. While this effort has been a department priority for several years, new majors such as Bioengineering have increased the number of students requiring Differential Equations and Calculus III. These new majors have also increased lab science requirements. The combination has made creating a cohesive, non-overlapping schedule for students a difficult logistical task. In response to this issue, we (1) have continued our long-standing practice of working with the science and engineering departments to avoid conflicts; (2) have expanded the number of offerings of Calculus III to two each semester; (3) have added a Differential Equations course to the Summer Session, and (4) are making changes to the schedule to ensure that a student can take the full sequence of upper level courses during the evening hours. In the developmental math area, 151/52/153 self-paced algebra will be offered together, thus giving students greater opportunity to fit these classes into their schedule. A hybrid on-line Algebra course has been offered to incorporate distance learning for some students. REDUCED TEXTBOOK COSTS: Within the traditional curriculum, math faculty have experimented with making standard textbooks for Precalculus and Calculus an optional feature of the course. In place of the standard textbook, material is available from faculty websites. For Precalculus, faculty created a set of homework, answers, and short notes for the course in place of the textbook. Three faculty have used the materials for their courses. For Calculus II and III, only homework assignments have been created. Students are expected to have some Calculus textbook (not necessarily the official course textbook). The reason for the difference in approach is three-fold: (1) Calculus is the first

course where many students keep the text for future reference; (2) Calculus is a three semester sequence so many students will be using the official text for other courses in the sequence; and (3) Calculus is the first math course in which reading the text is a vital portion of the course. One unanticipated benefit of not using a text occurred during Summer session. Often, summer students are coming from a four-year school and already have the textbook in use at their university. By using department homework assignments, students were saved the expense of purchasing a second Calculus textbook. SUPPORT: Embedded tutors (LAPSI) have been introduced in some of the algebra classes. This method allows students learn better because tutors attend lectures with students and become familiar with teachers' style and expectation.

4. *Assess student success in reaching program SLO using qualitative and quantitative data.*

As stated above, three Precalculus faculty used set of homework, answers, and short notes for the course in place of the textbook. The department looked at data from the Research Office to determine that there is no significant difference in the performance of students in the subsequent course, Calculus I.

5. *Future Action.*

**2. Program SLO - Exhibit problem solving skills at an appropriate level.**

1. Indicate program assessment strategies used.

1. Rubrics
2. Performance Assessment
3. Department Testing

2. *Discuss how SLO and selected assessment strategies relate to best practices or relevant performance standards in your area.*

The ability to solve problems is at the heart of mathematics. One of the areas of greatest difficulty for students is applications (word problems). This is what students will see in the real world. While standardized tests are not the best mechanism for determining student abilities, the concept of using a few uniform questions as part of student assessment is standard practice. After much discussion, the department decided to focus on a word problem in the developmental math area. We will choose a mixture problem, develop a rubric for analysis, and place this problem in algebra tests. Instructors will then see how well the students do in solving the problem. This will greatly assist instructors in deciding whether our teaching strategies need to be adjusted in this area.

3. *Describe revisions in curriculum or teaching strategies used to promote student success that were made since last program review.*

There have been attempts by individuals to increase student success but there has not been a single department-wide focus to these efforts. Attempts to improve student success have included increased use of online homework systems that provide immediate feedback, development of extensive materials by individual instructors, the beginnings of a completely online algebra course, and a focus on Basic Skills instructor.

4. *Assess student success in reaching program SLO using qualitative and quantitative data.*

This SLO has not been specifically assessed. However, the nature of math courses is such that the use of problem solving skills is pervasive through all courses.

5. *Future Action.*

**3. Program SLO - Retain information from course to course.**

1. Indicate program assessment strategies used.

1. Rubrics
2. Performance Assessment
3. Skills Assessment

2. *Discuss how SLO and selected assessment strategies relate to best practices or relevant performance standards in your area.*

During the last program review, a survey and two pre-tests were created and distributed to students. There were two aspects to measure: (1) To what extent can student explain the importance of retaining information and skills? (2) To what extent do students retain key information and skills from course to course. A survey and two pre-tests were created and distributed to students in the STEM area. Results are revisited below. Since that time, we have discussed the issue of retention. We know that it is important, but how can it be measured? Is it really retention or the ability to recall and use information after a short review? Also, how long should one be able to retain information? We have done some limited work in specific areas. However, more research needs to be done in this area.

3. *Describe revisions in curriculum or teaching strategies used to promote student success that were made since last program review.*

During the last program review, we found that a majority of students seem to understand the importance of retaining information from prerequisite courses. However, their attitudes become rather negative when they needed to actually work with variables, mathematical concepts, formulas, and applications. To

improve student success in retaining information the department has created detailed curriculum guides, specifying the exact skills needed from previous and successive courses, and has created technology based assignments. For the Spring 2008 semester, Algebra I instructors handed out a diagnostic test during the first week of school. Upon receiving the results of the test, students visited the Math Learning Center and were given worksheets to make up any deficiencies in their basic math skills. The addition on the new PreAlgebra course in Fall 2010 will bridge the gap between arithmetic and algebra, and should help to provide a more solid foundation to those entering algebra. In the Statistics area, faculty experimented with an assessment test but found that the data collected was not representative of the student learning outcomes for the classes. The assessment question was too long and written in a different style than some of the students were use to and caused students to skip the question. They have decided to try a new web-based assessment test (ARTIST - Assessment Resource Tools for Improving Statistical Thinking) that is multiple choice and may be more objective in discerning statistical concepts learned.

4. *Assess student success in reaching program SLO using qualitative and quantitative data.*

Previous results indicated that 41% of all tested students are proficient at performing calculations accurately, 7% are able to perform some kind of calculations accurately, and 52% can not perform any calculations accordingly to the pre-test.

5. *Future Action.*

4. **SLO Matrix**

Course	Demonstrate an improved attitude towards math.	Exhibit problem solving skills at an appropriate level.	Retain information from course to course.
MATH 101A	2	2	2
MATH 101B	2	2	3
MATH 101C	3	3	3
MATH 103	3	3	3
MATH 104	3	3	3
MATH 111	3	3	2
MATH 151	1	1	1
MATH 151A	1	1	1
MATH 151B	1	1	1
MATH 152	1	2	1
MATH 152A	1	2	1
MATH 152B	1	2	1
MATH 153	1	2	1
MATH 155	1	1	1
MATH 156	2	1	1
MATH 159	2	2	1
MATH 163	2	2	1
MATH 166	2	2	2
MATH 167	2	2	2
MATH 171	1	1	1
MATH 172	1	1	1
MATH 181	2	2	1
MATH 188	2	2	2
MATH 190	1	1	1
MATH 190A	1	1	1
MATH 190B	1	1	1
MATH 190C	1	1	1
MATH 196	1	1	1

MATH 199	1	1	1
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Key: 1-Introduced, 2-Practiced with Feedback, 3-Demonstrated at the Mastery Level

**5. Student Achievement – A series of measures including course completion, course retention, persistence, program completion, and others.**

1. *List expected student achievement outcomes:*

While we offered 20 fewer sections in 2007-08 than in 2004-05, we generated 64 additional FTES.

Our retention and success rates are below the college averages but the 2007-08 rates have improved relative to college averages.

The annual number of sections offered has decreased from 8.77% of total college offering to 7.17% of total college offerings.

2. *Analyze changes in data, identify trends, and provide possible contextual explanations for each measure used. (Example measures include: course completion, course retention, persistence, program completion).*

Completion rates for math courses are traditionally lower than the rates for courses in other departments. We believe this to be true nationwide however, a one hour search for a definitive study was unsuccessful.

We believe that improvements to our recent success rates are due to a better placement test and the California Math Exit Exam that was implemented in 2006.

3. *Describe overall success of program.*

The math department currently generates the second highest number of FTES, second only to English.

Our efficiency rating (WSCH/FTEF) has increased from 409 in Spring 2005 to 525 in Spring 2008 while at the same time the student success rate has increased from 52% to 58%.

It is important to note that the efficiency rating has increased without resorting to large lecture courses.

The improvement of the success rate may be attributable to the increased accuracy of the placement exam.

4. *Future Action*

**6. Program Analysis**

1. Based on your assessments in the previous sections, focusing on SLOs and student/program achievements analyze and summarize your findings. This information will be used to develop your Program Improvement Objectives (PIOs).

1. *Describe program achievements and successes.*

2. *Describe plans for improvements for student learning outcomes and/or student/program achievement.*

**7. Program Improvement Objectives:**

1. **Objective:**

*Move the Math Learning Center to the center of campus in order to improve student access to tutorial services.*

1. **Action Plan**

**Year 1:**

Create a plan to consolidate all tutorial services in the ground floor of Building 1.

**Year 2:**

Move all the existing tutorial services from scattered locations to the ground floor of Building 1.

2. **Staffing**

**Year 1:**

*Use existing faculty and staff as a planning team.*

**Year 2:**

Use existing faculty and staff to staff tutorial services.

3. **Equipment (Include items that fit under department budget codes)**

**Year 1:**

none

**Year 2:**

Furniture, white boards

4. **Technology (Include items that fit under IT budget codes)**

**Year 1:**

none

**Year 2:**

approximately 25 desktop computers

**5. Facilities (Include items that fit under the Facilities budget codes)**

**Year 1:**

none

**Year 2:**

Space in the ground floor of Building 1 that will accommodate all tutorial services.

**6. Other(Include other resources needed)**

**Year 1:**

Architectural/engineering fees

**7. Assessment Plan: List Assessment Strategies**

**Year 1:**

none

**Year 2:**

Attendance in the Math Learning Center (MLC) is measured through the TimeKeeper system. We envision that a return to the center of campus will return attendance in the MLC to levels that were present prior to the move to Hyman Hall. We can assess this by continuing to use TimeKeeper and comparing the records to previous years,

**Year 3:**

Continue using Timekeeper records.

**8. Outside Review Results**

1. List each team members name and title.

*The math program review does not have an outside team.*

**9. Attached Files**

1. [BLAST Group.doc](#)
2. [STEM Group.doc](#)
3. [DevMath Group.doc](#)
4. [MLC Group.doc](#)