Instructional Annual Program Review and Planning Update Form Fall 2023

BACKGROUND:

Program review is an integral part of the campus planning process. As programs and areas monitor their progress on the current comprehensive four-year program review, changes in need and scope can be expected. This Annual PR Update form is designed to outline and request modifications to the current program review that occur between comprehensive four-year review cycles, as needed.

Examples of a requested change include new information such as action plans, outcomes modifications, personnel changes, technology needs, and capital expenditures requirements. As programs and areas monitor their progress on the previous comprehensive four-year program review, the form provides the basis to suggest a change in plans and processes to improve student success and institutional effectiveness.

DIRECTIONS:

This form shall be completed annually by **all** instructional programs.

- Instructional programs must submit their Annual Program Review Update form to their dean by 5pm on Monday, November 27, 2023.
- Deans will forward the completed form to the Program Review and Planning Committee Chairs by 5pm on Monday, December 4, 2023.
- Questions or concerns?
  - Committee contacts:
    - Co-chairs Mary Bogan (mbogan@fullcoll.edu) and Bridget Kominek (bkominek@fullcoll.edu)
    - Division representatives on the Program Review and Planning Committee
  - Office of Institutional Effectiveness

SUBMISSION:

Program: Mathematics Division: Math/CS Date: November 16, 2023

☐ We have reviewed our most recent self-study and **have not identified** any significant changes that necessitate resource requests for the upcoming academic year. *(Complete part 1 only)*

☒ We have reviewed our most recent self-study and **have identified** significant changes that necessitate additional resource requests, which are attached in our submission. *(Complete parts 1 and 2)*

Principal Author Signature:  Printed Name: Nicole Rossi

Date: November 16, 2023

Dean Signature: Printed Name: Sam Foster

Date :12/6/2023

Part 1: Review of Data

Institution Set Standards (ISS)

1. Use the data provided by the Office of Institutional Effectiveness (OIE) to review your course completion and success rates and provide a comparison to the Institution Set Standards for course completion and success rates.

   After August 15, you will be able to access PDF copies of your program's ISS data here: ISS_ISLO_Documents. The folder will also include instructions to access Tableau dashboards with the same information. The instruction document will also provide more context about how these standards are calculated. If you have any questions, please reach out to the Office of Institutional Effectiveness at ie@fullcoll.edu.

2. If your program meets or exceeds the standard for completion and success, to what do you attribute your success? If your program does not meet this standard, please examine the possible reasons, and note any actions that should be taken, if appropriate.

Based on the Institutional Set Standards, the Mathematics Department is "Below Standard" for both course retention and course success. Our course completion for the 2022 – 2023 academic year was 74.1% in comparison to the completion aspirational goal of 86.7%. Our course success was 62.0% compared to the success aspirational goal of 78.3%. While these numbers are not at the standard that Fullerton College has set for its programs, they both have increased from the previous year. The percent increase of our course completion is 6.01% and the percent increase of our course success is 19.23%.

Completion Set Standard	Completion Aspirational Goal	Success Set Standard	Success Aspirational Goal
74.1%	86.7%	62.0%	78.3%

Course Success and Completion by Program

Subject	Race/Ethn	Enrollments	Avg. Success	Success Standard	Avg. Completion	Completion Standard
MATH	Asian	1,242	66.3%	+	80.2%	+
	Black/African ..	198	37.9%	Below Standard	64.6%	Below Standard
	Filipino	29	62.1%	+	75.9%	+
	Hispanic	4,965	40.8%	Below Standard	66.6%	Below Standard
	Native American	10	10.0%	Below Standard	60.0%	Below Standard
	Pacific Islander	22	40.9%	Below Standard	68.2%	Below Standard
	Two or More	774	51.9%	Below Standard	69.4%	Below Standard
	Unknown/Decli..	200	54.5%	Below Standard	73.0%	Below Standard
	White	1,030	54.4%	Below Standard	73.6%	Below Standard

The Mathematics Department is going through immense changes currently. Last year was the first time that the majority of our classes have been in-person since Spring 2020. In this first year back to campus, the department has made concerted efforts to offer our students as much support as possible. We have increased the number of support course offerings, offered Math Lab tutoring in-person and virtually, and collaborated extensively with both Hornets Tutoring and the Math Success Program.

Over the course of last year, the Math Department has continued working on student completion and success. Beyond offering more support courses, we have been more steadfast in our communication about these courses with the Counseling Department. Moreover, we have started offering topic-specific workshops during the semester to help students in a variety of courses as well as final review workshops for various courses near the end of the semester. We have also begun sharing more teaching resources for each course using Canvas. Ideally, these resources can be used to create a richer experience for students in their mathematics classes.

There have been quite a few curriculum changes that have occurred recently in the Mathematics Department. We have been actively attempting to shift our higher math class sequence to become C-ID aligned while maintaining the transfer requirements necessary for any majors they will be needed for. We have also been working extensively our STEM sequence to become ready for Fall 2025 AB 1705 compliance. This includes creating a precalculus course that will allow students to have a single-semester course to remediate and/or learn material required for the calculus series. We are also changing Math 151F: Calculus I to a 3.5-hour lecture and 1.5-hour lab course in order to increase our time with our students and include more problem-solving inside the classroom.

Institutional Student Learning Outcomes (ISLOs)--Global Awareness ISLO.

1. Describe your program's participation in assessment of Institutional Student Learning Outcomes (ISLO's). Specifically, how does your CSLO attainment, for the courses that are mapped to the Global Awareness ISLO, compare to Fullerton College's ISLO attainment?

Our department CSLOs are not mapped to the Global Awareness ISLO.

2. Does the SLO data show significant achievement gaps among demographic groups in your program? If so, where are the gaps and what steps can your program take to shrink them? If not, to what do you attribute your success in minimizing the achievement gap?

This question does not apply due to the fact that our department CSLOs are not mapped to the Global Awareness ISLO.

Part 2: Additional Resource Request Reasoning and Support

Request 1

Step A: Briefly describe the request.

We would like to replace the furniture in an additional 3 of the 13 math classrooms, including desks and chairs, to create collaborative spaces that are conducive for improved student engagement and more significant student-student and student-instructor relationships. It is imperative that this be completed sooner than later as our current rooms are extremely outdated for active learning purposes.

Additionally, we would like to increase the number of whiteboards in all of our classrooms. While our classrooms have a whiteboard at the front of the room, we want to help facilitate new modalities of teaching mathematics. In order for students to be more actively engaged in the learning process, there is a need for additional board space for the students to collaborate and work. The new whiteboard space would make learning more visible and provide the instructors with a quick method to assess learning. Some of the rooms have projector screens that hide the whiteboards. It is desired to have the screens moved to the corner of the room so as to not take away from the ability to utilize the whiteboards simultaneously. Other rooms that are larger are in need of a second projector and/or screen so that the students may see it better.

Step B: Answer the following questions:

1. Is it imperative that this resource request be processed now rather than during the next comprehensive program review? Why?

It is imperative that this be completed sooner than later as our current rooms are extremely outdated for active learning purposes. Funding this request would allow our department to be more current with the pedagogy of mathematics and be prepared for the changes brought by the bills AB 705, AB 1705 and other future reforms. Because AB 1705 is already going into effect July 1, 2023 and the bill was not passed until Fall 2022, time is of the essence to make the adjustments necessary to properly prepare for the changes the law will have on our courses.

2. How will this additional resource allocation specifically enhance your program's services, activities, processes, etc. to continue or improve student learning and achievement?
    - Is the resource request personnel-related? If so, please provide evidence to justify the requested positions such as retirements, program growth or curricular demands, full-time/adjunct ratios, etc.

This request is not personnel related.

Several studies on collaborative spaces and team-based learning show that there is an improvement on retention and learning gains for students of all levels, genders, and races. Such learning environment can be designed to facilitate interactions between small groups working on interesting tasks, simulations, or group presentations. However, to have a significant impact in math courses several classrooms at Fullerton College will have to be repurposed and current furniture will have to be replaced with more modern desks that are conducive for teamwork. Restructuring the physical space has the added benefit that it will encourage the instructors to rethink their teaching and the

way they engage with students. This would also provide an opportunity for instructors to consider their role in the classroom as facilitators of learning.

3. How will this additional resource allocation help you serve the college mission or strategic initiatives, and/or your program's goals for improvement, as stated in your last program review?

The new furniture would lend itself to a better environment for alternative teaching methodologies such as flipped courses, as stated in our previous math department goals. This request promotes the college's goals and objectives by promoting success for every student (Goal #1) and cultivating a culture of equity (Goal #2). The new furniture would improve student critical thinking skills and increase the completion of courses by allowing students to collaborate more efficiently. We also aim to remove institutional barriers to student equity and success by creating a sense of belonging through communities of learners. Several studies on collaborative spaces and team-based learning show that there is an improvement on retention and learning gains for students of all levels, genders, and races. Such learning environment can be designed to facilitate interactions between small groups working on interesting tasks, simulations, or group presentations. However, to have a significant impact in math courses several classrooms at Fullerton College will have to be repurposed and

current furniture will have to be replaced with more modern desks that are conducive for teamwork. Physical restructuring would not be an option as the current furniture does not easily allow for collaborative or active learning.

Step C: Complete this chart with details of the request:

Type of Resource	**Requested Dollar Amount**	**Potential Funding Source** It is only necessary to list potential funding sources if you are aware of specific grants/program funds appropriate to the request, such as Strong Workforce.
Personnel		
Facilities		
Equipment	We need desks and chairs designed for collaborative spaces. The cost for 53 desks and 53 chairs is about $27,000. This includes shipping and installation. We would also need to include whiteboards that can be added to every wall to amplify the space for sharing ideas. The goal is to replace furniture in at least 3 classrooms which would cost $81,000. We need additional whiteboards installed in the rooms that designated for mathematics. The cost for one wall of whiteboards is approximately $10,000 which includes installation. The goal is to add whiteboards in all 13 rooms that are currently designated for mathematics. This cost would be	

	$180,000. We need to have additional projectors and/or screens as well as some relocation of projector screens in some of our math classrooms. The anticipated cost for each room would be about $5,000. It might be nice to start the project in at least 5 of the rooms mathematics currently is assigned to which means the total cost would be $25,000.	
Supplies		
Computer Hardware		
Computer Software		
Training		
Other		
Total Requested Amount:	**$286,000**	

Request 2

Step A: Briefly describe the request.

This request is for funds to purchase ALEKS access codes at $50 each for students in Math 100 and Math 143 classes during the 2023-2024 academic year. ALEKS is an online adaptive learning system that is driven by 30 years of student data and artificial intelligence programming to create individualized pathways for each student's learning needs. ALEKS is currently being used to provide extra support in some Math 100 and Math 143 classes. Students currently must pay for ALEKS access.

The usual price for 18 weeks of ALEKS access ranges from $99 to $130 and above, depending on the course level. The Math department negotiated a price of $60 for all FC students, which is the price they are currently paying.

This request is for funds for the Math department to purchase codes in bulk from parent company McGraw-Hill for instructors to provide to Math 100 and Math 143 students at no charge. As a bulk order, the price will be $50 per code.

Step B: Answer the following questions:

1. Is it imperative that this resource request be processed now rather than during the next comprehensive program review? Why?

Some math faculty have used ALEKS in their classes over the last several years (Math 15, 20 and 40 which are no longer offered as per AB 705, and currently in Math 100 and Math 143). One Math 100

instructor, Cindy Zarske, has used ALEKS since fall of 2019 with good success and excellent student feedback. With AB 705, all students are eligible to enroll in Math 100. Many of them feel nervous about taking a math course, and lack the skills needed to succeed. The ALEKS individualized system fills in the gaps in that unique student's math background, and gives them confidence that they can indeed succeed in math.

Last semester (spring 2023), two faculty members (Ketan "Kenny" Shah and Dao Vo) are piloting the use of ALEKS in Math 143, College Algebra with Support. They report initial good results, and also that they will be working with the ALEKS course design team over the summer "to create a perfect course for our students taking College Algebra so that they can enhance their experience as well as become successful at the end of the semester which will help them transition well in Calculus."

Math 141 College Algebra is extremely dense with difficult material. It has long been the most challenging course the math department faces in our goal of increasing successful completion rates. Math 143, the support version of College Algebra, now has the lowest successful completion rate of all math courses. Our hope and expectation is that ALEKS will be an excellent tool to help these students who need their prerequisite math skills strengthened, and to help them navigate the density of the course material.

This funding is imperative due to the fact that we need the success rates for our classes to improve and we also have the added pressure of AB 1705 which will potentially eliminate classes that students take prior to calculus. If we have already worked with this program extensively, we can potentially use it to support our STEM students when AB 1705 takes full effect in Fall 2025.

This proposal requests funds to purchase the number of ALEKS codes sufficient to meet these goals:

Math 100:
Purchase codes for students of any Math 100 instructor that wishes to incorporate ALEKS in their Math 100 classes in 2024-2025. Cindy Zarske, the faculty member that has been using these materials since fall of 2019, agrees to share her Math 100 ALEKS course design with any Math 100 instructor wishing to copy and use it.

Math 143:
Fall 2024: Purchase codes for the three sections of Math 143 taught by piloting instructors Kenny Shah and Dao Vo so they can continue their pilot and refine the incorporation of ALEKS into Math 143 classes.
Spring -Summer 2025: Purchase codes for students of any Math 143 instructor that wishes to incorporate ALEKS in their Math 143 classes. Professor Shah and Professor Vo agree to share the ALEKS course design they develop in their pilot with any Math 143 instructor wishing to copy and use it.

2. How will this additional resource allocation specifically enhance your program's services, activities, processes, etc. to continue or improve student learning and achievement?
    - Is the resource request personnel-related? If so, please provide evidence to justify the requested positions such as retirements, program growth or curricular demands, full-time/adjunct ratios, etc.

This request is not personnel related.

ALEKS (**A**ssessment and **LE**arning in **K**nowledge **S**paces) is an online learning program that creates an individualized pathway for each student through the math skills they need for success in their math courses. ALEKS has a superior ability to address the unique knowledge space and learning needs of each individual student by assessing the topics that student needs to learn or review, and then generating a specific best-fit pathway through the topics for that particular student. The programmers of ALEKS have 30 years of student data from students using the program. They feed this data through artificial intelligence to create a map of each student's current knowledge space, and generate the ideal pathway for that student's unique knowledge space and learning needs. ALEKS then continues to assess the student's growing knowledge space and adjusts their pathway accordingly.

This research paper co-authored by two university professors and two ALEKS representatives describes the knowledge space theory and programming used by ALEKS to create the pathway for each student: https://www.aleks.com/about_aleks/Science_Behind_ALEKS.pdf

From the student perspective, working through this pathway is called "completing my ALEKS pie," where the slices of the pie are different math strands and topics. As the student reaches milestones (certain number of topics learned, completing a slice of the pie, etc.), ALEKS sends them congratulations messages, badges and certificates to encourage their progress.

ALEKS is already recognized and supported by Fullerton College as the best product to help underprepared math students build the math skills they need to successfully complete their transfer-level math course. FC's gold standard program for helping students build their math skills - the Math Success Program – has used ALEKS for years as its primary tool to help students achieve success in their math courses. The college pays for the ALEKS codes,and provides codes to students in the Math Success Program at no cost.

3. How will this additional resource allocation help you serve the college mission or strategic initiatives, and/or your program's goals for improvement, as stated in your last program review?

The ALEKS Pie (personalized pathway) is used to reinforce and fill in the gaps in each student's prerequisite knowledge space with an individualized pathway for that unique student. For a given topic, multiple problems can be generated that present new scenarios each time rather than just changing the numbers of the original problem. ALEKS provides a complete explanation of each scenario to help the student learn the concept. Then a different scenario is generated for the same topic so the student can practice applying that concept to new situations. This is one of the ways that ALEKS supports critical thinking and problem solving (College Goal 1.3).

In the Math department's 2021 Program Review, SAP #1 was to create support for students at all levels through workshops and/or boot camps. ALEKS has been used in these boot camps, and the college has supported providing ALEKS codes to these students at no cost.

SAP #1 for Boot Camps and this new request for ALEKS codes for class use address College Goal #1 and Objectives 1.3 and 1.4:

Goal #1: Promote success for every student
Objectives:
1.3: Improve student critical thinking skills
1.4: Increase completion of courses, certificate and degree

programs, and transfer-readiness

The Math department continues to support out-of-class programs like boot camps and the Math Success Program, and strongly encourages students to participate. But many students' schedules are so overloaded with classes, work, and family responsibilities that they are not able to commit to these extra programs. Also, boot camps understandably need to focus on STEM students where AB 705 has created the most critical situation, so Math 100 workshops have not been offered and there are no plans to offer them in the future.

The Math department is committed to student equity and closing the achievement gap. Making high quality instructional resources available to all students, including those whose financial and family obligations make it impossible for them to commit time to programs outside of the classroom, is critical for these goals. This need is particularly acute now that we have fully implemented AB 705 so that students no longer have the option to enroll in a prerequisite course to learn the math skills needed for success in their transfer-level course. We must find ways to help students within the context of their transfer-level math classes. This equity-minded request for funds asks that the same support Fullerton College has already provided for students who are able to join extra programs like boot camps and the Math Success Program be extended to those students who cannot.

Step C: Complete this chart with details of the request:

Type of Resource	**Requested Dollar Amount**	**Potential Funding Source** It is only necessary to list potential funding sources if you are aware of specific grants/program funds appropriate to the request, such as Strong Workforce.
Personnel		
Facilities		
Equipment		
Supplies		
Computer Hardware		
Computer Software	ALEKS codes at bulk rate of $50 each: Math 100: 800 codes x $50 = $40,000 Math 143: 350 codes x $50 = $17,500	
Training		
Other		
Total Requested Amount:	**$57,500**	