Introduction

Purpose

An effective program review supports continuous quality improvement to enhance student learning outcomes and, ultimately, increase student achievement rates. Program review aims to be a sustainable process that reviews, discusses, and analyzes current practices. The purpose is to encourage program reflection, and to ensure that program planning is related to goals at the institutional and course levels.

Process

Foothill College academic programs that lead to an A.A./A.S. or Certificate(s), or are part of a specialized pathway, such as ESL, Developmental English and Math My Way are reviewed annually, with an in-depth review occurring on a three-year cycle. The specialized pathways may be included as part of the program review for the department, or may be done as a separate document if they are not part of a department that offers a degree or certificate. Faculty and staff in contributing departments will participate in the process. Deans provide feedback upon completion of the template and will forward the program review on to the next stage of the process, including prioritization at the Vice Presidential level, and at OPC and PaRC.

Annual review will address five core areas, and include a place for comments for the faculty and the dean or director.

1. Data and trend analysis
2. Outcomes assessment
3. Program goals and rationale
4. Program resources and support
5. Program strengths/opportunities for improvement
6. Dean's comments/reflection/next steps

2012-2013 Submission Deadline:

- Program review documents are due to Dean by December 14 for completion of Section 6.
- Dean completes section 6 and returns documents to program review team by January 7, 2013.
- Program review documents are due to the Office of Instruction by January 18, 2013.

Foothill College Program Review Cycle:

To see which template your department is scheduled to complete, check the Program Review Schedule: http://foothill.edu/staff/irs/programplans/2012-2013/12-13-prog-rev-schedule.pdf

Questions?

Contact: Office of Instruction and Institutional Research (650) 949-7240
Website: http://foothill.edu/staff/irs/programplans/index.php

Basic Program Information

Department Name: Mathematics

Program Mission(s):

Provide opportunities to study undergraduate mathematics developed rigorously in a contextual environment relevant to students. In support of the college mission, the department commits itself to providing access to outstanding educational opportunities for all of our students.

It is our mission to provide every student the opportunity to pursue an outstanding math education, through a rigorous curriculum that will prepare students to succeed in courses at 4-year institutions. We pledge to provide students with opportunities to become effective problem solvers and to use mathematics in a contextual and relevant environment. Through our pre-collegiate math program, we prepare students for the college-level opportunities that they are pursuing. Through both our transfer program and our pre-collegiate program, we strive to develop within our students an appreciation for the respected traditions of classical mathematical thought: rigorous thinking, reason, and inquiry.

Program Review team members:

Name	Department	Position
Jennifer Sinclair	Mathematics	Faculty
Rick Martinez	Mathematics	Faculty
Teresa Zwack	Mathematics	Faculty
Debbie Lee	Mathematics	Faculty
Lori Silverman	Mathematics	Faculty
Patrick Morriss	Mathematics	Faculty
Marc Knobel	Mathematics	Faculty
Kathy Perino	Mathematics	Faculty
John Sawka	Mathematics	Faculty
Brian Stanley	Mathematics	Faculty
Marnie Francisco	Mathematics	Faculty
Sarah Delos Santos	Mathematics	Faculty
Phuong Lam	Mathematics	Faculty
Young Hee Park Lee	Mathematics	Faculty
Zach Cembellin	Mathematics	Faculty
Ion Georgiou	Mathematics	Faculty
Nicole Gray	Mathematics	Faculty
Rachel Mudge	Mathematics	Faculty

Total number of Full Time Faculty:	18

Total number of Part Time Faculty:	28

Existing Classified positions:
none

Programs* covered by this review

Program Name	**Program Type (A.S., C.A., Pathway, etc.)**	**Units****
Degree Program	A.A. or A.S.?	45
Transfer Program **Culminating class: Math 10 or Math 44 or Math 57** **Culminating class: Math 1C** **Culminating class: Math 12**	Pathway(s)	
Pre-collegiate Program **Math 230 (MathMyWay)** **Culminating class: Math 105/108**	Pathway(s)	

*If you have a supporting program or pathway in your area for which you will be making resource requests, please analyze it within this program review. For example, ESLL, Math My Way, etc. You will only need to address those data elements that apply.

**Certificates of 27 or more units must be state approved (transcriptable). A Certificate of Achievement is state approved (transcriptable).

Section 1. Data and Trend Analysis (See Appendix A)

1.1. Program Data: See Appendix A

1.2 Department Data: See Appendix A

Department Course Data: See Appendix A

1.3 Using the data and prompts, provide a short, concise narrative analysis of the following indicators.

1. Enrollment trends over the last two years: Is the enrollment in your program holding steady, or is there a noticeable increase or decline? Please comment on the data and analyze the trends.

   The overall enrollment in mathematics is up 3%. This figure includes a slight decrease in enrollment in the Calculus series (Math 1A – 1D) but an increase in enrollment in the newer classes that are offered to meet the needs of non-STEM majors. Specifically, Math 108 (accelerated algebra) and Math 44 (math for liberal arts) show an increase in enrollment. We have no data from 2010-11 to use for comparison in a large portion of our classes because we have classes that were offered for the first time in 2011-12, such as Statway™ and the new Precalculus sequence.

   At the developmental math level, other than math 108 (accelerated algebra), the courses show a decrease in enrollment. To address this, the math department has created a summer bridge to attempt to shorten the path between college entry and a transfer level math class.

2. Completion Rates (Has the number of students completing degrees/certificates held steady, or increased or declined in the last two years? Please comment on the data and analyze the trends.
   a. AA, AS, AA-T, AS-T, Certificates of Achievement
      Our department awarded only 3 AS degrees last year, down from 6 the prior year. Most of our students take classes in service to another degree, rather than complete a mathematics degree. The mathematics requirements for an Engineering degree and a Physics degree are very close to the requirements for a mathematics degree, and the number of degrees awarded in Physics and Engineering are up from 5 to 9. Although these numbers are all small, the total number of degrees awarded in majors with similar math requirements is up slightly. Once the transfer degree in mathematics is available, we expect numbers to increase.

   b. Local, non-State approved certificates- Certificates less than 27 units:
      Not applicable

3. Productivity: Please analyze the productivity trends in your program and explain factors that affect your productivity, i.e. GE students, seat count/facilities/accreditation restrictions. For reference, the college productivity goal is 546.

Our AY Productivity was down 21% from the prior year. However, at 546, we still met the college goal of 546. The decrease in productivity is due to: 1) all math classes removed one TBA hour from each course outline in 2011, and 2) declining enrollment in the college overall. In prior years, faculty would routinely add students above the maximum class size to meet student demand. The recent decline in enrollment has seen a decline in the number of students adding classes.

4. Course Offerings: (Comment on the frequency, variety, demand, pre-requisites.) Review the enrollment trends by course. Are there particular courses that are not getting the enrollment or are regularly cancelled due to low enrollment?)

   The courses that we discussed above that support transfer and basic skills are offered every quarter, via multiple sections. For this reason, there is no issue with frequency or prerequisites, except that we have to keep up with the demand. The exception is Math 44 (Math for Liberal Arts Majors), Math 108 (accelerated algebra) and Statway which often have small enrollments. We are watching these new classes to determine when and if we should offer additional sections and we are preparing marketing materials for outreach purposes. Online courses are the other exception as we have a difficult time keeping up with the increasing demand.

   a. Please comment on the data from any online course offerings.

Online courses continue to be in high demand. We are currently offering sections of both Intermediate Algebra and Statistics online. All sections offered continue to fill as we are slowly increasing the number of online sections. However retention is better for online statistics than it is for online intermediate algebra. In the program review data for online courses in the year 2011-2012, the enrollment for Math 105 went down 15% from the 2010-2011 year, whereas the enrollment for Math 10 went up 61% from 2010-2011 to 2011-2012. Additionally, the withdrawal rate for Math 105 was 25% whereas the withdrawal rate was 12% for Math 10 in 2011-2012.

5. Curriculum and Student Learning Outcomes (SLOs)
   a. Comment on the currency of your curriculum, i.e. are all Course Outline of Record (CORs) reviewed for Title 5 compliance at least every three years and do all prerequisites, co-requisites and advisories undergo content review at that time? If not, what is your action plan for bringing your curriculum into compliance?

      Our curriculum is in compliance with Title V. Within our department, each full time instructor chooses one or more course to “manage”, curriculum-wise. That instructor manages the SLO process (coordinates assessments and reflections) as well as the update of the COR. When issues arise, they are brought to department meetings to address.

   b. Comment on any recent developments in your discipline which might require modification of existing curriculum and/or the development of new curriculum?

The mathematics department continues to study completion rates for STEM and non-STEM majors nationwide. As described in our comprehensive program review last year, we are working hard to address the needs of students whose goal is one college level math course. We continue to refine the relatively new curriculum in Math 44 (Mathematics for liberal arts), and Math 108 (Accelerated Algebra). Enrollment in both of these courses is improving, and our knowledge of these students is helping to open the discussion of a revised Intermediate Algebra course for non-STEM majors. Revision of the Math 105 COR to better meet the needs of our students is under discussion.

Statway™ is another pathway to college level math credit that we continue to improve. Recently, mathematics faculty have met with faculty in the health career programs to determine if the Statway™ curriculum would better meet the needs of these students than the tradition algebra sequence. The current thinking is that the Statway™ curriculum is appropriate for health career programs provided certain developmental math concepts are incorporated into the curriculum. These changes are underway and this cross-campus collaboration will help improve enrollment in the Statway™ courses.

Regarding our STEM and business majors who require precalculus and/or calculus, last year was the first full year offering the new precalculus sequence. Faculty teaching the first course of the sequence (48A) express concern that we need to provide more support to our students, and we are in the process of determining how to do so most effectively. However, faculty teaching 48B and 48C feel that the design of the curriculum guides students to a mathematical maturity that will serve them well when they enter the calculus sequence.

c. Discuss how the student learning outcomes in your courses relate to the program learning outcomes and to the college mission.

Our programs are closely tied to the college missions. There are several course mappings that support transfer, summarized here:

Liberal Arts Transfer:	Math 10, Math 44, and Math 217/57 (Statway™)
Economics/Biology Transfer:	Math 1A/1B/1C
Stem Transfer:	Math 2A/2B/1D

The second and third mappings, above, are supported by our new sequence (48A/B/C), and used to be supported by the sequence 51/49. While 48C (the culminating course) could be used to satisfy the GE math requirement at CSU and UC, in reality, most students taking 48A/B/C would take them in preparation for calculus.

There are several course mappings that support the acquisition of basic skills, summarized here:

Supports acquisition of basic skills and AA/AS degree as well as progression to transfer level: 230(MathMyWay)/220/105 or 108 or 217/57(Statway™)

Besides serving Transfer, GE, Degree, and Basic Skills needs, math is a supporting topic/prerequisite for many related majors, such as sciences, business, and engineering, as well as for students applying to graduate school and for those in the Allied Health Program at Foothill College.

d. As a division, how do you ensure that all faculty are teaching to the COR and SLOs?
Within our department, each instructor "manages" one or more course, curriculum-wise. That instructor manages the SLO process as well as the update of the COR. As a department we use Google Drive to monitor the SLO assessment so everyone can easily see where we are in the process.
Additionally, the faculty teaching some courses meet periodically to discuss teaching the course. These faculty groups also occasionally also create common assessment including common finals.

6. Basic Skills Programs (if applicable). For more information about the Core Mission of Basic Skills, see the Basic Skills Workgroup website: http://foothill.edu/president/basicskills.php
   a. Please discuss current outcomes or initiatives related to this core mission.

   The mathematics department continues to work to improve the delivery of our basic skills courses, with a focus on student success and effective program design. In the fall of 2011, the faculty in Math My Way made modifications in the curriculum design to help improve the pace at which students moved through the modules and completed the program. This includes providing more materials "on demand" through a course website, links to instructional videos, and clearer communication methods with students.

   Additionally, in conjunction with the Basic Skills workgroup, the mathematics department developed a 2-week Summer Bridge program to address placement issues in mathematics. The goal was to provide a short review course and allow students to re-take a placement test at the end of the Summer Bridge program, in hopes that students would place higher and have a shorter path to completion of college level math requirements. After completing the summer bridge, most students placed one or two classes higher than their initial placement. We are tracking the success rates of these students in the classes in which they are currently enrolled. Data from these students will be used to improve the program in the future.

   Lastly, the mathematics department is working to select course materials that better support students in the beginning and intermediate algebra classes, Specifically, we are trying to address the transition from beginning algebra to intermediate algebra. We are in the process of selecting a textbook and software platform that best addresses the needs of our students, provides a cohesive set of materials for full and part-time faculty, and controls costs to students.
7. Transfer Programs (if applicable). For more information about the Core Mission of Transfer, see the Transfer Workgroup website: http://foothill.edu/president/transfer.php
   a. Please discuss current outcomes or initiatives related to this core mission.

The majority of our courses support Transfer. Math 105 and Math 108 may be terminal classes for students striving for an AA or Certificate. Or they may serve as prerequisites for transferable math classes. Enrollment in these classes during 2011-2012 was 1379 (out of a total enrollment of 10,147). So approximately 14% of our enrollment was in these classes.

Our enrollment in classes "above Math 105/108 (algebra)" was 6694 (out of a total enrollment of 10,147). So approximately 66% of our enrollment was in classes beyond algebra.

So depending on the goals of those taking algebra, somewhere between 66% and 80% of our enrollment is in classes that we believe students are taking for transfer reasons. Additionally, many of the students enrolled in Basic Skills classes may also plan to eventually transfer. So part of that enrollment may also be in support of transfer.

8. Workforce/Career Technical Education Programs (if applicable). For more information about the Core Mission of Workforce, see the Workforce Workgroup website: http://foothill.edu/president/workforce.php
    a. Please discuss current outcomes or initiatives related to this core mission.
    It is difficult for us to determine the proportion of our enrollment that is pursuing CTE Programs.
    Students who are getting certificates and A.A. degrees may view Math 105/108 as their "terminal" math class. Students in our classes may be pursuing a change in career. Although we believe that part of our enrollment is related to CTE Programs or student plans to change their career or improve their professional skills, we have a limited ability to quantify this. Generally, we feel that the % of our enrollment attributable to such plans is much smaller than the % of enrollment attributable to Basic Skills or Transfer pursuits. During 2005-2009, we found that 38% of the students who succeed in Math 105 do not continue in math at Foothill College. These students may be involved in CTE Programs, earning Associates degrees either from Foothill College or from another school in the state. In 2011/2012, 1379 of our enrollment were in 105/108. That's about 12.9% of our enrollment.

9. Student Equity: Foothill-De Anza Community College District Board policy and California state guidelines require that each California community college submit a report on the college's progress in achieving equity in five specific areas: access, course completion, ESLL and basic skills completion, degree and certificate completion, and transfer. For the latest draft of the Student Equity Report, please see the ESMP website: http://foothill.edu/staff/irs/ESMP/index.php
    a. To better inform the Student Equity efforts at Foothill College, please comment on any current outcomes or initiatives related to increasing outreach, retention and student success of underrepresented students in your program.

Students who identify themselves as White, Asian, Latino, or decline to state represent 89% of our enrollment. Among this group, the White, Asian, and Decline to State subgroups all succeed at a rate that is above our average success rate of 59%. Latinos have a success rate of 49%, well below the average. The remaining 11% of our enrollment (African American SR 44%, Filipino SR 48%, Native American SR 55%, Pacific Islander SR 45%) succeeds at a rate lower than the average. There are many things that we do to support all of our students.

Our PSME Center is open 40 hours per week. Students may take advantage of free tutoring, free computer access, and inexpensive refreshments.

We have provided the library with numerous calculators to maintain a calculator loan program. Under this program, students may borrow calculators for 3 week intervals, renewable all quarter. They may also borrow calculators for shorter periods if they just need one for an exam.

We have provided the library with numerous textbooks to maintain availability through the Reserve Desk. Students may borrow textbooks for courses from pre-algebra through linear algebra, for 2-hour periods or 24-hour periods. Some textbooks are also available for weekend checkout.

Many instructors make a shell course available through one of the course management systems (Webassign, Aleks, My Math Lab). These companies offer grace periods, so that a student who is unable to purchase the book during the first two weeks or who is waiting for financial aid may nonetheless have access to course materials from Day 1. Depending on the system, the student may have access to homework, video tutorials, hints, solutions, and possibly even an electronic version of the textbook.

We maintain class sets of the texts for NCBS 401A/B and Math 108. That way, the students enrolling in these classes do not have to purchase a text; they just borrow one for the quarter.

The math department has agreed in most instances to a single book for each course. That way, students don't have to buy alternative texts as they move through a sequence or when they must repeat a course.

To address the low success and retention rates in precollegiate math courses, the math department has engaged in the Statway™ project, developing an alternative curriculum to Math 220/105/10.

To address the low success rates in trigonometry, the math department has developed a new 3-quarter precalculus sequence, Math 48A/B/C.

The division is offering scholarships to underrepresented and needy students who want to major in STEM majors.

Right now, the division is partnering with Year-Up through the computer science department. Eventually, we suspect that math will also partner with Year-Up.

As a department, we reach out to the community through our annual "Let's Play Math" event. Some of the students in our math classes volunteer to help out before and during this event.

While these efforts are intended to help all of our students, there is no question that there is still a performance gap between ethnic groups (as measured by success and retention). The reasons for these gaps as well as possible remedies have not been seriously investigated within our department.

Section 2. Learning Outcomes Assessment Summary

2.1. Attach 2011-2012 Program Level – Four Column Report for PL-SLO Assessment from TracDat, please contact the Office of Instruction to assist you with this step if needed.

See appendix B

2.2 Attach 2011-2012 Course-Level – Four Column Report for CL-SLO Assessment from TracDat

See appendix C

Section 2 Continued: SLO Assessment and Reflection

2.3 Please provide observations and reflection below.

2.3.a Course-Level SLO

What findings can be gathered from the Course Level Assessments?

Some common findings that were gathered from the Course Level Assessments included:
1) Students are having difficulties with word problems and problems that require more than two steps to solve.
2) Students have basic skills but have a hard time applying these skills in performing larger tasks and solving more conceptual problems.
3) Students were lacking in their study skills.
4) Synthesis materials and activities may be lacking in textbooks. Students often ask for more application problems and feel that they don't have enough of these types of problems in the textbook.

What curricular changes or review do the data suggest in order for students to be more successful in completing the program?

This varies from class to class. We are somewhat limited in our flexibility with curriculum, due to the fact that so much of our curriculum serves transfer and that we are held to the UC and CSU descriptors for these courses.

The department has been actively testing out curriculum changes. This past year was the first year for the Math 48 sequence which replaced the old Math 51 and Math 49 classes. The success rate for Math 48A is a bit low for our liking, but the success rates for Math 48B and Math 48C are better than Math 48A. In fact, the Math 48C success rate is better than the Math 49 success rate in 2010-2011. The department will need to track the successful Math 48C students to see how they do in the subsequent calculus courses.

In addition to the Math 48 sequence, the department also ran its Statway classes, Math 217 and Math 57 for the first time last year. The enrollments in these classes were low due to the fact that these courses are not UC transferable and only transfer to some CSU's with restrictions.

One comment from last year's program review is that "the students we see need substantial help with what we view to be prerequisite materials". To address this need, the department ran several workshops for Math 105 and Math 1A students in the 2011-2012 year. These workshops are not

mandatory, but they are free for the students. The workshops were not well attended especially for the Math 105 sections. For the fall quarter of 2012, we did not run any workshops for Math 105, but we ran several sessions for Math 1A. However, the number of students that attended these sessions ranged from 0 to 6; hence, all sections of the workshops were canceled by week 7 of the fall quarter.

Based on the SLO reflections and data and the workshop attendance, it would seem that some students lack the study skills & habits necessary to succeed in our courses. Additionally, based on data gathered from informal surveys and anecdotes, we can conclude that some of our students have a hard time prioritizing their classes. Some students work 40 hrs/week, take too many units or have too many other priorities in life, yet they expect to pass our courses by putting in approximately 2 hours of outside study time per week dedicated to this class. This is a mentality that needs to change. No matter what pedagogical techniques are tried, students need to put time into studying to be successful. It would be beneficial for the math department to have its own counselor who can help students understand that they should put in at least 10 hours of study time outside the classroom dedicated just towards math, who can direct students to appropriate support programs such as EOPS, Health Services, Pass the Torch, etc…

The data would also suggest that some students may be placed incorrectly into our classes. Currently, one faculty member has a student who is co-enrolled in his Math 48B and Math 48C classes even though the student failed Math 48B twice already. Although it is the department's hope that Banner would not allow this to happen, it has. Again, a counselor who is familiar with our math classes would be helpful to have in this situation to help explain to the student the lack of prudence in taking two math classes simultaneously and to help place our students in the appropriate classes.

Lastly, the data would suggest that faculty be given release time to develop or find more synthesis materials and activities for the students. Many students want faculty to give more challenging problems because there are not that many of these types of problems in the textbooks.

How well do the CL-SLOs reflect the knowledge, skills, and abilities students need in order to succeed in this program?

The SLO's vary in how well they reflect the success rates of different courses. Classes such as Math 10 have maintained the same success rates for the last 6 years even though Foothill did not have SLO's 6 years ago. In some cases, the individual SLO reflections would suggest that students did pretty well, such as in Math 1A – Math 1D. However, the success rates for each of these courses is below 60%, which is worse than it was just the previous year. Since 2006, the success rates for our calculus classes have declined by nearly 10% for each of the calculus classes. There does not seem to be much of a correlation between the course success rates and individual SLO reflections. There could be several reasons for why this is the case:

1) The SLO assessments used are not as meaningful as we would like them to be.
2) The targets for success in the course SLO's are arbitrarily determined by the faculty entering the reflections. There is no uniform measure as to what is successful.
3) For the SLO process to be meaningful, there needs to be dialog among the course instructors. This can be difficult to do since instructors oftentimes teach other preps and since block scheduling can make it hard to schedule a common time to meet. Additionally, there may be over

6 instructors teaching one course and it can be difficult for all these instructors to meet at one common time.

Overall, it would seem that the SLO process that the department used last year did not make an impact on how well the students do in our classes.

How has assessment of course-level student learning outcomes led to improvement in student learning in the program?

At this point, the verdict is mixed and some of this can not be determined until we have more data points. We only implemented the Math 48 sequence, Statway and the booster courses last year. Those programs are still being tweaked as of this writing.
However, there seems to be a general feeling that courses are being taught in the best way possible without SLO's having driven these methodologies.

2.3.b Program-Level SLO

1. What summative findings can be gathered from the Program Level Assessments?

In the spring quarter of 2012, we assessed the first Program-Level Student Learning Outcome for the Math AS degree, and found that all students who completed the assessment did so successfully.

With an instructor-generated and qualitatively-graded research assignment in a section of Math 2A (Differential Equations), we assessed whether students completing their math program at Foothill College are able to clearly communicate mathematical ideas through graphs, tables of data, equations, and verbal descriptions.

Our target for success was that 70% of the students will earn a "C" grade or better on the assessment, and in the end, 24 of 26 students did. Two students failed to complete the assessment.

2. How has assessment of program-level student learning outcomes led to certificate/degree program improvements?

This assessment represented our first attempt at assessing program-level outcomes, and the results affirmed our program's effectiveness at helping students meet them. Because there is no single terminal or capstone course in the Mathematics AS degree program, any single years' program-level assessment is by nature incomplete and must be viewed in conjunction with assessment data from other courses. As part of our ongoing program-level assessment, we will add data from Linear Algebra, Multivariable and Vector Calculus, and perhaps Discrete Math to these findings from Differential Equations. Combining data from those assessments will give us a clearer picture of what program improvements are indicated and how to implement those changes.

3. If your program has other outcomes assessments at the program level, comment on the findings.

Section 3: Program Goals and Rationale

Program goals should be broad issues and concerns that incorporate some sort of measurable action and should connect to Foothill's core missions, Educational & Strategic Master Plan (ESMP), the division plan, and SLOs.

3.1 Previous Program Goals from last academic year

Goal	Original Timeline	Actions Taken	Status/Modifications
1 Improve teaching consistency among instructors	Long-term, continued	Provided 0.222 reassign time for part-time mentoring Math 1A and Math 105 workshops offered several times per week to provide additional help for students Several Instructors have collaborated on common final exams for various courses	This 0.222 reassign time has been eliminated for 2012-2013 due to budget cuts
2 Develop course by course collection of teaching resources	Long term	Created folders for every course in DropBox as way for all instructors to share course resources/materials	Continue using DropBox. It has been an efficient way to disperse and share info
3 Develop the means to track students across courses	Ongoing would be nice	Work with Institutional Research	We must still rely on IR to track students for a particular course and quarters. Some other means would be nice
4 Develop and nurture an ongoing conversation about pedagogy	Ongoing would be nice	Several working groups have formed to make common finals, which lead to discussions about pedagogy. Also, we shared a few lunches this fall, which provided opportunities to talk about teaching.	Continue to collaborate, discuss and support each other regarding development and experimentation of new pedagogy
5 Develop the PSME Center into a faculty resource to support student success	Long term	Apply for NSF Grant Offer workshops to support Math 1A courses	Awarded 5 year NSF Grant Additionally offered Math 105 and Math 1C

		Maintained and updated all necessary software in the computer labs to support all courses in the division	Workshops as well Prior to start of each quarter, computers are re-imaged with updated software and support programs

3.2 New Goals: Goals can be multi-year (in Section 4 you will detail resources needed)

Goal	Timeline (long/short-term)	How will this goal improve student success or respond to other key college initiatives	Action Steps
1 Improve teaching consistency among instructors	Long term, ongoing	Create a culture of shared expectations thereby allowing us to accomplish two things: We work to understand our students' perspectives, and students have an easier time making sense of their new environment.	Provide mentoring to part time faculty. Provide mentoring to new full time faculty. Encourage interested faculty to choose a focus (or two) for the academic year, thereby stabilizing what they're working on. This will allow for working groups to develop, which will support this goal and several others.
2 Develop and disseminate course by course collection of teaching resources	Ongoing	By accessing shared resources, instructors can leverage their time more effectively, and thus serve students better. Also, developing shared resources provides a venue for pedagogical discussions.	Continue sharing course resources and materials via DropBox. Many materials have been shared pertaining to 48A/B/C and 1A/B. We would like to build upon this start.

3 Develop the means to track students across courses	Ongoing	This provides us with a secondary means of assessing the effectiveness of our courses. For example, we are watching to see if student success in the 48A/B/C series is better than that of 51/49. However, we are also watching to see how the 48A/B/C graduates perform once they get to calculus. This will help us to assess whether the 3 quarter sequence is an improvement.	Explore tracking options via the Stemway grant (105/1A). Discuss options with Institutional Research
4 Develop and nurture an ongoing conversation about pedagogy.	Ongoing	Our student population is changing, as are technology options. For years, it seemed like teaching math didn't change much. Now it seems like we have lots to talk about and discuss, but little time or opportunity to do so.	Arrange for department-wide professional discourse via Flex Days, workshops, shared lunches, and working groups.

5 Develop the PSME Center into a faculty resource to support student success.	Long term, ongoing	Besides offering students tutoring, we're wanting to develop the center into a resource that enables faculty to carry out plans that might otherwise be logistically impractical, such as allowing students to test at alternate times or providing students with a "prescription" to review or receive help on much needed, but forgotten prerequisite skills.	Hire Director for PSME Center. Continue to assess and hire new supplemental instructors to tutor in the center and lead workshops for courses throughout the division. Continue to update computer labs with latest software to support courses in the division.
6 Enhance outreach to students to increase retention and success.	Long term, ongoing	Research suggests that developing a connection with their college is an important factor contributing to student success. So nurturing the development of a "feeling of belonging" may increase both retention and success.	Continue and improve Summer Bridge Math Program Continue participation in Day on the Hill Continue "Let's Play Math" Provide academic counseling, including success strategies to students enrolled in math classes. This could help in the dissemination of the college culture.

7 Respond effectively to the changing needs of students.	Long-term.	Experimenting with technology, inverted classrooms, and new pedagogy requires a lot of time and energy, but offers the possibility of improving student success and retention.	Do whatever we can to provide support to instructors who have good ideas that they'd like to pursue. Ideas include: Maintain scheduler position (which helps instructors to pursue their goals/interests pedagogically) Form course-level working groups that allow interested faculty to engage in multi-quarter (and even multi-year) improvement efforts. Maintain adjunct faculty mentor to provide guidance and support for adjuncts

Section 4: Program Resources and Support

4.1 Using the tables below, summarize your program's unfunded resource requests. Refer to the Operations Planning Committee website: http://foothill.edu/president/operations.php for current guiding principles, rubrics and resource allocation information.

Full Time Faculty and/or Staff Positions

Position	**$ Amount**	**Related Goal from Table in section 3.2 and/or rationale**
Dedicated Counselor		3,5,6 Many students who would benefit from the numerous resources that we provide are not accessing them. And successful students are not necessarily enrolling in the next class. A dedicated PSME counselor could help students navigate more effectively through their math and science education.

Unbudgeted Reassigned Time (calculate by % reassign time x salary/benefits of FT)

Position	$ Amount	Related Goal from Table in section 3.2 and/or rationale
Part time Mentor		1, 2, 4, 7
Scheduler		1, 7
Professional Development		1, 2, 4,7 (We are reeling from the demands to become ADA compliant and to develop and conform to a Common Core. We need time together, away from teaching to figure out how we can accomplish these goals.)

One-time B Budget Augmentation

Description	$ Amount	Related Goal from Table in section 3.2 and/or rationale.
Lunch supplies for 15 lunches in the next year.	$600	2, 4, 7 (This nurtures relationships and discussions and the individuals who share the food.)

Ongoing B Budget Augmentation

B Budget FOAP	$ Amount	Related Goal from Table in section 3.2 and/or rationale
Math My Way TA's		1, 7 (Allows teachers to maintain a student-centered learning environment)
Let's Play Math Funding		6 (Provides outreach and possibly a feeling of belonging to local children. Also, advanced math students really enjoy the volunteer experience.)
Log-in Person for PSME Center		5 (Allows us to maintain a more accurate record of center usage, thereby increasing the WSCH that we collect.)
Printing Expenses for PSME Center		5 (Allows for all PSME students to print computer project as assigned by faculty, gives tactile learners physical forms of their course assignments, and software is used to control amount of printing per student)
Scanners for Math 220/105		7 (Students need opportunities to learn from their mistakes. Online

		homework systems can provide immediate feedback, but they are limited in the types of questions that they can ask. Students also can benefit by feedback on their paper and pencil work before they are tested using a paper and pencil environment. We limit the amount of feedback that we give students, according to the amount of time we have to spend on the task. We can leverage our time by having scanners provide an initial review of the students' work.)

Facilities and Equipment

Facilities/Equipment Description	**$ Amount**	**Related Goal from Table in section 3.2 and/or rationale**
Additional Tablets (Samsung, iPad) for instructor class-time use.		1, 7 (More instructors would like to experiment with using these tools in their teaching.)
Software (Mathematica site license, MathType, TI-Emulator)		1, 2, 4, 7 (As we try to incorporate written papers/projects into our classes, we need to provide students with resources for producing them.)

Section 5: Program Strengths/Opportunities for Improvement

5.1 Address the concerns or recommendations that were made in prior program review cycles.

Many of the concerns and recommendations from the prior program review focused on declining students success rates and the faculty response. The faculty are as concerned as the Dean about these trends. As a department we held a retreat in February 2012 to discuss technology in our classes, becaue we feel that technology is an important tool, and it's use might help to enhance the students experience with mathematics. With the NSF grant funding the department will work with the PIs and PSME center staff to create booster courses for classes. However, we have already seen that creating these courses is not sufficient as students do not readily take advantage of them. So, we will also have to develop strategies for getting students to take advantage of these courses and programs that will help them to develop prerequisite skills and reinforce the new skills being learned. However, coming together as a department to have these discussions is still a challenge. So far the bulk of our department meeting time in Fall 2012 was devoted to discussing and directing the creation of the program

review documents and much of the meeting time in Winter 2013 will likely focus on SLO completion. This leaves little time for the department to come together to discuss more directly the issues of student success.

5.2 What statements of concern have been raised in the course of conducting the program review by faculty, administrators, students, or by any member of the program review team regarding overall program viability?

Nearly every academic program on campus demands something from the math program. Since math is a necessary part of general education and of many majors, there are no real concerns about the math program's viability.

5.3 After reviewing the data, what strengths or positive trends would you like to highlight about your program?

As a department, we continue to thoughtfully reflect on the trends in student success in courses at all levels in the curriculum. The faculty in the Math Department continue to show a willingness to come together to develop and offer new innovative curriculum, and also to search for materials and pedagogical techniques that will enhance courses with more traditional curriculum. These adaptations of our courses and materials seek to provide more meaningful experiences for our students that will lead to better success rates.

Section 6: Feedback and Follow Up

This section is for the Dean to provide feedback.

6.1 Strengths and successes of the program as evidenced by the data and analysis:
The main strength of the Math Programs is the Faculty's math teaching skills with the goal to have all the students succeed. The other strengths are:

1. Programs have shown continuous growth in new curriculum as well as student enrollment.
2. The faculty are very collegial and work together in a very Democratic manner.
3. The FT Faculty work very hard to maintain their teaching skills and regularly update their courses to keep the materials fresh.
4. Their professionalism is reflected in taking on additional tasks such as working in the PSME Center, the annual math show for K-6 students, managing & oversight of the two annual national math competitions (AMATYC and Putnam), advisers for the math club, leading the PSME division technology group and curriculum, and working on proposals for external funding.

The success of the math department is demonstrated in a number of different ways:

1. The Math My Way program has received national recognition and shown improvements far superior to other programs. Even though faculty could rest on their laurels, they are continually changing and improving how the course is taught. This is partially due to the change in demographics in the basic skills program.

2. Nicole Gray and Rachel Mudge have been funded by the Carnegie foundation for education to help develop 2 new innovative math programs, Quantway and Statway. Nicole Gray is funded to continue her work on Quantway in 2013 winter and spring. Kathy Perino is funded to assist Carnegie with developing professional develoment programs. Young Hee Park Lee addressed math students in South Korea in 2012 summer
3. Foothill's math department was selected to be one of the 5 community colleges in California to participate in Statway. The program is a revolutionary change for students in basic skills math to complete a college level math course in 2 quarters. The Allied Health programs have agreed to accept STATway for their degrees and Chem 30A changed the prerequiste to Math 217 (1^{st} qtr Statway).
4. The faculty have been campus leaders in the use of new technology to benefit their students. This has includes the use of online materials such as Kahn Academy, tablet computers to permit lectures to be more interactive, investigate learning management systems (LMS) that can be used across a sequence of courses, the use of online math applications in the classroom, and math skills assessment systems. Their use of WiDi video with the tablet computers to do in class groupwork. The are looking at the use of MOOCs in blended learning.
5. The Faculty continue to introduce new pedagogy as well as courses to meet student's needs. This includes:
    a.
    b. NCBS 405 course to provide PSME students learning support. This has provided a significant impact for PSME.
    c. Revamp of MathMyWay to reduce student book costs as well as reduce time to success.
    d. Math 42, MATH FOR ELEMENTARY SCHOOL TEACHERS
    e. Math 220/221 was combined into one class Math 220 and contact hours reduced to five. This was based on using research data compared to the prior baseline.
6. The faculty have created commom finals for a number classes. This provides a standardization of testing learning outcomes a s well as embedded SLO questions.
7. Lori Silverman and Ion Georgiou submitted a NSF STEP proposal and was awarded. They wrote the proposal on their own time. The STEMway proposal had less than a 10% chance of being awarded and is a tribute to the quality of faculty in the Math dept. STEMway's goal is to increase retaention and success of STEM students starting with Math 1 series.
8. The Math faculty have been very supportive of the Basic Skills community. This inlcudes being on the committee and the summer Bridge Program.

In summary the math department has been very successful at multiple levels and I anticipate this to continue with adequate funding and college support.

6.2 Areas of concern, if any:

There are number of areas of concern:

1. The decline in student success in a math sequences is a major concern. Two major factors appear to be that students are 1) ill prepared in math fundamentals and 2) being

college ready. The placement testing does not provide an adequate level of discrimination in core math concepts a student requires to be successful. The Math 1A students taking a commercial test called "MyMathTest" validated this in the fall quarter. A large number of the students were missing basic algebraic skills that should have been learned as a sophomore in high school. The 2nd factor is the student's lack of College Readiness. This is reflected in student's unwillingness to do homework or any activities outside of the classroom. There has also been a shift in the last 2 years in students withdrawing (W) from a class prior to the 8th week so they would not get a grade less then they "A". These students are often the ones that are taking too many credits during the college quarter. With Foothill College's demographics shifting towards high school districts that have a history of under preparing their students to be successful in math, there will be new pressure to remediate the students at the same time they are taking core courses. This continues to be an issue. See later comments.

2. The Math 48 series based on initial research against the original Math 51-49 series has been less successful in percentage of students completing the series although this is a small sample so it may not be statistically significant. The Math 48 series extended the time for precalulus to three quarters from two. The new Math 48 sequence require students to complete the sequence for UC math credit where Math 51 would meet the math requirement.
3. The next concern is how to best to identify student's skills, provide them remediation, and have them actively participate in their success, while they take their current course load. There has been a lot of research in this area and the most prevalent approach is the booster classes in parallel with the main class. The weakness in the current approach that was piloted in Math 1A in 2011 fall is that students that required remediation didn't take advantage of the free booster classes. This will be partially addressed in STEMway. The concern is how to make the testing and remediation mandatory and permit students to test out.
4. Another concern is that the community college population is composed of many students that have a large number of issues outside of college. Based on recent feedback from math faculty participating in the GSCC Grant, achieving success rate above 78% is very difficult. The SLI scholarships hopefully can make these students fulltime and permit them to commit.
5. The Algebra series (Math 220 & 105) continues to have a low success rate. There has been a national discussion on what students really need to understand for the STEM and Non-Stem pathway. Foothill based on MMW, STATway and Quantway should be an active participant.
6. The last concern is the professional development for the full-time faculty but more importantly the part-time faculty in the use of technology, common standards for student success in a course as well as the sequence, and new teaching techniques and methodology identified in working with outside programs such is Gates foundation and Carnegie foundation.
7. The continued funding of the PSME Center to include the "Boot Camps" to provide remedial assistance.
8. The department have developed additional first tier college level math courses. There is now Math 10, 11, 40, 42 and 54. Math 10 is the most popular. Math 40 has had spotty

enrollment, Math 42 will compete with an already weak pattern. These courses will be offered in frequently going forward.

6.3 Recommendations for improvement:
There is always areas for improvement in education and math has been a popular topic. The recommendations are tied to the 6.2 Concerns list.

1. 6.2.1 Decline:
    a. Identify a list a potential changes to curriculum as well as math skills assessment and remediation. This could be in three areas:
        i. Algebra: this is an on going national discussion on what do stduents really need for STEM and non-STEM careers.
        ii. PreCalculus: The Math 48 series has the content required but may want to consider compressing to 2 quarters. Research has shown extending the time students take to transfer is a determinant. We have lost a student population that just took the first course, Math 51.
        iii. Calculus: The Math 1A/B/C sequence has not increased the student success rate through the sequence. UC Economics majors just require Math1A/B. STEMway and PSME Center are focued on this issue.
    b. Research has shown that the high school transcript can be a better representative indicator than Accuplacer. Also a diagnostic test versus Accuplacer can show where a student is weak versus a numeric score has shown to be valuable. Foothill Student Services in cooperation with the Math Dept should look for a more effective way to place the students.
2. 6.2.3 Student Outside Demands:
    a. Provide precollegiate math students financial “support package” from SLI.
    b. Develop special contracts based on course success and levels of participation in Pass the Torch and/or Booster classes
    c. Students take accelerated classes such as Math 235/230, Math 217/57 or Math 108.
3. 6.2.4 Faculty Time:
    a. Provide 1 quarter (1 qtr or over 3 qtrs) reassign time based on agreed upon projects using Foundation and grant funds. The tasks will address requirements based on student success and technology implementations. Provide FT faculty reassign time to collaborate with local colleges (Stanford, UCSC) and Foundations (Gates, Carnegie, Packard).
    b. The faculty have assisted with scheduling and mentoring under reassign time. With the PSEC completed and CS incorporated into PSME, the Dean will have time for the scheduling. The mentoring will be shifted to performing J1s at least twice in 4 years by the FT Faculty and the Dean. If the scheduling coordinator position is no longer funded, we would implement a round robin for of scheduling to continue our past practice of having faculty input into scheduling our classes.
4. 6.2.6 PSME Center:
    a. Identify and fund BlackboardLMS for centralized course materials, assessments, homework and student tracking from course to course. This is funded under STEMway.

b. The Dean of Counseling will be meeting in 13W to discuss having a STEM Counselor availbale in the PSME Center. Financial Aid advisor in the PSME is TBD.

5. 6.2.7 Curriculum
   a. Review the Math 48 series to determine if a two quarter sequence has a benefit to stduent's success & retention. For example combine Math 48A & 48B into a 5 day a week course. The content is well thought out but the Math 48A students still have not seem to been able to adapt. This is only a year old sequence. We will need to run it longer to get a larger set of data. The faculty are continuing to tweak the course.
   b. Look at a new Algebra series to replace/enhance Math 220 & 105.
   c. Look at the pedagogy of STATway to enfuse into other math courses.
   d. Determine and implement gateway tests for key math entry courses such as Math 105, 48, 1A. Students need to show proficiency in prerequisite knowledge before being able to not attend booster classes or even continue with the course.
6. 6.2.8 Expansion:
   a. If FH is to reach a goal of 25% Latino as well as continue to attract students from outside FH's CCD, the basic skills (precollegiate) courses (Math 235/230, Math 108, Math 220/105, Math 217/57) will potential at least double in sections offered. These rooms are at a premium as the math courses compete with each other as well as with Computer Science (CS) courses. It is envisioned the CS will increase in 2012-13 and double in 2013-14. Many of the basic skills courses are 10 hours per week (2 hours per day) and use both FT faculty load as well as rooms. The FH plan is to develop these classes in the 5600 building under the Measure C remodel. Plans have been developed and submitted for bids.
   b. The basic skills courses require classroom with access to computers/groupwork/paperwork as well as faculty trained in the course materials. The courses should be taught in a "Team Environment". This requires FT Faculty dedicated to the classes to provide the additional oversight and coordination. The FH plan is to develop these classes in the 5600 building under the Measure C remodel. Plans have been developed and submitted for bids.
   c. For every two new sections of a basic skills courses offered a FT faculty needs to be assigned.
7. Access to online materials
   a. The College needs to provide tools and specific guidelines to address the accessibility issue. Just being informed what not to do is inadequate.

6.4 Recommended next steps:
_X_ Proceed as planned on program review schedule
___ Further review/Out of cycle in-depth review

Upon completion of section 6, the Program Review should be returned to department faculty and staff for review, then submitted to Instruction and Institutional Research for public posting. See timeline on page 1.

Appendix A

PROGRAM REVIEW DATA

10/26/12

Foothill College | **Mathematics-FD** | **Physical Scienc, Math & Engin**

Enrollment Trends

	2010-2011	2011-2012	% Inc
Unduplicated HC	5,188	5,362	3%
Enrollment	10,142	10,147	0%
Numb Sections	259	265	2%
WSCH	57,821	50,817	-12%
FTES	1,285	1,130	-12%
FTEF	27.8	31.0	12%
Productivity	693	546	-21%

Full and Part Time Faculty Load

	2010-2011	2011-2012	% Inc
FT Load	11.2	13.8	23%
FT Percent	40%	44%	10%
OV Load	4.4	5.1	16%
OV Percent	16%	16%	4%
PT Load	12.2	12.2	-0%
PT Percent	44%	39%	-11%
Total FTEF	27.8	31.0	12%

Course Success

	All Students			
	2010-2011		2011-2012	
	Grades	Percent	Grades	Percent
Success	5,649	59%	5,736	59%
NonSuccess	2,405	25%	2,404	25%
Withdrew	1,467	15%	1,624	17%
Total	9,521	100%	9,764	100%

Release/Re-assignTime

	2011 FTEF	2012 FTEF	% Inc FTEF
NonTeaching		0.27	
Teaching	4.22	3.44	-18%
Total	4.22	3.71	-12%

Course Success by Targeted Ethnic Groups

	Targeted Groups			
	2010-2011		2011-2012	
	Grades	Percent	Grades	Percent
Success	1,142	47%	1,355	48%
NonSuccess	793	33%	863	31%
Withdrew	482	20%	594	21%
Total	2,417	100%	2,812	100%

	Not Targeted Groups			
	2011-2012		2010-2011	
	Grades	Percent	Grades	Percent
Success	4,381	63%	4,507	63%
NonSuccess	1,541	22%	1,612	23%
Withdrew	1,030	15%	985	14%
Total	6,952	100%	7,104	100%

Distribution by Ethnicity

	2011-2012	
	Enr	Percent
African American	502	5%
Asian	3,281	32%
Decline to State	894	9%
Filipino	409	4%
Latino/a	2,031	20%
Native American	70	1%
Pacific Islander	135	1%
White	2,825	28%
Total	10,147	100%

Gender

	2011-2012	
	Enr	Percent
Female	4,820	48%
Male	5,327	52%
Total	10,147	100%

Age

	2011-2012	
	Enr	Percent
19 or less	3,254	32%
20-24	4,658	46%
25-39	1,864	18%
40 +	371	4%
Total	10,147	100%

Highest Degree

	2011-2012	
	Enr	Percent
BA/BS +	507	5%
AA/AS	219	2%
Special Admit	195	2%
All Other	9,226	91%
Total	10,147	100%

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PROGRAM REVIEW DATA

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Success Rates by Gender

	2011-2012							
	Success		NonSuccess		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
Female	2,825	61%	1,084	23%	728	16%	4,637	100%
Male	2,911	57%	1,320	26%	896	17%	5,127	100%

Success Rates by Age Group

	2011-2012							
	Success		NonSuccess		Withdrew		Total	
	Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
19 or less	2,049	64%	737	23%	405	13%	3,191	100%
20-24	2,401	54%	1,248	28%	812	18%	4,461	100%
25-39	1,088	62%	356	20%	325	18%	1,769	100%
40 +	198	58%	63	18%	82	24%	343	100%

Success Rates by Ethnicity (multiple years)

		Success		NonSuccess		Withdrew		Total	
		Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
African American	2011-2012	209	44%	162	34%	101	21%	472	100%
	2010-2011	182	41%	166	38%	93	21%	441	100%
Asian	2011-2012	2,091	66%	680	21%	420	13%	3,191	100%
	2010-2011	1,994	66%	645	21%	369	12%	3,008	100%
Decline to State	2011-2012	528	62%	195	23%	127	15%	850	100%
	2010-2011	739	65%	263	23%	141	12%	1,143	100%
Filipino	2011-2012	186	48%	114	29%	91	23%	391	100%
	2010-2011	180	52%	100	29%	67	19%	347	100%
Latino/a	2011-2012	960	49%	587	30%	402	21%	1,949	100%
	2010-2011	780	48%	527	32%	322	20%	1,629	100%
Native American	2011-2012	37	55%	17	25%	13	19%	67	100%
	2010-2011	40	47%	30	35%	16	19%	86	100%
Pacific Islander	2011-2012	58	45%	40	31%	32	25%	130	100%
	2010-2011	56	43%	41	32%	32	25%	129	100%
White	2011-2012	1,667	61%	609	22%	438	16%	2,714	100%
	2010-2011	1,678	61%	633	23%	427	16%	2,738	100%

Notes and Definitions

Data is for the fiscal year, including summer (and Foothill's early summer in 2011-12).

Figures include Apprenticeship.

Enrollment trends include students counted for apportionment for those report years.

Success data excludes students that dropped after census.

Ethnic data reporting prioritizes multi-ethnic students to targeted groups.

Cross-listed courses are included in home department.

WSCH:
Sum of quarterly End-of-Term Weekly Student Contact Hours. 4 Quarters.

FTES:
Fulltime equivalent students, (WSCH * 11.67) / 525.

FTEF:
Sum of teaching load factors for Summer, Fall, Winter, and Spring quarters, excluding all release/re-assignments.

FT and PT Load:
FT - Fulltime assignment types 0 and 3 (on load, paid and nonpaid).
PT - Parttime all other assignment types.
OV - Includes assignment type 2.

Productivity:
4-term total WSCH / 4-term total FTEF, excluding all release/re-assignments.

Success %:
Number of students receiving an A,B,C or P grade / total number of students receiving a grade.

Targeted Groups:
African Americans, Latinos, Filipinos

Release / Re-assign Time:
NonTeaching - 994 - Sick Leave
Teaching: -
991 - BHES
995 - PDL
996 - Release-Division
999 - Faculty Release-Contractual

PROGRAM REVIEW DATA 10/09/12

Foothill College **Mathematics-FD** **Physical Scienc, Math & Engin**

Enrollment Trends by Course (multiple years)

			2010-2011	2011-2012	% Inc
MATH	F001A	Enrollment	967	944	-2%
		Productivity	646	554	-14%
	F001B	Enrollment	750	756	1%
		Productivity	644	527	-18%
	F001C	Enrollment	456	380	-17%
		Productivity	632	486	-23%
	F001D	Enrollment	219	185	-16%
		Productivity	658	482	-27%
	F002A	Enrollment	209	196	-6%
		Productivity	538	507	-6%
	F002B	Enrollment	181	193	7%
		Productivity	652	580	-11%
	F010.	Enrollment	1,875	2,230	19%
		Productivity	704	541	-23%
	F011.	Enrollment	139	142	2%
		Productivity	626	533	-15%
	F012.	Enrollment	65	72	11%
		Productivity	549	546	-0%
	F017.	Enrollment		36	
		Productivity		180	
	F022.	Enrollment	69	73	6%
		Productivity	622	370	-40%
	F036.	Enrollment	4		-100%
		Productivity	167		-100%
	F044.	Enrollment	30	52	73%
		Productivity	541	395	-27%
	F048A	Enrollment		651	
		Productivity		576	
	F048B	Enrollment		246	
		Productivity		462	
	F048C	Enrollment		129	
		Productivity		487	
	F049.	Enrollment	791	342	-57%
		Productivity	714	599	-16%
	F051.	Enrollment	687	67	-90%
		Productivity	642	607	-5%
	F100.	Enrollment	1	96	9,500%
		Productivity	#INF	909	#NAN
	F100X	Enrollment	12	39	225%
		Productivity	58	1,175	1,937%

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PROGRAM REVIEW DATA

10/09/12

		2010-2011	2011-2012	% Inc
F100Y	Enrollment	19	39	105%
	Productivity	93	326	250%
F105.	Enrollment	1,400	1,312	-6%
	Productivity	678	488	-28%
F108.	Enrollment	23	67	191%
	Productivity	380	503	32%
F217.	Enrollment		49	
	Productivity		325	
F220.	Enrollment	634	558	-12%
	Productivity	635	566	-11%
F221.	Enrollment	631	553	-12%
	Productivity	612	559	-9%
F224.	Enrollment	24	43	79%
	Productivity	432	769	78%
F230.	Enrollment	242	177	-27%
	Productivity	1,360	852	-37%
F230J	Enrollment		19	
	Productivity		284	
F230X	Enrollment	18		-100%
	Productivity	280		-100%
F231.	Enrollment	433	271	-37%
	Productivity	2,187	2,053	-6%
F234.	Enrollment	62	27	-56%
	Productivity	1,117	500	-55%
F235.	Enrollment	192	185	-4%
	Productivity	#INF	2,483	#NAN
F236.	Enrollment	9	18	100%
	Productivity	#INF	#INF	#NAN

PROGRAM REVIEW DATA 10/09/12

Foothill College **Mathematics-FD** **Physical Scienc, Math & Engin**

Success Rates by Course (multiple years)

			Success		NonSuccess		Withdrew		Total	
			Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
MATH	F001A	2010-2011	530	57%	239	26%	153	17%	922	100%
		2011-2012	467	52%	255	28%	181	20%	903	100%
	F001B	2010-2011	356	52%	206	30%	121	18%	683	100%
		2011-2012	400	55%	183	25%	141	19%	724	100%
	F001C	2010-2011	261	62%	93	22%	64	15%	418	100%
		2011-2012	219	61%	79	22%	61	17%	359	100%
	F001D	2010-2011	134	64%	51	24%	25	12%	210	100%
		2011-2012	100	55%	54	30%	27	15%	181	100%
	F002A	2010-2011	155	83%	15	8%	16	9%	186	100%
		2011-2012	140	75%	22	12%	24	13%	186	100%
	F002B	2010-2011	130	75%	31	18%	12	7%	173	100%
		2011-2012	122	65%	49	26%	16	9%	187	100%
	F010.	2010-2011	1135	64%	375	21%	260	15%	1770	100%
		2011-2012	1420	66%	378	17%	364	17%	2162	100%
	F011.	2010-2011	87	66%	24	18%	20	15%	131	100%
		2011-2012	87	66%	22	17%	23	17%	132	100%
	F012.	2010-2011	49	77%	5	8%	10	16%	64	100%
		2011-2012	37	54%	12	17%	20	29%	69	100%
	F017.	2011-2012	24	69%	7	20%	4	11%	35	100%
	F022.	2010-2011	39	62%	11	17%	13	21%	63	100%
		2011-2012	51	72%	10	14%	10	14%	71	100%
	F036.	2010-2011	4	100%					4	100%
	F044.	2010-2011	25	83%	1	3%	4	13%	30	100%
		2011-2012	38	75%	5	10%	8	16%	51	100%
	F048A	2011-2012	244	39%	215	34%	169	27%	628	100%
	F048B	2011-2012	131	54%	68	28%	44	18%	243	100%
	F048C	2011-2012	80	63%	37	29%	11	9%	128	100%
	F049.	2010-2011	437	59%	191	26%	119	16%	747	100%
		2011-2012	249	74%	62	18%	26	8%	337	100%
	F051.	2010-2011	258	41%	191	30%	179	29%	628	100%
		2011-2012	34	55%	12	19%	16	26%	62	100%
	F100.	2010-2011			1	100%			1	100%
		2011-2012	81	91%	8	9%			89	100%
	F100X	2010-2011	7	64%	3	27%	1	9%	11	100%
		2011-2012	26	84%	5	16%			31	100%
	F100Y	2010-2011	6	35%	10	59%	1	6%	17	100%
		2011-2012	29	85%	5	15%			34	100%
	F105.	2010-2011	650	49%	450	34%	218	17%	1318	100%
		2011-2012	543	44%	429	34%	275	22%	1247	100%
	F108.	2010-2011	8	35%	12	52%	3	13%	23	100%
		2011-2012	48	72%	15	22%	4	6%	67	100%
	F217.	2011-2012	33	67%	15	31%	1	2%	49	100%
	F220.	2010-2011	342	57%	178	30%	82	14%	602	100%
		2011-2012	296	55%	161	30%	86	16%	543	100%
	F221.	2010-2011	341	57%	176	30%	78	13%	595	100%

PROGRAM REVIEW DATA

10/09/12

		Success		NonSuccess		Withdrew		Total	
		Grades	Percent	Grades	Percent	Grades	Percent	Grades	Percent
	2011-2012	296	55%	159	29%	85	16%	540	100%
F224.	2010-2011	12	55%	9	41%	1	5%	22	100%
	2011-2012	28	65%	14	33%	1	2%	43	100%
F230.	2010-2011	109	48%	73	32%	43	19%	225	100%
	2011-2012	81	47%	76	44%	15	9%	172	100%
F230J	2011-2012	13	68%	5	26%	1	5%	19	100%
F230X	2010-2011	11	61%	6	33%	1	6%	18	100%
F231.	2010-2011	335	81%	37	9%	43	10%	415	100%
	2011-2012	231	94%	14	6%			245	100%
F234.	2010-2011	28	62%	17	38%			45	100%
	2011-2012	22	81%	3	11%	2	7%	27	100%
F235.	2010-2011	191	100%					191	100%
	2011-2012	148	81%	25	14%	9	5%	182	100%
F236.	2010-2011	9	100%					9	100%
	2011-2012	18	100%					18	100%