Ohlone College
Program Review Report

• Program Description and Scope:
  1. Program Review Title: Math
  3. Review Type: Instructional Disciplines
  4. Program/Departments: Mathematics (17000)
  5. Authority Code: 44-Dean, Science, Engineering, and Mathematics
  6. External Regulations: Yes _ No X
  7. 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.

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

For the purpose of program review, the Math Program has been divided 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.

9. 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 StatCrunch.

New methods used by Statistics faculty include

- modules that show how to use Excel,
- recorded lectures that can be downloaded from the internet,
- use of the software package StatCrunch, eliminating the need for both hand calculations and learning Excel commands.

Self-paced Basic Math classes have been offered at Ohlone for many years. Since the last Program Review, the department has designed and implemented a new developmental course, Prealgebra. This course follows Basic Math and
provides additional foundation for those students entering Ohlone with weak Basic Math skills. It is the intent that the department offer a self-paced course by Fall 2014.

The department feels that it is very important to provide additional academic support to the students at the Basic Skills level. This can be done through a variety of methods including but not limited to embedded tutors, the LAPSI (supplemental instruction) program, and learning communities tying the basic skills courses to study skills workshops. Note that the LAPSI program is appropriate for all levels of instruction and should not be considered solely for basic skills courses.

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.

10. 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.

11. 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.

● College Mission
  1. Mission Statement
     The mission of Ohlone College is to serve the community by offering instruction for basic skills, career entry, university transfer, economic development, and personal enrichment for all who can benefit from our instruction in an environment where student learning success is highly valued, supported and continually assessed.
  2. Vision Statement
     Ohlone College will be known throughout California for our inclusiveness, innovation and superior rates of student success.
  3. Core Values, Goals & Objectives:
     College 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 under-served
populations.
• We maintain high standards in our constant pursuit of excellence.

**College Goals/Objectives**

1. **Through innovative programs and services, improve student learning and achievement.**
   4. By fall 2014, increase the improvement rate in Basic Skills and ESL courses to a rate at or above the statewide average.

4. *Briefly describe how the program supports the college mission, vision selected 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.

5. *Briefly describe how the program supports selected college goals.*

   The department is continually updating both the methods of instruction and the course content to insure that the students are receiving a modern curriculum. This is demonstrated by

   - our use of professional level software in the higher courses and
   - our modernization of our remedial courses to reflect current educational learning theories.

6. *Briefly describe how the program supports selected college objectives.*

   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.

- **Program SLOs & Assessment**

  1. **Program SLO -**

     At a level appropriate to his/her educational goals or major, the student will be able to manipulate mathematical expressions.

     a. *Indicate program assessment strategies used.*
        i. Rubrics
        ii. Performance Assessment
        iii. Skills Assessment

     b. *Describe the criteria and standards used to appraise student work.*

        The ability to manipulate mathematical expressions is a key to succeeding in mathematics. The criteria and standards for these type of manipulations are well developed and universal.
c. Enter assessment results and analyze student success in achieving this program SLO.

This is a new department SLO as of August 2012 so no data is available.

d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

In many courses, the use of computerized homework systems has created a mechanism whereby students can receive immediate feedback with regard to understanding and faculty can closely monitor student effort. In higher level courses, the availability of software such as **Mathematica** allows students to perform tedious manipulations that previously would have required extensive time.

e. Future Action (Improvements)
   Maintain current student learning plan

2. Program SLO -

At a level appropriate to his/her educational goals or major, the student will be able to solve mathematical equations

a. Indicate program assessment strategies used.
   i. Rubrics
   ii. Performance Assessment
   iii. Skills Assessment

b. Describe the criteria and standards used to appraise student work.

The ability to solve mathematical equations is a key to succeeding in mathematics. The criteria and standards for the process of solving equations are well developed and universal.

It is important to note that this objective is about the process of finding the solution, not simply finding the correct answer. In addition, students know that the answer that results from the solution process can be verified in the original equation. Thus, the students have the assurance that they will always know if the answer is correct.

c. Enter assessment results and analyze student success in achieving this program SLO.

This is a new department SLO as of August 2012 so no data is available.

d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

In many courses, the use of computerized homework systems has created a mechanism whereby students can receive immediate feedback with regard to understanding and faculty can closely monitor student effort. In higher level courses, the availability of software such as **Mathematica** allows students to perform tedious manipulations that previously would have required extensive...
All math teachers incorporate this objective as an essential part of their courses. Therefore no changes to the learning plan is necessary. However, changes in technology and teaching methodology will result in changes within individual sections of a course.

e. Future Action (Improvements)

3. Program SLO -

At a level appropriate to his/her educational goals or major, the student will be able to demonstrate the qualitative behavior of graphs.

a. Indicate program assessment strategies used.
   i. Performance Assessment
   ii. Rubrics
   iii. Skills Assessment

b. Describe the criteria and standards used to appraise student work.

The ability to create graphs is a key to succeeding in mathematics. The criteria and standards for the creation of graphs are well developed and universal.

The prevalence of graphing technology has increased the importance of graphs in society. As a result the ability to create detailed graphs is becoming subsidiary to understanding and interpreting detailed graphs. To appraise student work, faculty are using more assessment that ask students to interpret graphs rather than create graphs.

c. Enter assessment results and analyze student success in achieving this program SLO.

This is a new department SLO as of August 2012 so no data is available.

d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

None at this time.

e. Future Action (Improvements)

Maintain current student learning plan

4. Program SLO -

At a level appropriate to his/her educational goals or major, the student will be able to apply mathematical tools and concepts in solving word/situation-based problems

a. Indicate program assessment strategies used.
   i. Rubrics
   ii. Performance Assessment
   iii. Skills Assessment

b. Describe the criteria and standards used to appraise student work.
The ability to solve word problems is a key to succeeding in mathematics. In addition, the ready availability of technology has allowed for increasingly sophisticated mathematical models. The criteria for appraising student work is similarly dependent on the technology, to the same extent as the technology being used in the solution to the problem.

c. Enter assessment results and analyze student success in achieving this program SLO.

This is a new department SLO as of August 2012 so no data is available.

d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

No revision is necessary

e. Future Action (Improvements)

Maintain current student learning plan

- **SLO Matrix**

  *Key: I-Introduced, P-Practiced with Feedback, M-Demonstrated at the Mastery Level*

<table>
<thead>
<tr>
<th>Course</th>
<th>SLO-1</th>
<th>SLO-2</th>
<th>SLO-3</th>
<th>SLO-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 101A</td>
<td>M</td>
<td>M</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>MATH 101B</td>
<td>M</td>
<td>M</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>MATH 101C</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>MATH 103</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>MATH 104</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>MATH 111</td>
<td>M</td>
<td>M</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>MATH 151</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 151A</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 151B</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 152</td>
<td>I</td>
<td>P</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 152A</td>
<td>I</td>
<td>P</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 152B</td>
<td>I</td>
<td>P</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 153</td>
<td>I</td>
<td>P</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 155</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 156</td>
<td>P</td>
<td>I</td>
<td>I</td>
<td>P</td>
</tr>
<tr>
<td>MATH 159</td>
<td>P</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 163</td>
<td>P</td>
<td>P</td>
<td></td>
<td>I</td>
</tr>
<tr>
<td>MATH 166</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>MATH 167</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>MATH 181</td>
<td>P</td>
<td>P</td>
<td>I</td>
<td>P</td>
</tr>
<tr>
<td>MATH 188</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>MATH 190</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 190A</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>MATH 190B</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
</tbody>
</table>
### MATH 191

#### I

<table>
<thead>
<tr>
<th>MATH 191</th>
<th>I</th>
<th>I</th>
<th>I</th>
<th>I</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 199</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
</tbody>
</table>

- **SLO Matrix Comments**
- **Course SLO & Assessment**

**MATH 101A Calculus With Analytic Geometry**

1. Manipulate and evaluate mathematical expressions involving limits and derivatives at the intermediate level.
2. Apply differential calculus to problems involving related rates and optimization at the intermediate level.
3. Use the methods of calculus to analyze the qualitative behavior of graphs of two-dimensional functions at the mastery level.
4. Manipulate and evaluate mathematical expressions involving integration at the beginning level.
5. Use technology to analyze functions found in differential calculus at the intermediate level.

#### Indicate planned course assessment strategies

<table>
<thead>
<tr>
<th>Rubrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills Assessment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Describe the criteria and/or performance standards used to appraise student work.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard homeowrk and testing</td>
</tr>
</tbody>
</table>

**Enter assessment results and analyze student success in achieving course SLOs.**

See the attachment summary.pdf

#### Describe revisions in curriculum or teaching strategies implemented to promote student success.

**Future Action (Improvements)**

<table>
<thead>
<tr>
<th>Maintain current student learning plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>See the attached file &quot;summary.pdf&quot;</td>
</tr>
</tbody>
</table>

**MATH 152 Algebra II**

1. Solve problems involving the mathematical concepts of function and functional inverse.
2. Show increased skill in setting up and solving applications.
3. Solve mathematical problems using concepts that may be useful for learning statistics: logarithms, sigma notation, and the binomial theorem.
4. Solve mathematical problems in topics useful for trigonometry: functions and inverses and their graphs, quadratic equations, and conic sections.

#### Indicate planned course assessment strategies

<table>
<thead>
<tr>
<th>Rubrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills Assessment</td>
</tr>
</tbody>
</table>

| Describe the criteria and/or performance standards used to appraise student work. |

---

Page 7 of 16
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 2008-09 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.

   Building on this:

   While we offered 34 fewer sections in 2011-12 than in 2008-09, we generated only 17 fewer FTES. Thus, following the trend from the previous period, our efficiency continues to increase. In fact our WSCH/FTEF for 2011 - 12 in consistently over 630. Our retention and success rates are below the college averages have again improved relative to the 2008-09 levels.

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.

3. Analyze program budget trends and expenditures. Comment on how the program can best use budget resources.

4. Analyze the program's current use of staff, equipment, technology, facilities, and/or other resources. Comment on how the program can best use these resources.

   For 2011-12, the ratio of FTEF (Fulltime) to FTEF (Adjunct) is 11 to 16.2. This is a dramatic decline from the 16.6 to 7.8 level of 2008-09.

   This decline in fulltime faculty reduces student access to faculty, creates additional
strain on the administrative offices, increases turnover of faculty, and increases the burden on the existing fulltime faculty.

5. Describe any additional notable program achievements (optional).

6. Additional Program Table Data

7. Future Action
   Current levels of student achievement indicators maintained.

- Program Analysis
  After assessing student learning outcomes/impacts, student/program achievement, and the status of previous program improvement objectives (PIOs), analyze the data and any identified trends, and summarize your findings. Use these data and trends to prioritize, revise, or develop new PIOs
  1. Describe program achievements and successes.

  The math department currently generates the second highest number of FTES, second only to English. Our efficiency rating (WSCH/FTEF) has increased from 619 in Spring 2009 to 636 in Spring 2012 while at the same time the student success rate has increased from 58% to 63%. 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.

  2. According to the evidence, what are the areas needing improvement?

  none

- Program Improvement Objectives:
  1. Objective:

  Increase student success, retention, and completion rates.

  a. Action Plan

  Year 1:

  Return the fulltime faculty staffing levels to those of 2007 or higher since access to fulltime faculty improves student success.

  Year 2:

  Add one new FT faculty member each year until the 2007 staffing levels (or higher) are achieved.

  Year 3:

  none
b. **Staffing**  
   *Year 1:* none  
   *Year 3:* none

c. **Equipment (Include items that fit under department budget codes)**  
   *Year 1:* none  
   *Year 2:* none  
   *Year 3:* none

d. **Technology (Include items that fit under IT budget codes)**  
   *Year 1:* none  
   *Year 2:* none  
   *Year 3:* none

e. **Facilities (Include items that fit under the Facilities budget codes)**  
   *Year 1:* none  
   *Year 2:* none  
   *Year 3:*
none

f. Other (Include other resources needed)
   Year 1:
   none

   Year 2:
   none

   Year 3:
   none

g. Assessment Plan: List Assessment Strategies
   Year 1:
   none

   Year 2:
   Count the number of fulltime math faculty.

   Year 3:
   none

h. Which college goal(s) does this program improvement objective work to achieve? Clearly describe how your PIO will help achieve one or more of the college goals and objectives, has impact beyond the particular department, and contributes to student learning/success.

   4. Use human, fiscal, technological, and physical resources responsibly, effectively, and efficiently to maximize student learning and achievement.

Rationale:

The lack of fulltime faculty hinders student access to faculty, increases the burden on administrative staff, increases faculty turnover, and increases the administrative burden on existing faculty.

2. PIO Assessment
   a. Enter assessment results with analysis.

   This is a new PIO and has not been assessed.
b. *Future Action*
Strategies to promote improvements. Specify.

One fulltime faculty added in Fall 2012 however, this is after the loss of 5 fulltime faculty since 2007

1. **Objective:**

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

a. **Action Plan**
   
   *Year 1:*

   While the original plan was to consolidate services in Bldg 1, nothing was done and the project is now on hold, waiting for the results of the Measure G construction.

   *Year 2:*

   on hold

b. **Staffing**
   
   *Year 1:*

   Use existing faculty and staff as a planning team.

   *Year 2:*

   on hold

c. **Equipment (Include items that fit under department budget codes)**
   
   *Year 1:*

   none

   *Year 2:*

   on hold

d. **Technology (Include items that fit under IT budget codes)**
   
   *Year 1:*

   on hold

   *Year 2:*

   

e. **Facilities (Include items that fit under the Facilities budget codes)**  
   **Year 1:**  
   none  
   
   **Year 2:**  
   on hold  

f. **Other (Include other resources needed)**  
   **Year 1:**  
   on hold  

h. **Which college goal(s) does this program improvement objective work to achieve?** Clearly describe how your PIO will help achieve one or more of the college goals and objectives, has impact beyond the particular department, and contributes to student learning/success.  
1. Through innovative programs and services, improve student learning and achievement.  
   **Rationale:**  
   Math is best learned through a process of students working through the material with assistance as needed. Providing tutorial support is essential to this process.  

7. Increase access to higher education of under-served and under-represented demographic groups in the District and local communities.  
   **Rationale:**  
   The MLC provides access to support services for all of the math courses. This is essential for students who come to the college with a weak background in math. Since under-served and under-represented demographic groups often have a weaker education background, this service is often essential for these students to succeed.
1. **Objective:**

Maintain modern computing facilities in both the Math Learning Center and the classroom used for math instruction.

   a. **Action Plan**
      
      **Year 1:**
      
      This is an ongoing project, that is the responsibility of the IT department. It is also one that with ongoing budget issues, is often allowed to slide. In August 2012, the computers in the MLC and HH210 were updated. This is excellent. The purpose of this PIO is simply to ensure these updates continue on a regular basis.

      **Year 2:**
      none

      **Year 3:**
      August 2015: It is time to update

   b. **Staffing**
      
      **Year 1:**
      IT staff

      **Year 2:**
      none

      **Year 3:**
      IT staff

   c. **Equipment (Include items that fit under department budget codes)**
      
      **Year 1:**
      done

      **Year 3:**
      modern computing and projecting equipment

   d. **Facilities (Include items that fit under the Facilities budget codes)**
      
      **Year 1:**
none

Year 2:
none

Year 3:
none

e. Assessment Plan: List Assessment Strategies
Year 1:
new computers are in the room as of August 2012 - done

Year 3:
August 2015 - time to update again

f. Which college goal(s) does this program improvement objective work to achieve? Clearly describe how your PIO will help achieve one or more of the college goals and objectives, has impact beyond the particular department, and contributes to student learning/success.

4. Use human, fiscal, technological, and physical resources responsibly, effectively, and efficiently to maximize student learning and achievement.
Rationale:
Student will be using these computers on a regular basis for academic purposes.

7. Increase access to higher education of under-served and under-represented demographic groups in the District and local communities.
Rationale:
Lower income students are those most in need of college provided computing equipment.

2. PIO Assessment
a. Enter assessment results with analysis.

There was a computer refresh in August 2012. However, the college needs to be aware of this ongoing need

b. Future Action
Strategies to promote improvements. Specify.
The college needs to identify ongoing money to ensure that computers are not allowed to decline to a barely functional state.

**Outside Review Results** 01/01/2012
1. List each team members name and title.
   
   The math program review does not have an outside team.

2. Discuss key feedback provided by team and how it was incorporated into the report.
   
   n/a

**Attached Files**
1. [Evaluation_of_SLOs_Table #1.xlsx](#)
2. [Comments on the Math 152 SLOs Evaluation.docx](#)
5. [m188.pdf](#)
6. [summary1.pdf](#)
7. [philosophy1.pdf](#)