Math Lab: **Date:** 05/13/2016

- Program Review Non-instructional Cycle F 2015_Math Lab

Sorted by: Program

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Math Lab

PR Section 1.0

Program Review Non-instructional Cycle F 2015_Math Lab

1.0

Mission, Vision, Core Values and College Goals drive all college activities. The Program Review committee would like to understand the connection of your program to the Mission, Vision, Core Values and College Goals. Summarize how your program supports each area.

Mission:
The Math Lab strives to increase students' competence, connections, confidence, and collaboration in mathematics. Students have access to textbook-specific resources, generic and textbook-specific material that is available online, and mathematic tutors who can assist when needed. As students are encouraged to study math individually and in groups, the Math Lab certainly helps further the college mission to prepare students to be successful learners.

Vision:
Directed Learning activities, Math Lab Assignments and Activities, interactive software, faculty and staff tutors, and discussion with peers all fulfill the Fullerton College vision to promote inquiry, intellectual curiosity, personal growth, and an appreciation for learning.

Core Values:
Operation of the Math Lab is in line with the college's core values. Our staff and student tutors reflect the diversity of or student population. While mathematics is one of the oldies bodies of knowledge, the Math Lab supports its acquisition with innovative techniques. Faculty, instructional assistants, and student tutors welcome students at all levels of achievement, meet them where they are, and provide support for all students to continue growing and learning.

College Goals:
The Math Lab is integral to Fullerton College achieving the goal is increasing student success. The purpose of the lab is to support all students with their Fullerton College math courses by providing assistance that will encourage them to persist and be successful. This naturally leads to an increase in the number of students who transfer. Some of the needs of English language learners are being addressed by providing computer resources that are available in both English and Spanish, as well as by employing bilingual tutors. The Math Lab also supports the college goal to strengthen connections with the community. Many of the tutors are Fullerton College alumni who have transferred to four-year colleges in the area. Some faculty who tutor in the lab are adjunct instructors who teach full-time at local feeder high schools or part-time at other universities or colleges. The Math Lab also welcomes qualified volunteer tutors from the community.

PR Section 4.1 - 4.2

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4.1 - 4.2

4.1 List your SAO/SLOs and complete the expandable table below.

	Service Area Outcomes (SAO) / Student Learning Outcomes (SLO)	Date Assessment Completed	Date(s) Data Analyzed	Date(s) Data Used For Improvement	Number of Cycles Completed
1.	(SAO) The Math Lab will offer individualized tutoring to students enrolled in any Fullerton College Mathematics course.	Ongoing	Ongoing	Ongoing	n/a
2.	(SAO) The Math Lab will offer a variety of resources to support students enrolled in any Fullerton College Mathematics course.	Ongoing	Ongoing	Ongoing	n/a
3.	SLO for Math N01F: Upon successful completion of MATH N01F, students will be able to report progress in selected areas of	Fall 2014 Fall 2015	Fall 2014 Spring 2015 Fall 2015	Spring 2015 current/ongoing	2

	individualized units of study.				

4.2 Assessment: Complete the expandable table below.

Service Area Outcomes **Assessment for the Student Services Division of Fullerton College**			
Intended Outcomes	**Means of Assessment & Criteria for Success**	**Summary of Data Collected**	**Use of Results**
1. The Math Lab will offer individualized tutoring to students enrolled in any Fullerton College Mathematics course.	• Student surveys • TimeKeeper reports • Tutoring logs • Observation	The Lab has provided tutoring to students enrolled in any math course since Summer 2014. During the Fall 2014, Spring 2015 and Summer 2015, we provided 31,290 individualized tutoring sessions. This is documented in Table 3 of Section 2.4 19,871 or 63.51% of these sessions were for the students enrolled in courses that received tutoring prior to Summer 2014. • 7,420 sessions or 23.71% were for the students enrolled in Math 150A, Math 150H, Math 150B, and Math 250A • 2,200 sessions or 7.03% were for the students enrolled in Math 130 • 1,799 sessions or 5.75% were for the students enrolled in Math 100, Math 120, Math 171, Math 172, Math 250B and above. • The data show there is a strong demand for Math Lab	Data are used to adjust staffing, add additional tutors based on the average length of a tutoring session and level of satisfaction of students using the Lab, and upgrade technology. The data are used for evaluation and possible modification of Math Lab services and promotion efforts.

		tutoring at all levels. Note that 36.5% of students who used the Lab in 2014-15 were enrolled in courses not previously served in the Math Lab. • See Table 3 for data In Fall 2015 (8/24-10/31), 64.22% of students that received individualized tutoring in the Lab were enrolled in courses that received tutoring prior to Summer 2014. • 2,420 sessions or 24.50% were for calculus students (Math 150A, Math 150H, Math 150B and Math 250A) • 458 sessions or 4.64% were for business calculus students • 656 sessions or 6.64% were students enrolled in Math 100, Math 120, Math 250A, Math 171 and Math 250C • The data show a similar trend to the previous year, again illustrating that there is a strong demand for tutoring at all levels. • See Table 3 for data	
2. The Math Lab will offer a variety of resources to support students enrolled in any Fullerton College Mathematics course.	• Student surveys • TimeKeeper reports • Tutoring logs • Observation	Students have been observed using the various resources that the Math Lab offers. In addition to individualized tutoring, students use computers with internet access, watch	Data are used to adjust staffing, add additional tutors based on the average length of a tutoring session and level of satisfaction of students using the Lab, and upgrade

		instructional videos, check answers in the instructor editions of textbooks, collaborate with other students, attend exam and topic review sessions, math bootcamps, and complete Math Lab assignments and/or activities and DLAs assigned by their instructors. See Table 5 for data.	technology. The data are also used for evaluation and possible modification of Math Lab services and promotion efforts.
Student Learning Outcomes Assessment for the Student Services Division of Fullerton College			
Intended Outcomes	Means of Assessment & Criteria for Success	Summary of Data Collected	Use of Results
1. SLO for Math N01F: Upon successful completion of Math N01F, students will be able to report progress in selected areas of individualized units of study.	• Student surveys • TimeKeeper reports • Grade reports of full-time instructors of Math 150B	In Fall 2014, the Math Lab surveyed 1,212 students on how successful the Math Lab was in assisting them in improving their math skills in their math course. • 75.58% of students surveyed strongly agreed or agreed • 21.37% had no opinion • 3.05% disagreed or strongly disagreed • See Appendix A for data In Fall 2015, students were asked to rate two statements: A. The Math Lab has assisted me in improving my math skills in my math course. • 600 students responded • 82.5% agreed or strongly agreed • 15.8% had no	Data are used to adjust staffing, add additional tutors based on the average length of a tutoring session and level of satisfaction of students using the Lab, and upgrade technology. The data are also used for evaluation and possible modification of Math Lab services and promotion efforts.

		opinion • 1.7% disagreed or strongly disagreed B. If you have used the Math Lab in previous semesters, has the Math Lab better prepared you for your math course this semester. • 597 students responded • 22.9% of students surveyed were using the Math Lab for the first time (thus had not used the Lab last semester and could not evaluate if the Math Lab had helped them to be better prepared for this semester) • Out of 77.1% of students who used the Math Lab before: u25CB 69.3% “Yes” u25CB 11.1% “No” u25CB 19.6% “No Opinion” u25CB See Appendix B In Fall 2015 grades were analyzed (through week 13) of Math 150B students whose instructors were on duty in the Lab. This represents two instructors of seven currently teaching the course. • Sample size was 72 students • Average grade was 69.6% for the students that spent 0 minutes in the Lab (thus were not	

		enrolled in Math N01F) • Average grade was 73.6% for the students that spent at least one minute in the Lab • Average grade was 77.8% for the students that spent at least 500 minutes in the Lab • See Appendix E for data	

PR Section 4.3 - 4.6

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4.3 - 4.6

4.3 How has assessment of program SAOs led to improvements in services provided to students by this program?

The data shows that 11,419 individualized tutoring sessions, or 36.49% in Fall 2014-Fall 2015, were held for the students enrolled in courses that were not served by the Math Lab prior to Summer 2014. This shows that there is a significant demand for individualized tutoring in all levels of mathematics. This supports the decision to open the Math Lab to all students, which is a substantial improvement in access to providing services to all of our mathematics students. Another improvement in services that can be attributed to the assessment of SAOs is that we now post a schedule of instructors and what levels they tutor. Since not all of our instructors on duty in the Lab answer all questions in Math 100, Math 120, Math 150B and higher, the schedule ensures that the students can plan to come to the Lab at specific times when they know someone will be available to help them.

4.4 How has assessment of SLOs led to improvements in student learning and achievement?

After the results from Fall 2014 were analyzed, Math Lab staff and math faculty joined together to discuss the issues and plan improvements to the program. One major plan was to expand the offering of exam, topic, and final review sessions that we began offering in Summer 2013. Not only did we expand the number of sessions offered, but we were able to offer them to more courses. In Spring 2015, the division allocated equity funds were used to help fund this project and we were able to include Math 150A and 150B in these sessions. An assessment of SLOs and analysis of Math 150B data in Fall 2015 indicated that individualized tutoring and resources available in the Math Lab are academically beneficial for students. The combination of resources available in the Lab and face-to-face tutorial services led to improved student learning and academic success as can be seen in Appendix E.

4.5 What challenges remain to make your program SAOs/SLOs more effective?

The main challenges for the Math Lab are to gain the needed campus support and funding to implement expansion in order to provide out-of-class help and support for all mathematics

students. Since opening to all levels of math, the lab has seen a steady and high flow of students throughout the entire day and the demand for tutoring has created longer lines and wait time. This is evidence that the services of the Math Lab are in high demand. Oddly, in a period of campus growth, the staffing level of the Math Lab has actually decreased since 2012, and is currently staffed at the level it was 20 years ago. It is abundantly clear that the current Math Lab space and funding level is woefully inadequate to meet the needs of our students.

The Math Lab needs more space to provide individualized tutoring, group tutoring and collaborative work areas, and present review sessions to ensure that we offer the support to all students that enables them to be successful in their math course. This could be accomplished by:

- Dedicating additional rooms to the Math Lab
- Reverting control of Room 611L to the Math and Computer Science Division, as was originally planned and promised during the previous remodel of this area
- Dedicating an area for math in the Natural Sciences proposed Campus STEM Resource Center
- Incorporating additional Math Lab space into the next classroom office building or possibly dedicating space in the 600 building when remodeling.

More money is also needed in the budget for Math Lab staffing to provide sufficient out-of-class help and student support.

The other challenge that the Math Lab Program Review team encountered was that the current SAOs are not well-written, which made them impossible to "assess." Both SAOs were not measurable, and the second SAO was not specific. In order to make the Math Lab SAOs more effective, it is necessary to implement new SAOs. We propose the following as the new SAOs:

1. Increase the percent of mathematics students using the Math Lab by 3% by the next Program Review.
2. Increase the success and retention of mathematics students utilizing the Math Lab.

4.6 Describe how the program's SAOs/SLOs are linked to the college's goals. (*See http://programreview.fullcoll.edu/*)

The Math Lab SAO/SLOs are linked to the college's goals in the way that as a program we promote student success (Goal 1) and the student learning experience at Fullerton College. The Math Lab provides resources and tutoring so that students will deepen and broaden their understanding of mathematical concepts that directly affect student success. Helping students to be successful in their math classes will help increase course retention/success (Goal 1, Objective 2) and increase the persistence rate of students (Goal 1, Objective 6). As a service and resource to students, we also post flyers for STEM activities in the Math Lab, which supports increasing the number of students participating in STEM activities (Goal 1, Objective 5). As a resource for students, we offer various workshops, covering topics that many students commonly struggle with, thus addressing the needs of underprepared students (Goal 1, Objective 1). The Math Lab promotes a mathematically based community and encourages collaboration that aids students in developing essential skills to be successful.

4.7 Describe how the program's SAOs/SLOs support the achievement of the institution level SLOs.

We support the achievement of the institutional level SLOs by assisting students that receive tutoring in the Lab to complete their basic skills and transfer-level math courses. Through the individualized tutoring, resources and support students received from our program, they are able to develop the skills, knowledge, attitude, and ability to complete their basic skills and transfer-level math courses, and then move on to four-year colleges, universities, or enter the workforce. Students that receive our support and guidance are able to write proofs of mathematical theorems (1B, 2A). They are able to analyze and interpret data using technology (2C), present the findings of their research verbally (1D) and in writing using various graphs and diagrams (1B). During one-on-one interaction with an instructor or a tutor, students are expected to communicate effectively both orally and in writing (1B, 1D), accept criticism if mistakes are found in their work (1C), and respond appropriately to changing situations (4A). For example, since the Math Lab does not help with course exams, and individualized tutoring sessions are generally limited to 10 minutes unless there is a line, students are expected and encouraged to find example problems similar to the ones they are working on in the textbook (1A). In the Lab, students can also utilize a variety of online and offline resources such as instructional video lessons and graphing calculator tutorials available through Pearson's MyMathLab (1C). Additionally, we help students with computations, tables, charts, geometry (2B) and application problem-solving (2D) in the individualized tutoring sessions.

4.8 A. What methods are used to assess the program's success in serving the student population that interacts with your program?

- Student surveys
- TimeKeeper Reports
- Math Program SLO (PSLO) assessment results
- Observations made by the Math Lab staff
- Evaluations of topic and review sessions, workshops, and bootcamps

B. What do the results of the above methods of assessment indicate about the effectiveness of the program?

Over eighty percent of the students that participated in the assessment rated the services of the Lab as helpful, which implies that the program is effective. While this is a pleasant result, from observation, we know that we can be more effective in better serving students who prefer to work in groups while continuing to support students who need a quiet study area. This could be achieved by dedicating additional space, allocating funds to the Math Lab and by increasing our staffing levels. We could also be more effective in addressing the needs of underprepared students. Directed Learning Activities (DLAs) have been used at other colleges to facilitate just-in-time remediation. We plan to investigate how implementing such activities could improve our students' success, retention and persistence rates.

C. How were the assessment results used to make improvements to services provided by this program? Please provide examples.

The Math Lab staff are continually collecting data on the students who are being tutored as well as observing and recording the dynamics of the Lab. The data and observations are assessed and used to make improvements in the services the Lab offers. For example, we noticed that students tend to have difficulties with the same concepts and found ourselves answering the same questions again and again. To be more efficient and improve our services, we determined that it would be beneficial to have group or collaborative sessions for

students covering those difficult concepts, ideally in an area with a whiteboard that would be conducive to facilitating their learning. Thus, we started offering topic review sessions throughout the semester. We have expanded this new service to include exam review sessions for various levels of mathematics courses. We have received positive feedback for the review sessions.

Even with the large number of review sessions for calculus students, the tutoring data reveals that the number of tutoring sessions for students enrolled in Math 130, Math 150A, Math 150B, Math 150H and Math 250A increased from 25.22% in Fall 2014 to 29.14% in Fall 2015 (see Appendix D). This shows that the demand for support for calculus students is strong and increasing. We would like to further improve our services and support of students by shortening the wait time for tutoring in the Lab during peak hours. This is best accomplished by having a separate group tutoring area with an instructor on duty. This improvement can only come to fruition when the Lab gains more space and funding.

Appendix A
Math Lab SLO Assessment
Fall 2014 (11/26/14-12/31/14)
Question/Statement: The Math Lab has assisted me in improving my math skills in my math course.

Answer	Students	Percent		Percent
Strongly Agree	355	29.29%	Strongly Agree/Agree	75.85%
Agree	561	46.29%	No Opinion	21.37%
No Opinion	259	21.37%	Disagree/Strongly Disagree	3.05%
Disagree	19	1.57%	Total	100%
Strongly Disagree	18	1.49%		
Total	1212	100%		

Appendix B
Math Lab SLO Assessment
Fall 2015
Question 1: The Math Lab has assisted me in improving my math skills in my math course.

Answer	Students	Percent		Percent
Strongly Agree	226	37.7%	Strongly Agree/Agree	82.5%
Agree	269	44.8%	No Opinion	15.8%
No Opinion	95	15.8%	Disagree/Strongly Disagree	1.7%

Disagree	6	1.0%	Total	100%
Strongly Disagree	4	0.7%		
Total	600	100%		

Question 2: If you have used the Math Lab in previous semesters, has the Math Lab better prepared you for your math course this semester?

Answer	Students
Yes	319
No	51
No Opinion	90
First Semester	137
Total	597

Results for students who used the lab in the past

Answer	Students	Percent
Yes	319	69.3%
No	51	11.1%
No Opinion	90	19.6%
Total	460	100%

Appendix C
Individual Tutoring Sessions for Calculus Students, Business Calculus Students, Math 142 and below Students, and All Other Students

	Fall 2014	*Percent*	*Spring 2015*	*Summer 2015*	*2014-2015*	*Percent*	*Fall 2015 (8/24-10/31)*	*Percent*
Math 7	20	0.14%	31	0	51	0.16%	7	0.07%
Math 15	408	2.84%	260	9	677	2.16%	127	1.29%
Math 20	1694	11.79%	2109	483	4286	13.70%	1077	10.90%
Math 30	232	1.61%	168	0	400	1.28%	322	3.26%
Math 40	2812	19.56%	2321	425	5558	17.76%	2629	26.61%
Math 41	0	0.00%	0	0	0	0.00%	122	1.24%

Math 43	346	2.41%	241	0	587	1.88%	35	0.35%
Math 100	92	0.64%	227	58	377	1.20%	231	2.34%
Math 120	554	3.85%	412	144	1110	3.55%	305	3.09%
Math 129	466	3.24%	331	20	817	2.61%	470	4.76%
Math 130	621	4.32%	1421	158	2200	7.03%	458	4.64%
Math 141	2317	16.12%	1037	431	3785	12.10%	305	3.09%
Math 142	1734	12.06%	1738	238	3710	11.86%	1250	12.65%
Math 150A	2463	17.14%	1950	308	4721	15.09%	1039	10.52%
Math 150B	388	2.70%	1531	239	2158	6.90%	1001	10.13%
Math 150H	1	0.01%	0	0	1	0.00%	0	0.00%
Math 171	6	0.04%	0	0	6	0.02%	11	0.11%
Math 172	0	0.00%	15	0	15	0.05%	0	0.00%
Math 250A	152	1.06%	300	88	540	1.73%	380	3.85%
Math 250B	67	0.47%	98	112	277	0.89%	103	1.04%
Math 250C	0	0.00%	14	0	14	0.04%	6	0.06%
Total	14373	100.00%	14204	2713	31290	100.00%	9878	100.00%

Appendix D

Individual Tutoring Sessions for Math 130, Math 150A, Math 150B, Math 150H and Math 250A

Semester	Number	Percent
Fall 2014	3625	3625/14373=25.22%
Spring 2015	5202	5202/14204=36.62%
Summer 2015	793	793/2713=29.23%
Fall 2015 (8/24-10/31)	2878	2878/9878=29.14%

Appendix E

Math 150B Grades through Week 13 versus Math Lab Usage

ML=0 Average Grade	69.66
ML>0 Average Grade	73.61
ML>500 Average Grade	77.84
Sample size	72

PR Section 6.0 SAP w/o Resource Requests

Program Review Non-instructional Cycle F 2015_Math Lab

Action Plans

SAPs for this three-year cycle:

STRATEGIC ACTION PLAN # 1	
Strategic Action Plan Name: (formerly called short-term goal)	Math Lab Expansion
List College goal/objective the plan meets:	College Goal #: 1 Objective #: 1, 2, 6
Briefly describe the SAP, including title of person(s) responsible and timeframe, in 150 words or less.	Provide an area (room 611C, for example) where math students of all levels can discuss and collaborate on problems, work together in groups, write out problems on white boards while discussing them, and have an instructor present to facilitate from of the discussion and provide assistance as needed. If properly funded, timeframe for implementation could be as soon as Fall 2016. The Math Lab Coordinator and Division Dean are the persons responsible.
What *Measurable Outcome* is anticipated for this SAP?	An increase in the number of students utilizing Math Lab services and an increase in the performance of those students in their math courses.
What specific aspects of this SAP can be accomplished without additional financial resources?	Gaining control of the room dedicated to the Math Lab expansion.

STRATEGIC ACTION PLAN # 2	
Strategic Action Plan Name: (formerly called short-term goal)	Online Tutoring
List College goal/objective the plan meets:	College Goal #: 1 Objective #: 1, 2, 6
Briefly describe the SAP, including title of person(s) responsible and timeframe, in 150 words or less.	Investigate online tutoring and support for students at other academic institutions as well as at Fullerton College (Academic Support Services has a similar service), identify SWOCs for those programs, then implement an online math tutoring program. Procure appropriate technology (Surfaces, IPads, etc.) and sufficient staffing (classified staff, tutors, etc.) and training for successful implementation. Investigation of other programs could be done relatively quickly, and implementation could happen as early as Fall 2017. The Math Lab Coordinator and Division Dean are the persons responsible.
What *Measurable Outcome* is anticipated for this SAP?	An increase in the number of student utilizing Math Lab services and an increase in the performance of those students in their math courses.
What specific aspects of this SAP can be accomplished without additional financial resources?	None