BASIC PROGRAM INFORMATION

Program Review is about documenting the discussions and plans you have for improving student success in your program and sharing that information with the college community. It is also about linking your plans to decisions about resource allocations. With that in mind, please answer the following questions.

Department Name: Department of Mathematics

Division Name: Physical Sciences, Mathematics and Engineering Division

Please list all team members who participated in this Program Review:

Name	Department	Position
Jeffery Anderson	Mathematics	Faculty
Zachary Cembellin	Mathematics	Faculty
Marnie Francisco	Mathematics	Faculty
Nicole Gray	Mathematics	Faculty
Marc Knobel	Mathematics	Faculty
Phuong Lam	Mathematics	Faculty
Debbie Lee	Mathematics	Faculty
Matthew Litrus	Mathematics	PT - Faculty
Rick Martinez	Mathematics	Faculty
Patrick Morriss	Mathematics	Faculty
Rachel Mudge	Mathematics	Faculty
Sarah Munoz	Mathematics	Faculty
Young Hee Park Lee	Mathematics	Faculty
Kathy Perino	Mathematics	Faculty
Jennifer Sinclair	Mathematics	Faculty
Brian Stanley	Mathematics	Faculty
Sarah Williams	Mathematics	Faculty
Teresa Zwack	Mathematics	Faculty

Number of Full Time Faculty: 17 **Number of Part Time Faculty:** 30

Please list all existing Classified positions: *Example: Administrative Assistant I*

none

List all programs covered by this review and indicate the program type:

ADT - Mathematics	☐ Certificate	☐ AA / AS	☒ AD-T	☐ Pathway
Mathematics AS degree	☐ Certificate	☒ AA / AS	☐ AD-T	☐ Pathway
Basic Skills Mathematics	☐ Certificate	☐ AA / AS	☐ AD-T	☒ Pathway
General Ed Transfer Mathematics	☐ Certificate	☐ AA / AS	☐ AD-T	☐ Pathway
STEM Prep Mathematics	☐ Certificate	☐ AA / AS	☐ AD-T	☒ Pathway

SECTION 1: PROGRAM DATA & ENROLLMENT

1A. Transcriptable Program Data: Data will be posted on Institutional Research's website for all measures except non-transcriptable completion. You must manually copy data in the boxes below for every degree or certificate of achievement covered by this program review.

Transcriptable Program	2013-2014	2014-2015	2015-2016
AS Mathematics	4	12	11

1B. Non-Transcriptable Program Data: Please provide any non-transcriptable completion data you have available. Institutional Research does not track this data; you are responsible for tracking this data.

Non-Transcriptable Program	2013-2014	2014-2015	2015-2016

Please provide the rationale for offering a non-transcriptable program and share the most recent program completion data available.

NCBS 401A/401B certification???

1C. Department Level Data:

	2013-2014	2014-2015	2015-2016
Enrollment	**10022**	**10056**	**10638**
Productivity	**520**	**551**	**575**
Course Success	**60%**	**61%**	**62%**
Full-Time Load (FTEF)	**16.5**	**14.8**	**15.4**
Part-Time Load (FTEF)	**13.5**	**13.1**	**12.5**

1D. Enrollment Trend:

Program Enrollment (Over Past 3 Years): ☒ Increase ☐ Steady/No Change ☐ Decrease

1E. Course Success Trends: Please describe course success trends for the following student groups and compare the program-level data with the college-level data.

	Program-Level Trend			College-Level Comparison		
	Increase	Steady/No Change	Decrease	Above	At Level	Below
African American	☐	☒	☐	☐	☐	☒
Asian	☐	☐	☒	☐	☐	☒
Filipino	☐	☒	☐	☐	☐	☒
Latino/a	☒	☐	☐	☐	☐	☒
Native American	☐	☒	☐	☐	☐	☒
Pacific Islander	☐	☒	☐	☐	☐	☒
White	☐	☐	☒	☐	☐	☒
Decline to State	☐	☐	☒	☐	☐	☒

1F. Course Success Demographics: Please compare the program-level course success rate data for the following student groups with the college-level data.

Male:	☐ Above Level	☐ At Level	☒ Below Level
Female:	☐ Above Level	☐ At Level	☒ Below Level
<25 Years Old:	☐ Above Level	☐ At Level	☒ Below Level
>25 Years Old:	☐ Above Level	☐ At Level	☒ Below Level

1G. Equity: One of the goals of the College's Student Equity plan is to close the performance gap for disproportionately impacted students, including African-American, Hispanic/Latino, and Filipinos/Pacific Islanders. If the course success rates for these students (or other groups not listed above, such as foster youth, veterans, and students with disabilities) is below that of the College, what is your program doing to address this?

Eric Reed, the coordinator of the STEM Center has put an embedded tutor in many of our lower level math classes, which are the classes that have a disproportionately higher level of students from impacted populations. For example, every section of Math 230/235 NCBS 401A/B had a trained embedded student tutor last year and every face-to-face section of Math 105/108/220 and all the Statway sections had a faculty embedded tutor last year (with the exception of one adjunct instructor who did not wish to participate). Some sections of Math 48A/48C had a trained embedded student tutor, based on instructor request.

The STEM Center also offered facilitated study groups in any course based on requests from students, with a STEM center instructor attending one hour per week, approximately ten such groups formed each quarter last year. In the beginning of winter quarter, students who were attempting Math 105 or Math 220 for the third time were proactively offered a one-on-one tutor one hour per week and early alert students were offered a one-on-one tutor one hour per week.

Four of our full time faculty members are attending the year-long FTLA (faculty teaching and learning academy) professional development program. This program requires eight summer days and eight Friday afternoons so there is clear commitment to the college equity goals. These four instructors will be talking about their findings with the department.

Some instructors are participating in school wide conversations regarding race, including Beyond Diversity workshops and Courageous Conversations. The idea of these conversations is to explore and recognize our own privileges in the hopes that we start to understand where some of the students may be coming from.

The STEM Core Program also provides a supportive pathway and cohort to students that are interested in a STEM Pathway and more than 50% of the students in the current cohort are from disproportionately impacted populations. Some examples include providing students with textbooks, calculators, and extra weekly workshops in both academia and work related activities. The students are also "watched" on a daily basis for any issues that come up both inside and outside of the classroom and addressed accordingly.

We are also likely going to be holding a special NCBS course targeted at Umoja students in winter quarter and possibly a section of Math 220 in the Spring quarter. Hopefully those classes can build on the cohort model and help more students to be successful.

1H. Course Enrollment: If there are particular courses that are not getting sufficient enrollment, are regularly cancelled due to low enrollment, or are not scheduled, discuss how your program is addressing this.

Back in 2012 when we offered more sections of almost every class, many of those extra classes were cancelled. Now that our dean has a better handle on enrollment trends we have had to cancel very few classes. There is only one course that we don't offer on a regular basis because it is no longer the prerequisite class and therefore has seen low enrollment.

1I. Productivity: Although the college productivity goal is **535**, there are many factors that affect productivity (i.e. seat count / facilities / accreditation restrictions).

Program Productivity Trend: ☒ Increase ☐ Steady/No Change ☐ Decrease
Program Productivity (Compared to College): ☒ Above Goal ☐ At Goal ☐ Below Goal

Please discuss what factors may be affecting your program's productivity.

Up by 12.6% over the past 4 years

If your program's productivity is below that of the College, please discuss your program objectives aimed at addressing this.

N/A

SECTION 2: COURSE COMPLETION & PROGRAM IMPROVEMENT

2A. Institutional Standard: This represents the lowest course completion (success) rate deemed acceptable by the College's accrediting body (ACCJC). The institutional standard is **57%**.

Program Level Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard
Targeted Student Course Completion:	☐ Above Standard	☐ At Standard	☒ Below Standard
Online Student Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard
In-Person/Hybrid Course Completion:	☒ Above Standard	☐ At Standard	☐ Below Standard

2B. Institutional Effectiveness (IEPI) Goal: This represents an aspirational goal for course completion (success) rates; all programs should strive to reach/surpass this goal. The IEPI goal is **77%**.

Program Level Course Completion:	☐ Above Goal	☐ At Goal	☒ Below Goal
Targeted Student Course Completion:	☐ Above Goal	☐ At Goal	☒ Below Goal
Online Student Course Completion:	☐ Above Goal	☐ At Goal	☒ Below Goal
In-Person/Hybrid Course Completion:	☐ Above Goal	☐ At Goal	☒ Below Goal

Please comment on your program's efforts to continually improve course completion (success) rates, especially for students with basic skills needs.

Statway – Math 217 and Math 17 (formerly Math 57)
The department continues to offer Statway as an alternative pathway to complete the algebra and statistics requirements. Last year, although Statway had relatively low enrollment, the program had a success rate of 65% for Math 217 (the first portion of Statway) and 87% for Math 17 (the second portion

of Statway). C-ID has now accepted Statway as a prerequisite for Math 10 and the UC's are allowing articulation of Statway, which may help attract more students and increase enrollment.

Embedded Tutors and Supplemental Instructors

Supplemental instructors from the STEM Center helped out in Math 220, Math 105, Math 108 and Statway last year and the year before. These instructors were in those classes once a week. The results are slightly mixed as course success rates were up in Math 105 and 108 but down in Math 220.

Embedded tutors were placed in Math 235/230, NCBS 401 A/B, in about one fourth of Math 48A classes (by instructor request) and just a handful of Math 48C classes (by instructor request). Embedded tutors have been used for two years in some Math 48A classes, one year in Math 235/230 and Math 48C classes. These tutors are students who help in the class and hold breakout sessions for the students outside of class time. While the tutors are available to the Math 235/230 students outside of class upon request, breakout sessions are not regularly held for Math 235/230. The use of embedded tutors did not seem to make a difference in the overall success rates for these courses. Compared to last year, the course success rates were flat in Math 235 and Math 230, decreased for both Math 48A and Math 48C. The embedded tutoring program has requested data comparing success rates in classes with embedded tutors to those without, but has not yet received the data from institutional research.

Multiple Measures Pilot Program

This year, if students could show that they took and passed intermediate algebra in high school with a targeted minimum GPA, they were placed directly into Math 10 (statistics). Since this fall is the first quarter of the pilot, we do not know how well these students are doing. However, the math department is hopeful that students will come into their math classes without resentment in needing to repeat courses they already took in high school, and thereby performing up to the level they were placed into. The multiple measures program will be expanded to include other math courses.

STEM Center Workshops and Study Groups

The STEM Center provides a supplemental instructor to students who wish to form study groups in any of our math courses. Provided that there is a minimum of 4 students interested in forming a study group, the STEM Center will coordinate efforts to get the study group started. Approximately 10 such study groups were formed each quarter last year.

Foundations Lab

This year, the Foundations Lab is placed in a larger classroom to accommodate the growing number of basic skills students looking for assistance with their math coursework.

Owl Scholars' Program

The Owl Scholars program, formerly known as Early Alert, provides early intervention methods for students who have been identified by their instructors as needing more resources to succeed in their math class. The program is available to students in Math 220, 105 and 1A for now. We do not yet have data on how well the program is working.

STEM Core

STEM Core is a new program funded by a state grant and was implemented in the fall 2016 quarter. The program targets students who have placed into Math 105 and have an interest in obtaining a STEM degree. These students are put in a cohort to complete Math 105 in the fall, Math 48A & 48B in the winter and Math 48C in the spring. Additionally, this cohort of students also takes courses in computer

science and engineering to adequately prepare them for the possibility of STEM internship after one year. Math courses include an embedded tutor inside the classroom who also holds weekly workshops outside the classroom. The STEM Core director monitors student's progress daily including attendance and tardiness in addition to academic progress in the courses. Since this program just started, there is no data or results to comment on yet. So far, 56% of the students in this program are of the disproportionate population.

Beyond Diversity and Courageous Conversations
Individual faculty members in the department are attending these workshops and conversations. The idea behind these workshops is for individuals to explore their privileges and be more aware and understanding of others who may not have the same privileges. Change in actual teaching pedagogy will come after individuals have a better understanding of themselves.

FTLA (Faculty Teaching and Learning Academy)
Four of our full time faculty members are attending this year-long professional development program and will be sharing what they learned with the department.

Umoja cohort
In the early winter quarter, we will run a non-credit basic skills course (6 weeks) to prepare students from the Umoja cohort for Math 220 in the spring quarter.

If your program's course completion (success) rates are below the institutional standard (see above), please discuss your program objectives aimed at addressing this.

All of the math courses with the exception of Math 57 (now Math 17), have course success rates below the institutional standard for targeted groups of students.
One of the department's program objectives is to improve success rates among students from targeted groups.
What we would like to do is:
1) Improve our own cultural awareness and identities by attending Courageous Conversations and Beyond Diversity workshops.
2) Improve our pedagogical practices by attending professional development and learning about what works with students from our targeted groups such as universal design.
3) Become aware of stereotype threat and what we can do in our classes to combat this.
4) Develop and share effective teaching materials.
5) Provide support and guidance for adjunct faculty.

2C. Faculty Discussion: Does meaningful dialogue currently take place in shaping, evaluating, and assessing your program's Student Learning Outcomes (SLOs)? ☒ Yes ☐ No

Does meaningful dialogue currently take place around equity and course success rates? ☒ Yes ☐ No

If yes, in what venues do these discussions take place? (Check all that apply)
☒ Department Meetings ☐ Opening Day ☒ Online Discussions ☒ Other:
If no, please discuss what is missing and/or the obstacles to ensuring meaningful dialogue takes place.

Many of the faculty members of our department talk to their colleagues on a daily basis about the course they are teaching and the methods they are trying to reach students and increase student success. However, although those conversations of a few faculty members at a time happen on a regular basis it is rare that the full department has an opportunity to have those conversations and generally there are few if any part-time faculty. In large, part this is because most of our department meeting are now taken up with the business of Program Review, SLO administration and curriculum. We have found that finding common times to meet is difficult and very often does not include part-time faculty. Some faculty in the department feel the college should set aside time for faculty to have meaningful dialogue and exchange ideas about their courses and for these days to include both full-time and part-time faculty.

2D. Course-Level: How has assessment and reflection of course-level Student Learning Outcomes (CL-SLOs) and course completion data led to course-level changes?

Many faculty members in our department make changes to our courses in the hopes of improving student success regardless of reflections and SLO's. Here are changes that the department has made this year through reflection of their own teaching:

- Some instructors are changing their courses to include more flip activities.
- The math department recently changed the calculus textbook, which has more graphics and interactive sliders accessible through the e-book to help students visualize difficult concepts.
- Quantway materials were tested in Math 108 in 15/16.
- Some instructors are revising their course syllabi to take on a learning-centered approach.
- Instructors are increasing the offerings of Math 235/230 by running evening sections.
- The department has adopted a new graphing technology policy no longer requiring specifically the TI-83/84 graphing calculator for our courses. Instead, students would be able to use free graphing technology that can be accessed from a laptop or tablet or smart phone.

The department had discussion on how we might offer math courses that can be alternatives to Math 220 and Math 105, and the conversations continue. The pathways that ultimately get created at Foothill will undoubtedly be influenced by what happens around the state and acceptance of transfer courses at CSU and UCs that do not have the traditional Intermediate Algebra prerequisite.

If your program's CL-SLOs are not being met, please indicate your program objectives aimed at addressing this.

CL-SLO targets were not met last year in Math 108, Math 105, Math 10, Math 48A and Math 1C. (Some of this is due to the randomness of setting targets.)
The following program objectives will help improve instructors' ability to teach and student ability to learn mathematical concepts in these classes: (1) Provide support and guidance for adjunct faculty members, (2) Improve pedagogical practices, (3) Share good teaching materials, (4) Develop videos, handouts and other material to support student learning. These objectives are described more in the next section.

2E. Program-Level: How has assessment and reflection of program-level Student Learning Outcomes (PL-SLOs) led to certificate/degree program changes and/or improvements?

Calculus Program : AD-T Pathway

Based on the data for Math 1A/B/C, we see that most students who start in Math 1A do not complete Math 1C in 1 year. But, we have to consider that most non-STEM majors who are required to take the regular STEM track calculus courses are only required to take one or two quarters of the course sequence . We continue to offer calculus study groups and study sessions at the end of the quarter.

STEM Prep

Based on the data for Math 48A/B/C, we see that most students who start in Math 48A do not complete Math 48C in one year. Some of the reasons for this might include:

- Students are using Math 48A to satisfy the UC and CSU requirement for Quantitative Reasoning and are not interested in pursuing math beyond this level.
- Students are taking Math 48A as a prerequisite for Math 12 and are not interested in continuing the precalculus sequence.

We are looking to possibly change the textbook to something that may be easier for students and PT faculty to use. We are also looking to possibly changing the 48 sequence into a 2-quarter sequence provided that 105 can be made into a more robust course and absorb some of the 48A material.

Basic Skills

We are awaiting data on how students perform going from M230/235 to M220 to M105. The success rates for Math 230 this year was 59% and for Math 235, it was 35%. The Math 230/235 instructors are looking into making changes to improve the success rates in those courses. The department is looking into offering alternatives to Math 220 and Math 105.

What is being done at the program-level to assist students in achieving degree/certificate completion and/or transferring to a four-year institution?

The math department offers courses that are prerequisites to other courses. The number of students who are math majors is generally less than 10 per year.
We are offering Math 1A – honors which hopefully will inspire students to major in math. In addition, the math instructors teaching collegiate level courses are passionate about the subject and teach in such a way that shows our students the wonders of the mathematical world.

If your department has a Workforce/CTE program, please complete Section 2F.
If your department does not have a Workforce/CTE program, please skip to Section 3.

2F. Workforce/CTE Programs: Refer to the program review website for labor market data.

What is the regional three-year projected occupational growth for your program? N/A

What is being done at the program-level to assist students with job placement and workforce preparedness?

N/A

If your program has other program-level outcomes assessments (beyond SLOs and labor market data), discuss how that information has been used to make program changes and/or improvements.

N/A

SECTION 3: SUMMARY OF PROGRAM OBJECTIVES & RESOURCE REQUESTS

3A. Past Program Objectives: Please list program objectives (not resource requests) from past program reviews and provide an update by checking the appropriate status box.

1. Improve pedagogical practices • Foster ongoing conversations about pedagogy • Seek continue professional development	Year: 14 - 15	☐ Completed	☒ Ongoing	☐ No Longer a Goal
2. Share teaching materials	Year: 14 -15	☐ Completed	☒ Ongoing	☐ No Longer a Goal
3. Develop videos and handouts to support student learning	Year: 14 - 15	☐ Completed	☒ Ongoing	☐ No Longer a Goal
4. Develop means to track students across courses	Year: 14 - 15	☐ Completed	☒ Ongoing	☐ No Longer a Goal
5. Provide support and guidance to adjunct faculty	Year: 14 - 15	☐ Completed	☒ Ongoing	☐ No Longer a Goal
6. Develop STEM Center to support student success **(Transferred to Eric Reed)**	Year: 14 – 15	☐ Completed	☐ Ongoing	☒ No Longer a Goal
7. Enhance outreach to students to increase retention and success rates **(Transferred to Eric Reed)**	Year: 14 – 15	☐ Completed	☐ Ongoing	☒ No Longer a Goal
8. Build STEM Career Information in STEM Center	Year: 14 – 15	☐ Completed	☐ Ongoing	☒ No Longer a Goal

(Transferred to Eric Reed)				
9. Acquire institutional support to facilitate video production **(Transferred to Online Learning)**	Year: 14 - 15	☐ Completed	☐ Ongoing	☒ No Longer a Goal

Please comment on any challenges or obstacles with ongoing past objectives.

Ongoing Program Objective 1: Improve pedagogical practices

To improve pedagogical practices in our courses, the math department's Jennifer Sinclair facilitated a series of discussions during the 2015 – 2016 academic year. These meetings focused on student success and improving teaching practices. We noticed two obstacles:

1. It is not easy to schedule weekly meetings during a time that all faculty members are free.

2. Faculty members are busy teaching full loads and fulfilling other responsibilities on campus. Participating in continual professional development is hard work. Currently, no clearly articulated procedures exist to guide faculty members in organizing professional development activities that count for PGA/PAA credit. Because these guidelines don't currently exist, our team had a hard time incentivizing Math faculty to attend these meetings regularly. Thus, attendance for last year's meetings was consistently low.

Ongoing Program Objective 4: Develop a means to track students across courses

During the 2015 – 2016 academic year, the Math department attempted to study a number of important questions about student success rates in our courses. We believed the best way to research student success is based on data. We created a list of data requests related to student success and submitted these requests to Foothill's Office of Institutional Research. The following obstacles prevented us from placing these requests and getting results in a timely manner:

1. Our department was not universally aware of any document or online resource that introduces Foothill's policies and procedures for submitting research request to the Office of Institutional Research. This seems to be in opposition to the encouragement to make decisions based on data.

2. Often, we had to wait months between the date we submitted a data request and the date we received said data from the Office of Institutional Research.

Ongoing Program Objective 5: Provide support and guidance to adjunct faculty:

The Math Department is the largest department on Foothill's campus as measured by Weekly Student Contact Hours (WSCH) and by the total number of faculty that teach our courses. The table below illustrates the Math department's reliance on part-time faculty during the 2015 –

2016 academic year. This data is from the Math Department's internal scheduling spreadsheets.

2015 – 2016 Academic Year: Foothill Math Department's Use of Part-time Faculty			
Quarter:	Total Number of Sections Scheduled	Number of Sections for which Full-Time Math Faculty are the Instructor of Record	Number of Sections for which Part-time Math Faculty are the Instructor of Record
Fall 2015:	85	43	42
Winter 2016:	78	41	37
Spring 2016:	71	46	25
TOTAL:	234	130	104

As seen above, the math department does not have enough full-time faculty members to teach all of the courses we offer. So more than 100 of the sections offered were taught by part-time faculty during the 2015 – 2016 academic year. The strategy of hiring part-time instructors to "fill in the gaps" provides a huge benefit to our campus by allowing our department to serve more students.

In order to maintain the high standard of teaching and improve our success rates for targeted students in all classes, our department must ensure that part-time faculty members are sufficiently supported and familiar with campus infrastructure so that they can focus on the quality of their instruction. To do this, our department must be able to:

- provide orientation to Foothill's campus and classroom technology
- provide virtual tour of Foothill's MyPortal
- work closely with the dean and scheduler for part-time teaching assignments
- set up part-time faculty members with Learning Management Systems for online HW and e-books
- provide necessary course materials to part-time faculty members including textbooks and calculators
- write and send at least 4 communiqués to part-time faculty each quarter
- serve as liaison between part-time and full-time faculty members by inviting part-time faculty to department meetings
- answer e-mails/questions PT faculty have regarding curriculum
- share course teaching materials from seasoned full-time faculty members including sample green sheets, COR's, sample quizzes, and sample exams
- guide part-time faculty to get involved with professional development on campus

- work closely with PT faculty to answer ongoing questions and provide guidance and feedback regarding classroom policies, appropriate levels of assessments, preventative measures necessary to help maintain academic integrity among students, and other student/classroom issues.

While the Math department needs part-time faculty members to meet the teaching load of each quarter, we currently do not have reassign time allocated to support part-time instructors. This is a major challenge. Without reassign time, full-time faculty must find time outside of their normal teaching load to complete all of the items list above. As the quarter gets busy, our ability to support part-time faculty is diminished. We feel very strongly that this arrangement is not in the best interest of our department as we work to improve student success.

Please provide rationale behind any objectives that are no longer a priority for the program.

Past Program Objectives 6 – 8:

Eric Reed was hired as the first full-time, permanent faculty director of Foothill's STEM Center in September 2013. Since that date, the Math Department has worked to support Mr. Reed in developing this center. In the first few years of operations, our department worked closely with Eric to ensure the best tutorial support possible for our students. We actively discussed these items during department meetings and created faculty work groups to coordinate with Mr. Reed about what we would like to see in the STEM Center.

However, year after year, Mr. Reed has demonstrated great competence in his work. He has significantly enhanced the STEM Center's capacities while actively consulting our department. We know that he understands our perspectives and will consult us when needed.

We consider the past program objectives 6 – 8 to be part of the daily function of the STEM Center. Of course, our math faculty members still actively contribute to this center. However, unless there is a specific issue that needs renewed discussion or guidance, we provide this support as part of the structure of our classes. Because we are confident in Eric Reed's ability as the director the STEM Center, our department has decided to narrow the focus of our program objectives to specific measures we can take in our classes to improve success rates for students from targeted groups.

Past Program Objective 9: Acquire institutional support to facilitate video production

Peter Murray (PSME Dean from 2005 - 2013) did Foothill College a great service in purchasing over $60,000.00 of video production equipment in Spring 2014. This included a green screen, studio lighting, a video-editing computer system and digital cameras. During the 2015 – 2016 academic year, Mark Anderson (Dean of Fine Art) provided $50,000.00 categorical funding to pay an outside consultant to act as a technician in the video production facility.

Lori Silverman and Jeff Anderson helped guide Peter Murray's purchasing decisions for the video product equipment mentioned above. As part of this work, both Jeff and Lori thought very deeply about how to use video in Foothill Classes to improve student success rates. These discussions centered on the use of video in math classes. However, Jeff and Lori soon realized

that the medium of video should not be limited to math faculty members.

From Winter 2015 – Spring 2016, Math faculty members Lori Silverman and Jeff Anderson spent significant energy working to integrate this recording studio into Foothill College's institutional structure. However, this task was very difficult. While many faculty and staff members showed strong interest in this project, only Judy Baker engaged in a discussion about the implications of this project for improving Foothill College. Trying to implement this type of institutional change without support from all levels of administration proved to be extremely difficult.

To be effective as a resource for the entire campus (and not just the math department), we propose that Foothill create a video production studio that has a dedicated space on campus and is permanently funded by the appropriate division on campus. This includes support for a video production technician and a recurring budget for upgrading studio facilities.

Judy Baker proposed that such a facility would fit very nicely within the goals of Online Learning by providing support for faculty teaching online courses and augmenting the online support system on campus. Because the math department is focused on student success in math courses and the objective is wider reaching than our department, we decided to support Dean Baker in including a request for this facility in her 2015 – 2016 Program Review for Online Learning.

3B. New Program Objectives: Please list all new program objectives discussed in Sections 1-2; do not list resource requests in this section.

Program Objective	Implementation Timeline	Progress Measures
1. Improve student success rates, particularly for underserved students by a. Improving pedagogical practices b. Sharing teaching materials c. Developing videos and handouts to support student learning d. Providing students with necessary resources to succeed in our classes e. Developing mechanisms to track students across courses f. Providing support and guidance for part-time faculty members	Fall 2016 – Spring 2020	Success rates for individual courses Success rates for math department

2. Improve efficiency in math department planning and management by:	Fall 2016 – Spring 2018	
a. Scheduling math department classes in a timely manner	Ongoing each quarter	
b. Creating math department meeting schedules at the start of each academic year	Each fall quarter	
c. Deciding on and implementing a common platform to share math department resources and materials	Fall 2016 – Spring 2017	
d. Create and maintain clear policies and procedures for department management tasks	Fall 2016 – Spring 2018	

3C. EMP Goals. Please refer to the Educational Master Planning (EMP) website for more information. Indicate which EMP goals are supported by your program objectives (Check all that apply).
☒ Create a culture of equity that promotes student success, particularly for underserved students.
☒ Strengthen a sense of community and commitment to the College's mission; expand participation from all constituencies in shared governance.
☐ Recognize and support a campus culture that values ongoing improvement and stewardship of resources.

3D. Resource Requests: Using the table below, summarize your program's unfunded resource requests. Refer to the Operations Planning Committee (OPC) website for current guiding principles, rubrics and resource allocation information. Be sure to mention the resource request in your narrative above when discussing your program so the request can be fully vetted.

Resource Request	$	Program Objective (Section 3B)	Type of Resource Request			
			Full-Time Faculty/Staff Position	One-Time B-Budget Augmentation	Ongoing B-Budget Augmentation	Facilities and Equipment
Mathematica Software License	$5500 annual	1d	☐	☐	☐	☒
	$500	1d	☐	☐	☐	☒

MATLAB Software License	annual + $1500 every 3 years					
MathType Software License	$5000	1d	☐	☐	☐	☒
Math Department Retreats	$3200 annual	all	☐	☒	☐	☐
Math My Way TA's	$50k annual	1d	☐	☒	☐	☐
Let's Play Math	$2,000 annual	Community outreach for faculty and students.	☐	☒	☐	☐
Embedded Tutors from STEM center in Math Classes	$20K annual	1d	☐	☒	☐	☐

3E. Unbudgeted Reassigned Time: Please list and provide rationale for requested reassign time.

The department requests 1.0 FTEF reassign time for full-time faculty to serve as department coordinator. The duties of the coordinator should encompass

> Scheduling and facilitating department meetings
> Maintaining and disseminating records of departmental action
> Scheduling classes
> Mentoring part-time faculty
> Recruiting and hiring new part-time faculty

In Fall 2015, administration authorized the expense of $10,000 to serve as stipends for full-time faculty to perform many of these duties (and others) and left it to the department to decide who should take on which tasks and how the stipend should be divided. The stipend form of compensation and the amount offered proved to be wholly inadequate for the work involved.

The stipend form for these tasks is inappropriate in our view for two reasons: 1) it offers no relief from other duties, and 2) the work continues through school breaks and into the summer, especially in the

case of part-time faculty mentoring and hiring.

As a result, any faculty member accepting a stipend in return for performing these duties simply must work more hours. In effect, a stipend is mandatory overtime pay for the person who chooses to be a leader in the department. This form of compensation limits the pool of full-time faculty candidates for the position to those able and willing to work overtime.

As a consequence of the second reason, especially in the case of hiring part-time faculty, the work continues beyond the end of the school year, and in fact can become more demanding at that time. As noted in earlier sections, hiring excellent part-time instructors is essential to the department in meeting our goals of improving student success and closing achievement gaps. It is consequently essential to compensate full-time faculty in the summer term to allow conscientious completion of this important task.

The amount of the stipend is also inadequate for the work involved. For instance, one full-time faculty member (Morriss) accepted $2000 of the departmental stipend to share the duties of part-time mentoring and hiring with another faculty member (Lee). In return for the $2000, Morriss worked 76 hours, for an average compensation of $26 per hour. A typical rate of faculty compensation for non-instructional work (from Schedule G of the Faculty Association Agreement with the district) is double that. Morriss worked 19 total hours in Fall 2015 and Winter 2016, and in Spring 2016 when he assisted with part-time faculty hiring he worked 57 hours. In the spring Patrick kept a detailed invoice type log of the hours he work, and he's willing to sit down and discuss the log with any appropriate administrators who are interested in hearing more about what's needed for that position and to support part-time Math instructors.

3F. Please review the resource requests that were granted over the last three years and provide evidence that the resource allocations supported your objectives and led to student success.

Math software licenses

The dean reported that the requested software licenses were paid for with lottery funds and over the last couple of years these have been consistently funded that way.

Mathematica is an indispensable tool used by students and faculty for visualization, particularly of mathematics in 3-D. Many of the faculty teaching calculus let their students know that the software is available for use in the STEM center. Additionally, faculty members use Mathematica so that they are able to have students do assignments with more robust computation than one would normally ask students to do by hand, an important aspect of 21st Century learning. Faculty members also use the software to help create graphics for exams.

Zachary Cembellin notes that, he has found that the students who use it the most tend to be the computer science majors, as they enjoy learning the coding and syntax. In his 1AH class this quarter alone, he has about 1/3 the class currently using it on a daily basis during class lessons. Students follow along the lesson and use it to help them with problems that he asks them to try during class. In 1AH, he

has them do formal, typed-up projects, and many of the students use the Mathematica software in completing their projects. The Math 1A honors students also make use of the MATH Type license in creating the various types of assignments required for the class.

The department believes that having this software available for students to use in the STEM Center and also in particular computer labs is very beneficial. It gives students access to software needed to complete assignments for some class and also is used as a tool by some students to help them to learn about concepts that would be more difficult to grasp without the use of technology. We also note that having the software available through the STEM center ensures more equitable access to these valuable tools.

Classroom set of Graphing Calculators

We were able to purchase 300 scientific calculators that will be placed in the library next quarter provided that they arrive in time to allow them to be processed during the winter break. These calculators will allow faculty members to check-out classroom sets for students to use during activities in class, or during exams. This will ensure that students have equal access to technology, and reduce opportunities for cheating by student storing information, or downloading programs on their personal calculators that aren't allowed on exams.

Embedded tutors

Embedded tutors have been used in some Math 48A classes over the last 2 years. This has been funded through Equity and has been made available to faculty members who request it. So far Maria Tomutiu, Zachary Cembellin and Teresa Zwack elected to incorporate the use of embedded tutors into their courses. Not all instructors have elected to use the tutors, because it requires instructors to organize their instruction in such a way that the tutor can be useful. So it is a small portion of the sections that use the tutors. The overall success rate in Math 48A has not increased since we started using the tutors. However, one instructor reports there has been an increase in success and persistence in her 48A classes since she started using the tutors and reorganized her class to get the most out of them. The embedded tutoring program (Eric Reed and Katie Ha) has requested data on success rates in classes with and without embedded tutors, but are still waiting to get it from I.R. Having this data will help us to know more about how embedded tutors are effecting the success rates for students in these classes.

PT mentoring & Material Coordinator

The department used $4000 of the $10,000 stipend that was offered to the department to cover department chair duties to pay two faculty members $2000 each to assist the dean with supporting PT faculty members. This included hiring, orientation, evaluation and material distribution, but didn't leave much time or energy for true mentoring. Please see comments in 3E.

SECTION 4: PROGRAM SUMMARY

4A. Prior Feedback: Address the concerns or recommendations made in prior program review cycles, including any feedback from the Dean/VP, Program Review Committee (PRC), etc.

Concern/Recommendation	Comments

Placement issues including but not limited to Accuplacer, cut scores, and international students	The department approved and supported a pilot program to place students into Math 10 based on the RP Group MMAP Recommendation Decision Rules for placing students into Math classes. The testing center was to implement the plan starting in Spring 2016. The math department is also working to map the competencies for the CCC Common Assessment to our courses. We are carefully considering this work as placement has a big impact on student success.
Success rates in online courses (105, 1A and 1B)	Net Tutor is now available in Canvas. Hopefully this makes it easier for online students to get tutorial assistance. The conversion of online courses to CANVAS will also give faculty an opportunity to review and renew the structure of their online courses. Additionally, Math department faculty members have been engaged in conversations to learn from each other and build better courses by working together. Two faculty members are working to structure online forums to encourage dialog between students in an online class.
Concerns related to Math My Way (Math 235/230)	The department has started to offer the class in the evening 4 nights a week, giving students an alternate time for the course. Now that the Sunnyvale Center is open we will need to consider as a department how to address the student needs at this new site. The instructors who teach Math My Way are working with the STEM Center's Foundations Lab, to set up workshops for students to help them through some of the modules that prove difficult for students. Additionally, the instructors are considering other improvements to the curriculum, materials or structure that will support students to continue to master the vitally important concepts that are needed for success in the math sequence but that will also increase the success rates.
Overall success rates Success rates for Math 105 and developmental Math courses Part-time Coordination and mentoring	The Math department sees all of these issues as being related to the need to have a Math Department Chair. In a department containing courses where a student's success depends at least partly on the knowledge and skills that the student gained in the previous course, the department needs to have a lot more communication than a typical department.

	Currently without a department chair, we rotate a lot of responsibilities like the duties of setting up meetings, and taking meeting minutes. While the meetings work okay, we've had some hiccups with communicating decisions to important stakeholders. Additionally, we have many activities and initiatives going on in our department. The department would benefit greatly from having a person who would be able to coordinate those efforts and make sure that they work to complement each other. When there is no one heading the department and individuals are rotating the duties and responsibilities that do not belong to any one individual such as leading program review, mentoring, coordinating and hiring PT faculty, this is potentially time that is taken away from prepping for our teaching, grading, and meeting with our students, which has a negative impact on our students' success.

4B. Summary: What else would you like to highlight about your program (e.g. innovative initiatives, collaborations, community service/outreach projects, etc.)?

Our Math Department has a real commitment to student success. This can be seen in the many things that the math department is involved in to try to increase student success. These include:

Statway™
STEMway
STEM Core
Embedded Tutors
Coordination with the STEM Center & Foundations Lab
STEM Center Workshops
Multiple Measures Pilot
Beyond Diversity and Courageous Conversations Participation
FTLA (Faculty Teaching and Learning Academy)
Summer Bridge
Umoja Cohort Support
Coordination with the OWL Scholars program
Coordination with the Pass the Torch program
Weekly faculty seminars in Winter and Spring 15 to discuss SLO development/assessment/reflection

With 17 full-time faculty and 30 part-time faculty the Mathematics Department is huge! In the Fall, Winter and Spring quarters of the 15-16 academic year the department offered 234 sections of 20 different courses that cover math topics normally taught in elementary school through advanced classes needed by students planning to major in a STEM field. The students who take math classes are Art, Language, Kinesiology, Business, Social Science, Biological and Physical Science and Engineering Majors, with a very small number of math majors each year. Some of the students we serve are pursuing AA degrees, some are planning to transfer and others are students in career programs. In other words, we serve nearly all the students in the college.

Added to the huge diversity of students, faculty and courses, is the fact that these course are highly interdependent. A student doesn't just have to remember core ideas and concepts from the previous course, they need to remember and be able to perform with accuracy a laundry list of skills. Without that ability the student's chances of success in the subsequent class are low.

If we liken the math department to the world of water vessels, we are not a dinghy or even a large yacht. No, in that world the Math Department would be a very large cruise ship. (But are we the Titanic or the Disney Dream?) Like a cruise ship we have a large number of systems that all need to work together to create a seamless enjoyable experience for the passengers (student). However, unlike a cruise ship, we do not have a captain (Department Chair). With a department as large as ours with as many different highly interdependent courses, and faculty as we have, we really need to have a faculty person or people in our department who have dedicated time for leadership, without needing to work overtime to do the coordination that is necessary to keep such a large department working smoothly.

SECTION 5: LEARNING OUTCOMES ASSESSMENT SUMMARY

5A. Attach 2015-2016 Course-Level Outcomes: Four Column Report for CL-SLO Assessment from TracDat. Please contact the Office of Instruction to assist you with this step if needed.

5B. Attach 2015-2016 Program-Level Outcomes: Four Column Report for PL-SLO Assessment from TracDat. Please contact the Office of Instruction to assist you with this step if needed.

SECTION 6: FEEDBACK AND FOLLOW-UP

This section is for the Dean/Supervising Administrator to provide feedback.

6A. Strengths and successes of the program as evidenced by the data and analysis:

The math department has crafted a well-written documentation of their commitment to student success. They have addressed their continual support and engagement of all students while continuing to resist the temptation to reduce course standards. They understand that the skills needed from their math courses are essential for student success in areas such as basic skills, transfer, and workforce (career education). The math department remains committed to both technology and pedagogical improvements as seen in their involvement with not only on campus committees but also external collaborations, such as Statway and Stem Core. They continue to look for opportunities to engage students and support students across multiple dimensions such as ethnicity and gender.

Even though many of these activities have become part of the math department "daily" routines, these activities are of course ever changing and adapting. As such they are ongoing and not just one

time fixes, as noted by the department. Hence they are considered strengths of the department:

- Continual search for pedagogical practices that support current students, for all medium: face-to-face, hybrid, and online
- Willingness to work across departments both internally and externally to support student success
- Using funding from grants and other resources to engage and further student success
- Using student learning outcomes process to not only meet state mandates but also as a tool to create an environment of faculty learning and improvement in pedagogical practices
- Streamlining support for student with the STEM Center and other academic support services to address the students as a whole within a complex system.

As noted in their report, the math department is primarily a support program for transfer, basic skills and workforce. As such they are often seen by students as "holding" them back for real courses but many programs or other departments expect that these same students have met certain math skills (such a quantitative reasoning) when they enroll in their programs or courses. Thus, the math department continues to assess and balance between the two demands.

The math department continues to grow in enrollment, productivity, and student success based on the last three-year trend.

6B. Areas of concern, if any:

Areas of concern:

1. The pathway for basic skills students. The length of time that it takes for students to complete the Pre-Algebra to Intermediate Algebra sequence is too long. Many students are taking more than 4 quarters to complete their developmental pathway.
2. Course placement for international students continues to be difficult compared to US educated students. Placement for US educated students are still inaccurate but the math department has recently implemented multiple measures for Math 10 (Statistics) placement so hopefully this will place students into the correct math course.
3. Low enrollment in alternate pathway, i.e. Statway should have more students than currently
4. Student success rates (61%) is still below the institutional effectiveness percentage goal of 77% but above for ACCJC accepted rate of 57%
5. Lack of coordination of faculty for both full and part time. There is no department chair to help with keeping everyone on the same page, especially for a department this large.
6. With more number of part time instructors than full time instructors, many of the math courses are taught by part time instructors. This could affect the student success rate since PT instructors are more likely to be unfamiliar with the campus resources.

6C. Recommendations for improvement:

Some suggestions based on 6B Areas of Concern:

1. One possible way to reduce the length of time for Basic Skills students is for the math department to have a champion to work with student services to support Basic Skills students in a more comprehensive way. Understanding and supporting Basic Skills students means dealing with their assets as a whole and building in support beyond academics so that they can be academically successful. Often, students are unsuccessful because of factors outside of the

school, such as lack of money or basic nourishment, are unmet. I encourage the faculty to continue their involvement with external resources such as Carnegie Foundation in areas such as growth mindset, which has shown some success at Foothill College.

2. A recommendation to improve course placement is for the faculty to continue their work with assessment/testing to support multiple measures or other means for proper placement. The testing department needs to assess other available material for international students such as international baccalaureate test. The math department along with the international office and testing needs to inspect the conditions under which the international students are being assessed. Are the students (both international and domestic) given ample information about the assessment and resources prior to the assessment?
3. Alternate math pathways are not currently getting the needed traction as the traditional pathway is still being favored. A suggestion is for both math faculty and counselors to provide students information based on individual goals and not broad general goals. For example, the math department along with the support of the dean should look into providing Basic Skills math instructors and counselors on how to advise students in a pathway where students are most successful and allows for them to reach their goals. Maybe build an informational video for students, new faculty, and counselors about the alternate pathway and who should take advantage of it. Highlight the benefits of both pathways and which one is best for which student.
4. Low student success rates in mathematics is a problem nation-wide. It is recommended that the math department continues their work with current research and remains active in the math communities locally, regionally, and nationally.
5. With a department this large, coordination between groups is extremely important. The Math department needs a FTE faculty coordinator to help with aligning external activities and within the departmental needs. With 17 full-time faculty and usually twice the amount of part-time instructors, this department is being pulled by many interests. Furthermore, being in the Silicon Valley with its high cost of living, it is hard to find consistent part-time faculty who stay on the teaching staff for long term. Continual on-boarding is needed for consistency among new part-time faculty with the departmental teaching philosophy. Coordination of faculty is needed in basic skills, transfer and workforce as the pedagogical environment continues to change within each of these areas.
6. I support the department in keeping the same if not add another Full Time faculty to maintain the full time math faculty that the department once had (19 Full time faculty in AY 2015-2016). The enrollment in the department has either increase or remain the same year to year. In addition, with 18 or more faculty, the department will be losing 3 faculty every year to Professional Development Leave. Thus, all these factors support the need to keep the math department stable with at least 19 full time faculty.

6D. Recommended Next Steps:

☒ Proceed as Planned on Program Review Schedule
☐ Further Review / Out-of-Cycle In-Depth Review

This section is for the <u>Vice President/President</u> to provide feedback.

6E. Strengths and successes of the program as evidenced by the data and analysis:

The great work in serving Foothill students is very much in evidence in this program review. While the 11 AS degrees in Math for 2015-16 are listed, the department also awarded 15 ADTs as well as 23 noncredit certificates. The strength of the department comes from its diversity of thought / perspective

and its willingness to look at the data and try new approaches to help students.

6F. Areas of concern, if any:

I support the Dean's recommendations. The department should continue its work examine the competency mapping for Common Assessment with an eye towards improving the accuracy of course placements.

6G. Recommendations for improvement:

While still a relatively small N, the department might consider looking at the range of courses (including courses outside the math department) taken by ADT graduates to advise students on pathways to the degree.

Based on this program outcomes assessment result (below) the department might consider asking institutional research for assistance in examining how previous course outcomes explain the variance in program outcomes.
"31 of 32 completed the assessment on time; all responses were satisfactory or better. …
I attribute the high success rate to the form of the prompt: a nonroutine exercise, assessed as a take -home project allowing for all resources (text, notes, collaboration with classmates, expert consultation, internet resources)."

6H. Recommended Next Steps:

- ☒ Proceed as Planned on Program Review Schedule
- ☐ Further Review / Out-of-Cycle In-Depth Review

Upon completion of Section 6, the Program Review document should be returned to department faculty/staff for review, then submitted to the Office of Instruction and Institutional Research for public posting. Please refer to the Program Review timeline.

Unit Course Assessment Report - Four Column

Foothill College

Department - Mathematics (MATH)

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 10 - ELEMENTARY STATISTICS - Concepts and Connections - Students will develop conceptual understanding of descriptive and inferential statistics. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Rigorous homework problem, graded upon a rubric that is shared with students in advance. **Assessment Method Type:** Data **Target for Success:** All students will obtain a passing average (70%) on this homework.	05/26/2016 - Homework is correlated with course grade. So it's possible that by focusing on increasing student homework scores, course grades might also increase. See complete analysis in related document. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Continued support of the STEM Center **GE/IL-SLO Reflection:** These rigorous homework problems, collected throughout the quarter, require translation and interpretation, complex computations and problem solving, and also critical thinking and synthesis. **Related Documents:** Math 10 SLO Reflections Winter 2016.pdf	
Department - Mathematics (MATH) - MATH 105 - INTERMEDIATE ALGEBRA - Concepts and Connections - Students will develop conceptual understanding of the relationship between a function and its graph. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year	**Assessment Method:** Class Quiz **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** Obviously, we want 100% success. Any target under 100% seems arbitrary. Historically, we have often chosen a success rate of 70% as our target.	04/29/2016 - 43% of students scored 70% or higher on a quiz that asked students to identify characteristics of a parabolic graph given a quadratic equation. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** PD: SLOs, Equity, Assessment **Resource Request:** PD: SLOs, Equity, Assessment **GE/IL-SLO Reflection:** A student who successfully completed this	04/29/2016 - Request professional development in our Program Review.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Start Date: 12/14/2015 **Course-Level SLO Status:** Active		quiz would have carried out a careful analysis with many computations. It also required knowledge of mathematical vocabulary. **GE/IL-SLO Reflection:** A student who successfully completed this quiz would have carried out a careful analysis with many computations. It also required knowledge of mathematical vocabulary. **Related Documents:** Math 105 Reflections.pdf	
Department - Mathematics (MATH) - MATH 108 - ACCELERATED ALGEBRA - Concepts and Connections - Students will develop conceptual understanding of four representations of a function: algebraic model, graph, table, verbal description. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and connecting multiple representations. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Exam problems. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 100% of students will show satisfactory understanding of relationship between 4 representations. That's not likely to happen, but any other target feels arbitrary.	07/13/2016 - 50% of students who took the final exam earned a passing grade. 50% is also the percentage of students taking the final exam who completed at least 70% of the conceptual problems satisfactorily. See related document for complete reflection. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** PD: Equity; Assessment-stereotype threat, cultural competency, implicit bias; FTLA **GE/IL-SLO Reflection:** The conceptual problems required translation, explanation, computation, and critical thinking. **Related Documents:** Math 108 Reflections.pdf	
Department - Mathematics (MATH) - MATH 12 - CALCULUS FOR BUSINESS & ECONOMICS - Concepts and Connections - Students will develop conceptual understanding of limits, rates of change, and integrals. They will demonstrate and	**Assessment Method:** Students' performance on select Exam/Quiz problems will be used to assess their conceptual understanding. **Assessment Method Type:** Exam - Course Test/Quiz	04/28/2016 - There is general agreement among the teachers teaching this class that the primary challenge is too much content in this course. See related document for more. **Result:** Target Met	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Target for Success:** Since 70% correct is usually deemed "satisfactory," we will aim for a 70% success rate, though, ideally, it would be higher.	**Year This Assessment Occurred:** 2015-2016 **Resource Request:** None **GE/IL-SLO Reflection:** This type of conceptual problem requires application of concepts (computation), understanding of content-specific vocabulary (translation skills), and synthesis of several ideas (critical thinking). **Related Documents:** M12_SLO_Assessment_Reflection.W2016.pdf	
Department - Mathematics (MATH) - MATH 1A - CALCULUS - Concepts and Connections - Students will develop conceptual understanding of limits and rates of change of functions of a single variable. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Final exam questions **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** The target for success depends largely on the level of difficulty of the question given. Also, due to the different types of problems given (some were multiple choice, while others were free response type questions), the target for success are different and somewhat arbitrary.	04/12/2016 - The assessment results differed for each instructor. Two instructors gave two multiple-choice questions to measure this SLO. For one instructor, 77% of the students answered question one correctly and 77% of the students answered question two correctly. For the second instructor, 81.5% of the students answered question one correctly and 76.2% of the students answered question two correctly. A third instructor assessed this SLO using two free response questions. 65% of the students scored over 70% on both questions. A fourth instructor assessed 4 questions. 79%, 71%, 73% and 45% of students scored at least 65% on each of the questions. A fifth instructor identified 8 out of 16 final exam questions that he considered more on the conceptual side. The mean score on just these problems was 78% and median was 84%. A sixth instructor used her exams in totality to get a very broad understanding of the students' conceptual knowledge. The success rate was 51%. The cutoffs for determining success varies greatly among instructors and are seemingly arbitrary. What would help determine success is how the	04/12/2016 - The way SLO's are currently designed looks at the small picture and minutiae rather than the larger picture. It's difficult and maybe unrealistic to isolate questions that look solely at conceptual understanding. The idea of an outcome should encompass more than course objectives. I think that we need to look at creating outcomes that look at the larger picture and how we can assess students meaningfully with these outcomes in mind. i.e., A year later, we would like students to be able to understand or interpret what a derivative is in the context of an application. We would like students to know when to use the idea of local linearity in real world. There needs to be time for faculty to really discuss the issues raised in the reflection section for this course. Some faculty are willing to cancel their classes for professional development while others are not.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		students did in the subsequent course in the sequence; in this case, how they did in Math 1B. What the data shows is that student success varies greatly among the instructors. There are no standard exams and the level of what is considered rigorous differs among instructors. It can be difficult to standardize what these levels are. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Time built in to the college calendar to meet with colleagues. **GE/IL-SLO Reflection:** The two multiple choice questions required students to be able to compute derivatives, find the local linearization of a function and determine where a function was not continuous. These questions required students to compute and perform analytical thinking. The free-response questions required students to communicate and reason with definitions and theorems, compute derivatives and perform critical/analytical thinking. **Related Documents:** W2016_M1A_SLO_Reflections	However, I do believe the college should set aside time and have it built in to the school calendar for faculty to meet with colleagues to discuss these issues, without interrupting class time. How can SLO assessment and reflections be genuine without honest discussions and without having time to do so?
Department - Mathematics (MATH) - MATH 1B - CALCULUS - Concepts and Connections - Students will develop conceptual understanding of integration of functions of a single variable. They will learn to demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting	**Assessment Method:** Individually, instructors created and implemented assessments to measure students' conceptual understanding. **Assessment Method Type:** Exam - Course Test/Quiz	05/23/2016 - Faculty had a good discussion, with many members attending. See related document. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** College support to meet more to share across the department and engage in	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active		relevant professional development. **GE/IL-SLO Reflection:** Questions that assess concepts and connections often assess writing, computation, and critical thinking skills as well. **Related Documents:** Math 1B Reflections for TracDat.pdf	
Department - Mathematics (MATH) - MATH 1C - CALCULUS - Concepts and Connections - Students will develop conceptual understanding of sequences and series and functions of multiple variables and their rates of change. They will learn to demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Questions on Exams. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will complete problems satisfactorily.	10/21/2016 - Only about 50% of students approached first problem successfully. A slightly higher percentage of students were successful with second problem. See related document for initial reflection and follow-up comments and resource requests. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Support for development and delivery of high-quality Mathematica supplements and access for students and faculty. Support for development of calculus review materials for use in higher level classes. **GE/IL-SLO Reflection:** Problems required computation and critical/creating reasoning. **Related Documents:** M1C.Reflection.W2016.pdf	
Department - Mathematics (MATH) - MATH 1D - CALCULUS - Concepts and Connections - Students will develop conceptual understanding of Integration involving functions of multiple variables and theorems and concepts related to vector calculus. (Created By Department - Mathematics (MATH))	**Assessment Method:** Selected problems taken from a midterm exam and a final exam **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% or above for each question sampled.	05/15/2016 - On a final exam, students answered the following questions with success indicated: 1. A problem about Stokes' Theorem, which asked students to compute the line integral about a triangular plate in 3-space: 68% answered the question correctly.	05/15/2016 - The instructors participating in this assessment are happy with the results. Thoughts for further improvement are given below. There are two major challenges in

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Assessment Cycles: End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active		2. A problem asking students to correctly identify the correct integral among 4 choices the correct integral to compute the flux out of a hemisphere in 3-space using spherical coordinate: 80% of students answered the problem correctly. 3. A problem asking students to identify the correct multiple integral in rectangular coordinates for computing triple integral for an unspecified function of 3-variables integrated on the 3D solid region corresponding to a solid half-cylinder with its rectangular base in the xy-plane: 74% of students answered the problem correctly. On a Midterm Exam at Week 10, a problem consisted of 7 sub-problems asked students to demonstrate conceptual understanding of a line integral, the Fundamental Theorem for Line Integral, and Green's Theorem given a vector field and two curves in R^2. Result: 80% class performance on average (79% of students scored at least 70% on this problem.) On a Midterm Exam at Week 10, a problem consisted of 4 sub-problems asked students to evaluate a flux integral without using the Divergence Theorem. Result: 74% class performance on average (76% of students scored at least 70% on this problem.) On a Midterm Exam at Week 5, an application problem consisted of 2 sub-problems asked students to estimate a double integral and the average temperature in a room. Result: 92% class performance on average (89% of students scored at least 70%, and 81% of students scored 100% on this problem.) **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	this class that are not directly related to Math1D concepts, but affects their performance in Math1D. One is students' clear understanding of multivariable functions from Math1C, and the other one is their general reasoning skills. 1. About understanding multivariable functions from Math 1C: functions are composed of analytic, numeric, and graphical interpretations. For example, given an analytic multivariable function that represents a quadric surface, they need to know how the function graph looks like to come up with specific curve, region, surface, and solid accordingly.Perhaps 1D instructors can communicate more clearly with colleagues teaching 1C that this is an issue in 1D. 2. About students' general reasoning skills: Students often think the inverse of a true statement is also true. This happens in this class when students determine whether a given vector field is a gradient vector field or a curl vector field using special tests. It might be helpful to provide students review materials from Math1A through Math1C along with useful math facts that are directly used in Math1D, like an basic knowledge of conditional statements in logic.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		Resource Request: Continued support for hiring Staff in the STEM Center capable of answering questions at this level; continued support of Mathematica license, which is used in courses at this level **GE/IL-SLO Reflection:** The multiple choice questions required students to be able to compute various integrals involving functions of multiple variables. These questions required students to compute and perform analytical thinking. The free-response questions required students to communicate and reason with definitions and theorems, compute various integrals and perform critical/analytical thinking.	
Department - Mathematics (MATH) - MATH 217 - INTEGRATED STATISTICS I - Mechanical Fluencies - Students will demonstrate the ability to calculate probabilities, descriptive statistics, and z-scores. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Selected problems from the secure common assessment from the Carnegie Foundation for the Advancement of Teaching. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% success rate on those problems	04/20/2016 - 70.5% got two questions involving the calculation of z-scores correct. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** none **GE/IL-SLO Reflection:** Our target was met as the two questions on the final exam were about computing z-scores. We were hoping for higher than 70.5% because these two questions are considered some of the easier ones on the final. Lack of attendance on the final review day may have contributed to the lower percentage but lack attendance overall was an issue this year. Also it's possible that there was a lower reading comprehension for some students and they were not able to	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		interpret the language in these two questions.	
Department - Mathematics (MATH) - MATH 22 - DISCRETE MATHEMATICS - Concepts and Connections - Students will develop conceptual understanding of formal logic and various methods of arguments that can be used as the basis of a computer program. They will demonstrate and communicate this understanding by writing proofs involving number theory, set theory, combinatorics, and discrete probability. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** A high level problem requiring a proof, completed either at home or in class with full access to all resources. **Assessment Method Type:** Class/Lab Project **Target for Success:** We'd like for all students to demonstrate satisfactory skill and understanding (passing score on assignment).	10/26/2016 - In both sections, all students completing the assessment on time did so successfully. In 1 section, four students failed to complete the homework assignment on time but did so later. In another section two students were absent the evening of the assessment (April 18), but completed it satisfactorily and handed it in later. We attribute the student success rate to the form of the assessment. With either a homework assignment or a collaborative quiz, students can use all their resources to respond to the assessment prompt, including text, notes, classmates, and internet resources. Under those circumstances, a routine prompt will generate answers that look like the ones in the back of a typical math textbook. With non-routine prompts, we give students the opportunity to respond in rich ways that demonstrate high-level skills. We can then use those rich responses to authentically assess high-level outcomes. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** This kind of assessment requires communication and critical thinking skills. **Related Documents:** 03 Retailing.pdf M22 SLO Reflection 16S.pdf	10/26/2016 - Next year, we suggest that the instructors may want to continue to focus on this SLO even though we have some evidence of success. In our minds, this SLO neatly captures the essence of Math 22.
Department - Mathematics (MATH) - MATH 220 - ELEMENTARY ALGEBRA - Concepts	**Assessment Method:** Questions from Final Exam	04/18/2016 - 71% of the students scored over 70% on the final exam questions.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
and Connections - Students will develop conceptual understanding of the relationship between a linear function and its graph. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** Over 70% of the class scoring at least 70% on the questions	**Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Continue funding for embedded tutors and early alert program. Increase number of hours for embedded tutors in the classroom.. **GE/IL-SLO Reflection:** The problem given was a problem involving systems of equations. The students had to compute the solution for the system. In addition, the students had to verbally describe what the solution meant in terms of the context of the problem. Lastly, the problem required critical thinking skills since the students had to determine which equation would better serve the needs given in the problem.	04/18/2016 - Ask for additional hours for embedded tutors to assist in the classroom for this course. In addition, the math department should look into revising this course so that it is more aligned with the common core and more relevant to the 21st century. Topics such as factoring should be revisited.
Department - Mathematics (MATH) - MATH 235 - PREPARING FOR ALGEBRA: REAL NUMBERS - Concepts and Connections - Students will develop conceptual understanding of whole numbers, fractions, decimals, and real numbers. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Students need to pass 5 module exams by 87% or better in order to pass this course. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** The institutional standard is 57%.	11/03/2016 - 60.9% of the students passed this class. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** It is quite difficult to reflect on this SLO since some conceptual problems are assigned in each module for homework and on exams.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 2A - DIFFERENTIAL EQUATIONS - Concepts and Connections - Students will develop conceptual understanding of mathematical modeling of continuous processes and their rates of change. They will learn to demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Exam question that asks students to connect the various skills learned in class in the context of an application problem. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** We want 100% success rate, though experience tells us we´re not there yet!	10/05/2016 - Most of the students enjoy the course contents since they finally see applications of what they learned in previous Calculus classes. They also relate the applications to their major studies and find them meaningful. There are some students who need Calculus reviews because it has been a while since they took the prerequisites. The gaps between the averages and the medians show that there are students who are really underprepared for the course. Those students who come in underprepared for the course, don't perform as well as they could have. Therefore, it would be very helpful for the students to have supplementary materials to review for the course. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Support for the development of supplementary calculus materials to accompany the course. **GE/IL-SLO Reflection:** This assessment requires translation, interpretation, computation, and analysis skills. **Related Documents:** Math2A SLO Assessment Reflection.W2016.pdf	10/05/2016 - Begin construction of supplementary calculus review materials during PDL. Then reassess.
Department - Mathematics (MATH) - MATH 2B - LINEAR ALGEBRA - Concepts and Connections - Students will develop conceptual understanding of the four major problems in introductory linear algebra: the matrix-multiplication problem, the linear systems problem, the least-squares problem, and the eigenvalue/eigenvector problem. Students will demonstrate and communicate this understanding by reasoning with	**Assessment Method:** Students are given 16 questions over 3 exams during the quarter. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** Average success rate (over 16 questions) will be at least 70%	11/03/2016 - See document for complete reflection. In this case, we met our target goal of 70% success in addressing this SLO process. There are a number of teaching techniques we used to support student success on these exams including detailed Exam Information sheets that described the important concepts, theorems and ideas that students should expect to be tested on, Sample Exams that provided targeted practice, the ability for students to take mock exams that had	11/03/2016 - In order to improve our student performance, ensure that our Math 2B SLO's are being routinely assessed, and improve student success we would like to see Foothill College formally support faculty in sharing good teaching practices. We also want to have more support in maintaining continual and meaningful

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
definitions and theorems and connecting concepts. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active		very similar format of the in-class exam questions, and an Exam Corrections process by which students correct mistakes on each exam and formulate a plan for their study skills to improve on their next in-class exam performance. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Institutional support for sharing good teaching practices and materials. Institutional support for conversations about improving pedagogical practices. **GE/IL-SLO Reflection:** These problems required computation and/or critical or analytical thinking. **Related Documents:** M2B SLO Reflection.W2016.pdf M2B SLO Reflection.W2016.pdf	conversations about improving pedagogical practices. Currently, it is very challenging to convince groups of faculty to find time during our busy quarter to discuss pedagogy and assessment with no formal incentives provided by the institution. To address this challenge, we encourage Foothill College to create a formal structure in which groups of faculty members can apply for PGA credit to form a study group with the goal of sharing resources for each class. Such a project might fit nicely into the structure of Foothill's Professional Development committee and would provide incentives for more faculty members to contribute to these types of conversations.
Department - Mathematics (MATH) - MATH 44 - MATH FOR THE LIBERAL ARTS - Mechanical Fluencies - Students will investigate particular phenomena analytically, numerically, graphically, and verbally. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Contextualized, real-world problem. **Assessment Method Type:** Class/Lab Project **Target for Success:** All students will complete this satisfactorily.	10/26/2016 - All students completing the assessment did so successfully. I attribute that success rate to the form of the assessment, which allows students to use all their resources, including text, notes, classmates, and internet resources. Under those circumstances, a routine prompt will generate answers that look like the ones in the back of a typical math textbook. With this non-routine prompt, I give students the opportunity to respond in rich ways that demonstrate high-level skills. Of the 21 students still registered in the course at the time of the assessment, 13 completed the assessment on time, and one finished it later. 7 never completed it	10/26/2016 - Students failing to complete assessments are a common problem in my experience with Math 44. Of the seven who did not complete this assessment, only four were able to pass the course at all. I'm not yet sure what to do about that. We have rewritten SLOs to support departmental discussion themes. But if that SLO structure doesn't work especially well for this class, we may need to modify the SLOs in 2016/17.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		at all. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** This problem requires translation and interpretation, critical thinking, computation, and supports development of global consciousness through an analysis of environmental phenomena. **Related Documents:** 7 Atmospheric CO2.pdf M44 SLO Reflection 16W.pdf	
Department - Mathematics (MATH) - MATH 48A - PRECALCULUS I - Concepts and Connections - Students will develop conceptual understanding of linear, polynomial, power functions and their inverses. They will demonstrate and communicate this understanding by graphing, analyzing, and transforming these functions and connecting their multiple representations. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Students where given questions on exams and/or quizzes. The type and number of of questions varied by instructor. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** The target of success varies with the way the problem was graded. One instructor make a passing grade success and another made the student getting the problem completely correct success.	07/12/2016 - In two classes, 53% and 57% of students got a passing grade on the final exam. In another class, 44% of students got question one completely correct and 24% of students got question two completely correct. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** expand embedded tutoring program **GE/IL-SLO Reflection:** Math 48A is the first class in the PreCalculus series. It is difficult for student to make the transition from Algebra to PreCalculus. Many instructors have noticed that the students in PreCalculus have poor Algebra skills. If the students in Algebra that intend to take PreCaculus can be separated from the student in Algebra that intend to take Statistics or are done with their math education for now, it may be advantageous to combine the topics in Algebra and the beginning of PreCalculus.	07/12/2016 - expand embedded tutoring program

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 48B - PRECALCULUS II - Concepts and Connections - Students will develop conceptual understanding of rational, exponential, logarithmic, absolute value, composite, and piecewise-defined functions. They will demonstrate and communicate this understanding by graphing, analyzing, and transforming these functions and connecting their multiple representations. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Each instructor will assess how they see fit and then meet to discuss their choices and findings. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students will score satisfactory or better.	06/30/2016 - This class was taught entirely by part time faculty and one Phase I faculty member. Either faculty did not assess this SLO or they did not share their reflections. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Time to support collaborations and discussions. Multiple flex days. **GE/IL-SLO Reflection:** This SLO requires critical and analytical thinking.	06/30/2016 - Consider adopting an alternative structure of SLO contributions to include all part time faculty. Although the contract has changed, part time faculty are largely unfamiliar with the SLO process. Many had schedules which completely precluded participation in a course-wide discussion. Additionally, some expressed concern over how they would be judged for their contributions.
Department - Mathematics (MATH) - MATH 48C - PRECALCULUS III - Concepts and Connections - Students will develop conceptual understanding of trigonometric functions and parametric equations. They will demonstrate and communicate this understanding by graphing, analyzing, and transforming these functions and connecting their multiple representations. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Quiz: Given a graph, find important features of graph. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of students will earn a passing grade.	10/26/2016 - 50% (13/26) showed mastery (>70%) of this on quiz 4. Sample quiz attached. **Result:** Target Not Met **Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** This assessment required students to have learned mathematical vocabulary (communication skill). It also required connections be made, a type of critical thinking. It also required computations be performed. In mathematics, modelling is a process that often requires synthesis of computation, connections/concepts, and communication (mathematical translation between forms). **Related Documents:** Math 48CQuiz4-1.docx	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 54H - HONORS INSTITUTE SEMINAR IN MATHEMATICS - Using Appropriate sources of information - Analyze research questions posed by the instructor using appropriate sources of information. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Course-Level SLO Status:** Active	**Assessment Method:** The instructor will grade the students' research presentation based on a rubric to be included with the assessment findings. **Assessment Method Type:** Research Paper	12/05/2016 - This class was not taught, so the SLO could not be assessed. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Mathematics (MATH) - MATH 54H - HONORS INSTITUTE SEMINAR IN MATHEMATICS - Presenting answers - Present answers to the defined research questions orally or in writing using appropriate mathematical language (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Course-Level SLO Status:** Active	**Assessment Method:** The instructor will grade the students' research presentation based on a rubric to be included with the assessment findings. **Assessment Method Type:** Presentation/Performance	12/05/2016 - There is no data available since this class was not offered. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016	
Department - Mathematics (MATH) - MATH 57 - INTEGRATED STATISTICS II - Mechanical Fluencies - Students will demonstrate the ability to compute descriptive statistics, calculate confidence intervals, and carry out tests of hypotheses. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Problems chosen from the secured common assessment from the Carnegie Foundation **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct on these selected problems	04/20/2016 - 82% on the Chi-Squared exam from Chapter 11. It consisted of two full hypothesis tests **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** none **GE/IL-SLO Reflection:** This exam was highly computational so it fits well with the SLO and ILO.	
Department - Mathematics (MATH) - MATH			

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
57 - INTEGRATED STATISTICS II - Concepts and Connections - Students will develop conceptual understanding of descriptive and inferential statistics. They will demonstrate and communicate this understanding in a variety of ways, such as: reasoning with definitions and theorems, connecting concepts, and connecting multiple representations, as appropriate. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 12/14/2015 **Course-Level SLO Status:** Active	**Assessment Method:** Exam problem. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 100% of students scoring 70% or better is the goal. **Related Documents:** Exam Q(2).pdf	10/26/2016 - 100% of students performed satisfactorily (>70%) on this exam question. I would consider that to be a success. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **Resource Request:** Support in growing Statway into a larger program to serve more students. **Resource Request:** This is a successful program that is offered at a large scale at other schools across the country. Now that it articulates to both UCs and CSUs, we ask for support in growing Statway into a larger program to serve more students. **GE/IL-SLO Reflection:** In performing this test of hypothesis, students must use translation, computation, critical thinking, and interpretation skills. **GE/IL-SLO Reflection:** In performing this test of hypothesis, students must use translation, computation, critical thinking, and interpretation skills.	

Unit Assessment Report - Four Column

Foothill College

Program (PSME - MATH) - Mathematics AS

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Program (PSME - MATH) - Mathematics AS - 1 - Students completing their math program at Foothill College will be able to clearly communicate mathematical ideas through graphs, tables of data, equations, and verbal descriptions. **SLO Status:** Active	**Assessment Method:** Non-routine, open-ended take-home project where students have the opportunity to demonstrate their competence in analyzing settling time in a variety of ways, including numerical and graphical analysis, analytic work, and exposition of results. **Assessment Method Type:** Class/Lab Project **Target:** 100% success among those who submit it, with most students submitting it.	06/30/2016 - 31 of 32 completed the assessment on time; all responses were satisfactory or better. The straggler handed it in late and it was satisfactory. The prompt gave students opportunity to demonstrate their competence in a variety of ways, including numerical and graphical analysis, analytic work, and exposition of results. I attribute the high success rate to the form of the prompt: a nonroutine exercise, assessed as a take-home project allowing for all resources (text, notes, collaboration with classmates, expert consultation, internet resources). Students are directed to prepare their own paper. There's always a lot of sharing of mathematical results, but explanations that come in too similar earn lower grades or rejection for a grade at all. The richness of the exercise allows students many opportunities to demonstrate their competence. With so many opportunities, all students manage to complete the assessment satisfactorily. **Result:** Target Met **Year This Assessment Occurred:** 2015-2016 **GE/IL-SLO Reflection:** This assessment requires creative/critical thinking, strong communication skills, and also computation.	
Program (PSME - MATH) - Mathematics AS - 2 - Students completing their math program at Foothill College will be able to construct appropriate mathematical models of natural phenomena, develop those models with appropriate mathematical	**Assessment Method:** In 2014/2015, we evaluated this SLO in Math 2B, one of our 3 Capstone Courses (1D/2A/2B). This assessment consists of a two-part problem from the second exam. **Assessment Method Type:**		

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
techniques, and interpret results of those models **SLO Status:** Active	Exam - Course Test/Quiz **Target:** 70% Success Rate **Related Documents:** M2B_W15_Exam_2_PLO_Question(2).pdf		