



## Fullerton College Program Review and Planning

### Self-Study for Instructional Programs

Fall 2021

# MATHEMATICS

#### Statement of collaboration

The program faculty members listed below collaborated in an open and forthright dialogue to prepare this Self Study. Statements included herein accurately reflect the conclusions and opinions by consensus of the program faculty involved in the comprehensive self-study.

#### Participants in the self-study

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#### Authorization

After the document is complete, it must be signed by the Principal Author, the Department Coordinator, and the Dean prior to submission to the Program Review and Planning Committee.

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## 1.0 Executive Summary

Since the last program review cycle in 2017, the math department has been in a very dynamic mode, adjusting and adapting to many external influences, including California's new AB 705 legislation which became law on January 1, 2018, and the COVID pandemic which closed the Fullerton College campus precipitously in March, 2020. To call these forces "disruptive" would be an understatement, but the department has consistently risen to face these challenges, innovating at a rapid pace while still maintaining the integrity of its courses and programs.

In response to the AB 705 legislation, which says no student may be denied entry into transfer-level math (and English) classes, the department has been very nimble, with several different approaches to this new regime evolving in succession. For example, to prepare students for transfer-level Statistics, the department experimented for a year with a new Pre-Statistics course. The department quickly transitioned to a Support for Introductory Statistics course, giving students an additional class to take at the same time as their Statistics class, rather than before. And this year the department is piloting the Enhanced Introductory Probability and Statistics course which gives students additional support within the very same Statistics course. Such rapid course development shows the department is willing to continue to experiment to find the best possible response to AB 705.

The department has followed a similar path for College Algebra, creating Enhanced College Algebra as a course which combines the standard College Algebra curriculum with the support students need to succeed in the class. For three other courses—Calculus for Business, Liberal Arts Mathematics, and Trigonometry—the department has also created support courses.

These new courses have had the desired effect of decreasing the total time it takes students to complete the math requirements for their degrees. The department has virtually eliminated the Basic Mathematics, Pre-Algebra, Elementary Algebra, and Intermediate Algebra sections that previously represented almost two-thirds of its class offerings.

The second major challenge of the last five years was the worldwide health crisis which closed the Fullerton College campus in March 2020. The math department responded admirably, as did the entire campus, transitioning to completely remote instruction after just two days of training. The net effect of nearly two years of reaction to the pandemic is that many more teachers in the department have trained to teach online; online courses have been strengthened to comply with Title V requirements and good teaching practices; and every teacher has, by necessity, learned to teach remotely, via Zoom and/or Big Blue Button. This may allow asynchronous and synchronous courses to continue to occupy an important part of the department's offerings in the future, even after a full re-opening of the campus.

To respond to possible learning loss during the crisis, the math department intends to offer workshops and/or bootcamps at all levels led by Math faculty. The department also intends to experiment with new tutoring modalities in the Math Lab.

In addition to the previously mentioned innovations, the department has also rewritten its Program Student Learning Outcomes, and is implementing a new method of assessing them, ensuring continual program improvement into the future.

While the department can point to many successes in the face of daunting challenges, there are still opportunities for growth and improvement. In general, department enrollment has declined by 26.4% over the past five years, compared to a 9.8% decline for all programs. At first glance, such a trend might seem alarming; however, we remind the reader that AB 705 has required our department to eliminate the basic skills courses that formerly accounted for about 60% of the department's generated FTES. While some of this loss is likely permanent, new FTES is generated by our support courses, which provide just-in-time remediation that has significantly increased throughput for our students, especially under-prepared students in their first college-level math courses. While this new FTES certainly does not fully replace the lost FTES, the new funding formula does allocate additional monies based on this throughput rate.

Although students are now completing their transfer-level math classes sooner, due to AB 705's shortening of the curricular pathway for most students, the overall success rate across the department remains low. In particular, the so-called "achievement gap" between different ethnic groups has remained stubbornly in place.

Even before AB 705 was enacted, our faculty were already addressing concerns that transfer-level courses comprised a relatively low percentage of our offerings. We began to increase the quality and number of our college-level offerings and focused in particular on growing our entry-level courses, such as MATH 100, 120, 141, 142, and 151. FTES in these courses has dramatically increased since the department decided to make that a priority. When we first experimented with support courses based on models tried at other California community colleges, we found that it was not sustainable to offer separate support courses -- students simply did not choose to take these optional courses. So we are now expanding the curriculum within our entry-level courses to create "enhanced" courses with built-in support content and instruction time. This newer approach has already been more successful. However, with COVID-19 forcing us to teach online only, and with students having the opportunity to drop courses with the excused option, we have naturally seen a decline in retention and success, especially in our more challenging courses. Between the curriculum changes dictated by AB 705, the need to teach online for the last two years, and the overall impact of the pandemic on our students, it is difficult to attribute data and trends to any specific causes within the department's control.

Many of the best high-impact enrichment-oriented activities for the department's students—Math Club, Math Colloquium, and the AMATYC and Putnam Exam competitions—have been completely derailed by the campus shut-down, effectively ending, for now, these opportunities for exploration and interaction with professors and other students that gave majors in our department a special experience unique to Fullerton College. The math department intends to ramp these activities back up with the return to campus in Spring 2022. This will involve both faculty members and compensated student interns.

Of course, what is past is prologue, so all of these changes and challenges help us define our future plans. In response to the new course offerings, the department intends to identify lead teachers for each of the new support courses. These lead teachers will be supported by professional expert pay to develop a pool of course materials teachers can share, conduct workshops, and mentor faculty teaching these new courses. The department will also seek ways to increase student awareness of and enthusiasm for the new courses. In some cases, perhaps only a name change is necessary—for example, many students this year mistakenly thought the courses that included the word “enhanced” in the title (such as MATH 143 Enhanced College Algebra) were meant to be more difficult when they are actually meant to be more supportive. So we learn from all these experiences and adapt in order to provide our students with a great math education.

## 2.0 Mission

*Please explain briefly how your program contributes to the College's mission, vision, core values, and goals. Highlight any new contributions since your most recent self-study. If your department has a mission statement, please share it. If not then please consider discussing one with your colleagues.*

### *Mission*

The Fullerton College Mathematics Department continues to embody the spirit of Fullerton College's mission statement as it explores new student pathways through degree programs, updates degree options, and develops programs to support student learning, foster an inclusive environment, and help students develop as leaders and engaged community members.

The math department has long provided a rich assortment of courses for students to take to attain the college-level proficiencies needed for the different pathways they may take towards their diverse degree, certificate, or transfer goals, including the Science, Technology, Engineering, and Mathematics (STEM) pathway, the Liberal Arts Math pathway, the Business Calculus pathway, and the Elementary Teaching pathway, among others. Since the 2017-2018 Program Review cycle, the math department has eliminated its basic skills offerings in accordance with AB 705, as students can now take a college-level math course immediately upon entering Fullerton College.

The math department is also responding to an exploding demand for virtual learning due to the Covid-19 pandemic. Both synchronous and asynchronous modes of learning have been introduced to accommodate this demand. In addition, due to AB 705, we have increased Liberal Arts Math and Statistics classes and now offer optional support courses for those who are underprepared. The math department has also articulated with other departments to learn how it can better meet the needs of students pursuing certificates. The math department continues to offer the Associate in Science-Transfer (AS-T), and Associate in Arts (AA) degrees; students who earn the transfer degree are guaranteed transfer to the California State University (CSU) system. And the math department has updated its course descriptions to conform with the Course Identification Numbering System (C-ID) project of the CSU to standardize curriculum across California. All these recent improvements attest to a forward-looking department, adjusting nimbly to many changing demands.

To support students academically, the math department continues to run the Math Lab which is dedicated to math tutoring and enrichment activities. During the pandemic, the Math Lab has added virtual tutoring to accommodate students. The math department has also been working with the Fullerton College Math Institute for Learning Enhancement Success (FC MILES) to reduce the achievement gap. The department offers its courses through various learning environments, with face-to-face, online, and hybrid courses, to reach students with different learning styles and schedules. The department works closely with Disabled Student Services and the Veterans Resource Center to help students meet their educational goals and has had robust participation in the Fullerton College Hornets

Tutoring program, with more professors and class sections being supported by the program every semester. These measures demonstrate the commitment of the math department to student success.

The math department also gives students many opportunities to become responsible leaders, with interested students pursuing roles as Hornet, Math Lab, and FC MILES tutors. The department's Math Colloquium gives students an opportunity to prepare a professional math talk and experience presenting it to an audience, complete with a Questions & Answers segment. And math professors are experimenting with flipped classrooms, collaborative learning activities, and other group-learning experiences that allow all students to become more active and responsible learners. These opportunities allow students to develop their leadership skills while pursuing their coursework.

The math department also works to connect its students and faculty with the larger community. Some professors, independently or in conjunction with the Fullerton College Career and Life Planning Center, incorporate career research or informational interviews with professionals into course work, and/or have guest speakers from industry visit their classes. Honors classes allow students to write their own research papers, working with the research librarians and other support staff to develop their research question and use the databases available to the college. The math department is involved in with the community outreach programs on campus. For example, the math department hosts a "Fun with Numbers" station in the KinderCaminata program every spring, when hundreds of local kindergartners visit campus. Some professors participate in the annual Manufacturing Day organized by the Career Education program, which presents high school students with various career options as they tour the campus. The math department is working towards a dual enrollment program with local high schools to offer college level courses to high school students. Some professors participate in the Study Abroad program and advertise for upcoming programs. Faculty are in close communication with the Math Department at California State University Fullerton and have participated in joint programs. Dana Clahane served as an external reviewer for the CSUF Math Department's latest external Performance Program Review. All of these actions help Fullerton College math students and faculty become more engaged with the larger community.

### *Vision*

The math department supports the Fullerton College vision of transforming lives and inspiring positive change in the world. The entire math faculty is driven by a love and appreciation for the field of mathematics and strives to pass that perspective on to others. The effort disciplined thinking required to study math inspires students to realize they can achieve anything they put their minds to. The study of mathematics teaches students to logically analyze and work through problems in order to find valid solutions, skills which are critical in almost any career or field of study. Mathematics is a powerful tool for global understanding and communication and is used in practically every career in some way, especially the fields of science and technology that are rapidly transforming our society. As our students learn these skills, the result is a positive change in the world.

The math department aspires to meet students at whatever level of mathematical understanding they possess. Through resources such as support courses, enhanced courses, the Math Lab, and Hornets Tutoring, we are providing a variety of helpful resources to all of our students. As the students increase their understanding of the subject and see that the faculty and staff care about their success, lives are transformed.

### *Core Values*

The Math Department embodies each of Fullerton College's core values as it pursues its work. It fosters the values of community and partnership as it participates in the college-wide Honors, Teacher Prep, Hornets Tutoring, and FC MILES programs. The Math Colloquium invites mathematicians from many local universities to speak on our campus, connecting the Fullerton College math student to the larger mathematical community. Individual instructors encourage students to engage with professionals in their field of interest, or have guest speakers come onto campus. All these activities support the values of community and partnership.

Diversity and equity are supported as students from diverse backgrounds work together to study the universal language of mathematics. Our faculty is comprised of professors with diverse backgrounds, and we embrace that diversity among our students. The department supports equity for our students, as demonstrated by our participation in the Hornets Tutoring and FC MILES programs, as well as our close work with the Disability Support Services (DSS) office to implement student accommodations. The department also hosts "Women in Mathematics" events to encourage more female students to study and pursue careers in mathematics. Some highlights of these events are the student panels, guest speakers, information on careers in mathematics, and networking among students and professionals.

The math department continues to stress excellence and integrity as leading values, offering students a broad range of course offerings, allowing students to excel at whatever level of math they arrive at. For math majors, the department offers access to a rich curriculum, the Math Colloquium and Seminars, a growing list of scholarship opportunities, and participation in national math contests such as the Putnam exam, giving our department a strong reputation, even when compared to four-year universities. Our faculty work to create a culture of integrity in the classroom, both academically and personally. We expect our students to adhere to the Fullerton College Academic Honesty policy, and we also work to cultivate an environment where all participants are respected by one another.

The math department is also built on the idea of growth, helping students progress and attain knowledge and understanding they didn't have before. Indeed, the department itself is growing, responding to changing demands with new courses, new student pathways, and new instructional delivery methods. The new courses have included support and enhanced courses to assist under-prepared students. The program is involved in Guided Pathways to guide our students to their goal in an efficient way. Our new instructional delivery methods support not only the value of growth, but also innovation. We have adapted to new modes of instruction which implement best practices and meta-cognition. In particular, faculty members have worked tirelessly to learn the necessary technical skills

and effective methods to deliver content online, both synchronously and asynchronously, in response to the Covid-19 pandemic. And many faculty are members of the American Mathematical Society, Mathematical Association of America, California Math Council – Community Colleges South, or American Mathematical Association of Two-Year Colleges. Faculty members attend conferences and workshops in order to stay current with the latest developments in teaching mathematics, and in mathematics itself.

The math department supports the values of inclusivity and respect among students, faculty, and the larger college community. It participates in shared decision-making with strong involvement on the committees for Student Learning Outcomes (SLOs), Staff Development, and Curriculum. The math department also has a large contingent of senators in the Academic Senate and representation in United Faculty, demonstrating commitment to inclusivity and respect.

Finally, the math department accepts its responsibility to provide a quality education to students, with an emphasis on quantitative reasoning, both of which help students to improve their lives and make the world a better place.

### *College Goals*

The math department is completely committed to the college's goals, which are also seen as the department's goals. The math department promotes student success through active participation with many student support programs, such as FC MILES, Hornets Tutoring, and the Math Lab. The department's commitment to student success is also demonstrated through improved student placement methods, new course offerings, and new teaching methodologies. These create clear pathways to their goal for each student, which are important for increasing transfer readiness, and helping students complete their degree and/or certificate.

Participation in the above-mentioned support services, which help to ensure the success of all students, demonstrates the department's commitment to student equity and reducing the achievement gap. In particular, the department's work with Hornets Tutoring and FC MILES, which are specifically designed for historically underperforming groups, further supports the college goal of equity.

The college goal of pursuing connections with community is supported by several of the math department's activities. For example, the department connects with neighboring institutions through the Colloquium and Math Club, connects with local businesses through informational interviews and guest speakers, and connects with future students through the KinderCaminata.

Finally, the goal to commit to accountability and continuous quality improvement is supported by the development and assessment of SLOs. Offering high quality instructional support programs, ensuring resources are available to students, and providing career development opportunities through seminars and the Colloquium are key to the success of our students.

### 3.0 Students

Because there is a nearly infinite amount of student data that can be studied, please focus your analysis on the trends that stand out. The Office of Institutional Effectiveness (OIE) is providing data that will help you zero in on bottlenecks, gateways, and student equity issues. As per accreditation standards, OIE data will be broken down by race, ethnicity, gender, and other demographic categories. One of the purposes of this section is to identify inequities and make plans to remedy them.

### 3.1 Enrollment demographics

**3.1.1** Using the data provided by the OIE, briefly describe the enrollment trends in the program over the past five years.

Over the last 5 years, enrollment is down over 26% for our program (Table 1, below), compared to a 9.8% decrease for all other programs. This trend could be attributed to a number of factors such as:

1. Elimination of the courses MATH 7, 15, 20, 30, 41 in response to AB 705;
2. A significant reduction of the number MATH 40 sections in response to AB 705; and
3. The transition to teaching remotely due to the pandemic.

While overall enrollments (seat count) decreased by 26% over the past five years, enrollments in MATH 100, 120, 171, and 172 actually increased by more than 30% (Table 2, below). And over the last year, enrollments in our calculus sequence through MATH 252 and 253 have remained approximately the same; this is exciting because prior to the pandemic we never offered any courses at or above the calculus level in hybrid or online form.

Table 1: Mathematics Enrollments, 2016-21

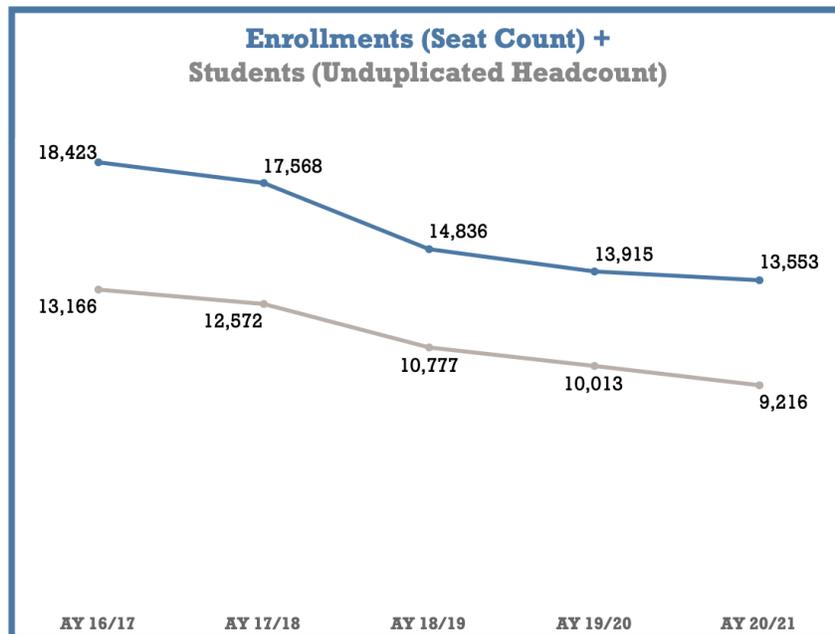


Table 2: Mathematics Enrollments (Seat Count) by Course, 2016-21\*\*

Course	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21	AY 20/21	AY 20/21
MATH 007 F	44	49					-100%
MATH 015 F	1,108	949	293				-100%
MATH 020 F	3,152	2,756	723				-100%
MATH 024 F			538	188		-100%	
MATH 026 F				523	825	58%	
MATH 030 F	248	213	186	42		-100%	-100%
MATH 031 F			8	373	593	59%	
MATH 033 F					32		
MATH 034 F					129		
MATH 040 F	3,065	2,969	2,043	1,231	1,054	-14%	-66%
MATH 041 F	888	1,020	1,294	619	309	-50%	-65%
MATH 043 F	224	70	118				-100%
MATH 100 F	1,172	1,171	1,462	2,313	2,110	-9%	80%
MATH 120 F	1,753	1,859	1,940	2,435	2,498	3%	42%
MATH 120HF	18	19	5	24	24	0%	33%
MATH 129 F	714	683	635	605	448	-26%	-37%
MATH 130 F	636	631	612	537	510	-5%	-20%
MATH 141 F	1,579	1,298	1,289	1,382	1,446	5%	-8%
MATH 141HF	6	4		17	9	-47%	50%
MATH 142 F	1,061	941	919	1,000	955	-5%	-10%
MATH 150AF	1,196	213					-100%
MATH 150BF	721	100					-100%
MATH 150HF	20						-100%
MATH 151 F		992	1,051	1,010	1,012	0%	
MATH 151HF		9	9	12	15	25%	
MATH 152 F		652	710	641	681	6%	
MATH 152HF		3	3	9	12	33%	
MATH 171 F	117	129	160	155	154	-1%	32%
MATH 172 F	60	60	70	120	117	-3%	95%
MATH 203 F	39	40	36	39	33	-15%	-15%
MATH 250AF	337	69					-100%
MATH 250BF	160	32					-100%
MATH 250CF	64	10					-100%
MATH 251 F		322	352	323	311	-4%	
MATH 252 F		193	222	194	197	2%	
MATH 253 F		70	121	101	79	-22%	
MATH 260 F	9	9					-100%
MATH 290 F	8	10	9	4		-100%	-100%
MATH 290HF	6	6	13	3		-100%	-100%
MATH 291 F	7	2	3	6		-100%	-100%
MATH 291HF	2	8	4	3		-100%	-100%
MATH 295 F	2	3	7	4		-100%	-100%
MATH 295HF	7	4	1	2		-100%	-100%
<b>Grand Total</b>	<b>18,423</b>	<b>17,568</b>	<b>14,836</b>	<b>13,915</b>	<b>13,553</b>	<b>-3%</b>	<b>-26%</b>

\*\* Note: The first column labelled AY 20/21 shows the decrease from AY 19/20 to AY 20/21; the second column shows the decrease from AY 16/17 to AY 20/21.

**3.1.2** *Using the data provided by the OIE, describe the student population the department serves. Do you have a way of determining which students are majors, for example through a gateway course? Please explain.*

In 2020-21, 82% of mathematics enrollments were in transfer-level courses, 76% were by low-income students, and 58.2% were by Latinx students (Table 3, below).

There is no “gateway course” that allows us to identify math majors, and even our most advanced math courses are requirements for other majors, so the only reliable method to determine which students are majors is to ask them or OIE. According to the latter (Table 4, below):

In 2020-21, there were 294 mathematics majors. Of these:

- 51.9% were Latinx, 17.0% were Asian, and 14.6% were White;
- 72% were low-income;
- 51.9% were male, 39.4% were female, and 8.6% were unknown;
- 15% were college graduates.

In 2020-21, there were 13,259 non-majors. Of these:

- 58.4% were Latinx, 14.7% were White, and 12.3% were Asian;
- 76% were low-income;
- 48.2% were male, 47.7% were female, and 3.5% were unknown;
- 82% took at least one transfer-level class;
- 37% were under the age of 20.

Table 3: Mathematics Enrollment Demographics, AY 20/21

Enrollments in Mathematics Compared to All Other Programs: AY 20/21		
% Degree   Transfer	All Other Programs	77%
	This Program	82%
% Certificate	All Other Programs	3%
	This Program	1%
% Career Dev.	All Other Programs	6%
	This Program	4%
% Special Admit	All Other Programs	3%
	This Program	1%
% Age: Under 20	All Other Programs	32%
	This Program	37%
% Age: 20 - 24	All Other Programs	42%
	This Program	40%
% Age: 25+	All Other Programs	26%
	This Program	22%
% Majors	All Other Programs	23%
	This Program	2%
% 3+ Program Courses / Year	All Other Programs	6%
	This Program	13%
% Special Admit Last Year	All Other Programs	7%
	This Program	12%
% 24+ Unit Attempts This Year	All Other Programs	23%
	This Program	43%
% College Grad	All Other Programs	7%
	This Program	5%
% DSS	All Other Programs	6%
	This Program	5%
% Foster Youth	All Other Programs	1%
	This Program	0%
% LGBT	All Other Programs	9%
	This Program	9%
% Low-Income	All Other Programs	74%
	This Program	76%
% Veteran	All Other Programs	1%
	This Program	2%

AY 20/21  
Enrollments  
(Seat Count) for  
"This Program"  
Mathematics

**13,553**

AY 20/21  
Enrollments  
(Seat Count) for  
"All Other  
Programs"

**116,430**

Mathematics Enrollments by Race   Ethnicity   Ancestry		
	All Other Prog..	This Program
Amer. Indian   Alaska N..	0.2%	0.2%
Asian	11.1%	12.4%
Black   African Amer.	2.9%	2.3%
Filipino	2.7%	3.0%
Latinx	57.6%	58.2%
Native Hawaiian   Pacifi..	0.2%	0.2%
Two or More	3.5%	3.3%
Unknown	5.6%	5.8%
White	16.2%	14.7%

Mathematics Enrollments by Gender		
	All Other Programs	This Program
Female	53.7%	47.5%
Male	41.7%	48.2%
Different Ident..	4.6%	4.2%

Table 4: Majors vs Non-Majors in Mathematics Courses, AY 20/21

Majors vs. Non-Majors in Mathematics Courses: AY 20/21		
% Degree   Transfer	Non-Majors	82%
	Majors	71%
% Certificate	Non-Majors	1%
	Majors	1%
% Career Dev.	Non-Majors	4%
	Majors	6%
% Special Admit	Non-Majors	1%
	Majors	0%
% Age: Under 20	Non-Majors	37%
	Majors	31%
% Age: 20 - 24	Non-Majors	41%
	Majors	39%
% Age: 25+	Non-Majors	22%
	Majors	30%
% Majors	Non-Majors	0%
	Majors	100%
% 3+ Program Courses / Year	Non-Majors	13%
	Majors	30%
% Special Admit Last Year	Non-Majors	12%
	Majors	6%
% 24+ Unit Attempts This Year	Non-Majors	43%
	Majors	37%
% College Grad	Non-Majors	4%
	Majors	15%
% DSS	Non-Majors	5%
	Majors	5%
% Foster Youth	Non-Majors	0%
	Majors	0%
% LGBT	Non-Majors	9%
	Majors	8%
% Low-Income	Non-Majors	76%
	Majors	72%
% Veteran	Non-Majors	2%
	Majors	2%

AY 20/21  
Enrollments in  
Mathematics  
courses for Majors

**294**

AY 20/21  
Enrollments in  
Mathematics  
courses for  
Non-Majors

**13,259**

Mathematics Enrollments by Race   Ethnicity   Ancestry		
	Non-Majors	Majors
Amer. Indian   Alaska N..	0.2%	
Asian	12.3%	17.0%
Black   African Amer.	2.2%	3.9%
Filipino	3.0%	
Latinx	58.4%	51.9%
Native Hawaiian   Pacifi..	0.2%	
Two or More	3.3%	
Unknown	5.7%	8.4%
White	14.7%	14.6%

Mathematics Enrollments by Gender		
	Non-Majors	Majors
Female	47.7%	39.4%
Male	48.2%	51.9%
Non-Binary	0.6%	
Unknown	3.5%	6.6%

**3.1.3 Which classes have the highest demand and why? Are they offered regularly -- at different times of the day and week, in different formats (in-person, on-line, hybrid)? Please explain.**

In the last five years, the courses with the highest demand were MATH 120, 100, 141, 40, and 20 (Table 5). However, we no longer offer MATH 20, and only very few sections of MATH 40 in response to AB 705. So students are now able to enroll in transfer level courses immediately, which for most means one of the other three: MATH 100 (Mathematics for Liberal Arts), MATH 120 (Statistics), and MATH 141 (College Algebra, Pre-calculus).

Table 5: Courses with Most Enrollments

<b>5 Courses with Most Enrollments (5 Year Totals)</b>				
Course	Enrollments	Sections	% Online	% Evening
MATH 120 F	10,485	251	4%	24%
MATH 040 F	10,362	232	9%	21%
MATH 100 F	8,228	200	7%	18%
MATH 141 F	6,994	164	0%	26%
MATH 020 F	6,631	147	12%	27%

Overall enrollment in MATH 120 grew by 42% from 1,753 in 2016-17 to 2,498 in 2020-21 (Table 2). That increase is dwarfed only by MATH 100 enrollment, which increased by 80% from 1,172 in 2016-17 to 2,110 in 2020-21 (Table 2).

These trends could be explained by elimination of pre-requisite courses such as MATH 40 and our offerings of support classes such as MATH 26. We offered MATH 24, a pre-statistics course, in 2018-19 and 2019-20. This course was shown to be effective in 2019-20 per the student learning outcomes assessment. However, the overall enrollments in MATH 141 went down from 1,579 in 2016-17 to 1,446 in 2020-21 (Table 2). This decrease could be explained by the pandemic, a sudden transition to teaching MATH 141 remotely in Spring 2020, and teaching MATH 141 remotely with and without support in 2020-21. To improve retention rates in all high-demand classes, MATH 141 in particular, we will need embedded tutors and lead instructors to improve our students' experience in support classes such as MATH 31 and 26.

To meet student demand and help students reach their academic goals, MATH 100, 120, and 141 were offered at different times of the day with approximately 20% of the sections offered in the evening. We also offer sections of various courses on both Friday and Saturday. Prior to the pandemic, we had just one online section of MATH 120 per semester and one or two online or hybrid sections of MATH 100 per

semester. Prior to Fall 2021, we did not offer MATH 141 in hybrid or online formats. We are looking forward to seeing how teaching MATH 141 fully online has affected the success rate.

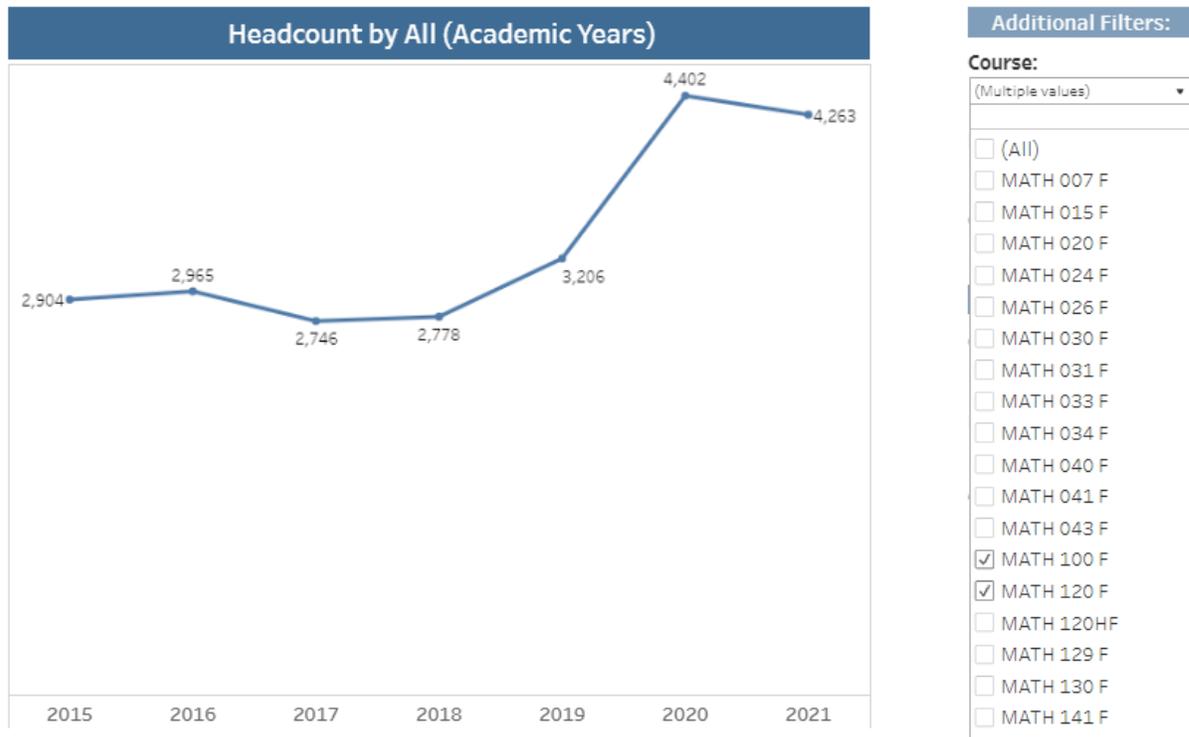
**3.1.4** *Please describe how course offerings match students' preparation and goals.*

To meet students' academic goals and match their preparation, we offer almost all of our classes at different times of the day and week in various formats. We have offered support classes for students enrolled in MATH 120, 130, 141, and 142. We had to cancel several sections of MATH 31, Support for College Algebra, in the past. We also had a few low-enrolled sections of MATH 26, Support for Statistics, in a few previous semesters. Classes with the highest demand such as MATH 100, 120, and 141 have no prerequisites. We offer one section of MATH 151HF and one section of MATH 120HF every fall semester and one section of MATH 152HF every spring semester to meet the needs of students enrolled in the Honors Program at Fullerton College. We have offered MATH 290HF, 291HF, and 295HF in fall and spring semesters to meet the needs of students enrolled in the Honors Program as well as the needs of both MATH majors and non-majors interested in exploring number theory, cryptography, and/or upper division math courses. We also offer these seminars in summer, though the newness of the seminars and their unique nature leaves opportunity for growth in these courses once we are back on campus.

**3.1.5** *Does enrollment vary by semester? Please describe how course offerings are adjusted to meet student demand and help students reach their academic goals.*

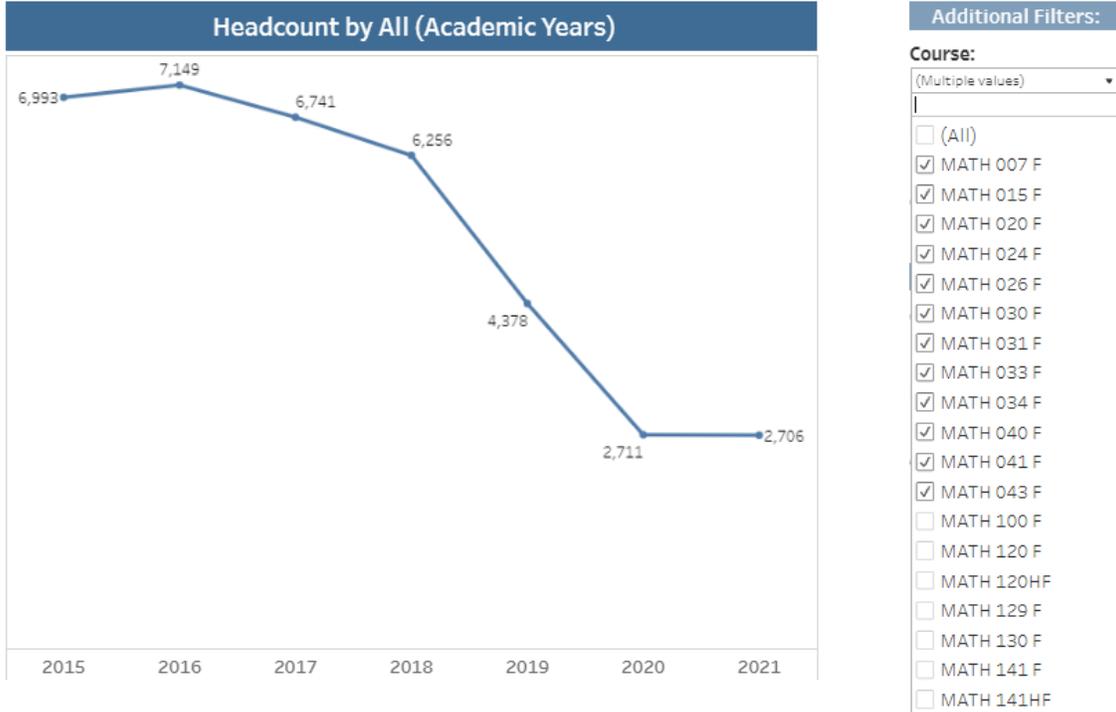
1. We typically offer more MATH 151 and 251 in the fall, and more MATH 152 and 252 in the spring, under the assumption that students work through that core 4-semester sequence with us.
2. Similarly, we tend to see more students in MATH 141 in the fall and MATH 142 in the spring.
3. We only offer MATH 203 in the spring, since the teacher prep students enroll in the prerequisite MATH 100 course in the fall.
4. AB 705 resulted in a dramatic increase in our MATH 100 and 120 offerings.

Table 6: Total Headcount in MATH 100 and MATH 120 in 2016-2021



5. AB 705 really pushes students to enroll in their math course in their first semester here. We will gradually see a decrease in the number of courses we can offer in the spring as we bolster our offerings in the fall for entering students.
6. We try to anticipate enrollments by looking at the demographics of the local high schools, and we watch how CSUF is handling their enrollments, since many students want to attend CSUF and come here if they are not admitted.
7. We regularly receive input on desired enrollment targets in terms of FTES, but scheduling is often a case of looking at previous years (fall to fall, spring to spring), predicting as best as we can, and making adjustments as needed.
8. It was a challenge to encourage students to enroll in sections linked with separate support classes. In much of the initial literature surrounding AB 705, corequisite courses seemed to be the primary way to serve our students who need extra support. Unfortunately, those sections that did have the support attached were often canceled. We are hopeful that the new courses with support built in will be more successful. Having lead instructors responsible for creating instructional materials, math instructors on duty in the Math Lab, and more embedded tutors are essential for higher fill, retention, and success rates in all support classes.
9. Since AB 705, our basic skills offerings have decreased to nearly zero now. For the 2021-22 year, it is likely that fewer than 100 students in all will take basic skills classes. Here is the enrollment of all basic skills courses (MATH 007-043) over the last 7 years:

Table 7: Total Headcount in Remedial Math Classes, 2016-21

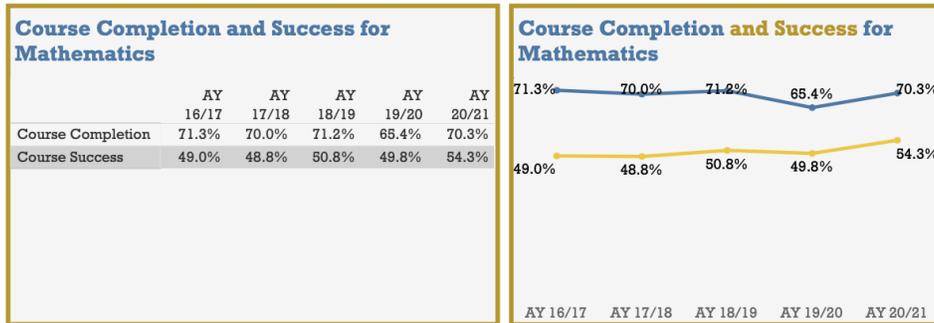


10. Finally, we often use our best judgement to estimate demand. For example, in simple terms we could take the enrollment in MATH 151, multiply by the success rate, and get a rough estimate of how many students will enroll in MATH 152 the following semester.

### 3.2 Student Achievement and Equity

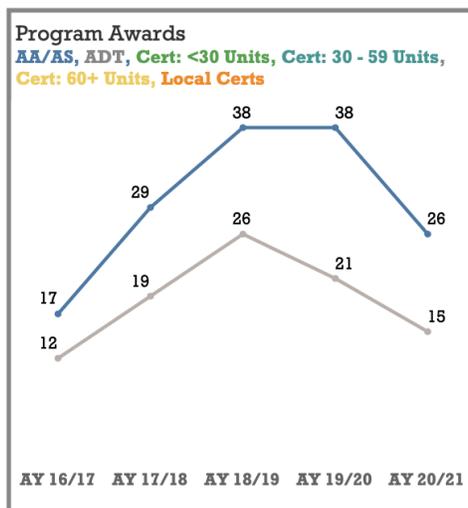
**3.2.1** Using the data provided by the OIE, briefly describe student achievement rates in your program over the past five years: completion, success, degrees/certificates, transfer, licensing, job placement, wage improvements (not all of these measures apply to every program).

Over the past five years, course completion remained steady at approximately 70% with a small decrease of about 5% in the 2019/20 school year:



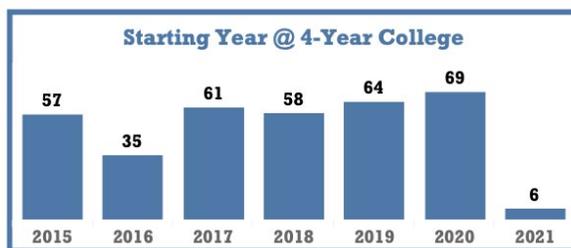
The statewide shutdown in March 2020 due to COVID-19 that forced many to stay home may have caused many students to drop their classes, possibly because students were not familiar with and/or not well-equipped for remote learning. And of course the excused withdrawal (EW) option for students, by design, made it easier to drop classes. Even so, course success remained steady at approximately 50%, with a small increase of about 5% in the 2020/21 school year (see above).

The number of math degrees awarded increased by approximately 20 per year between 2016/17 and 2018/2019:



From 2018/19 to 2019/20, the number of Math AS degrees awarded stayed the same, then dropped in 2020/21, the last full school year. In the meantime, the number of Math AS-T (associate degree for transfers) took an immediate downturn from 2018/19 to 2019/20. In response to the statewide shutdown in March 2020 due to COVID-19, all math classes at Fullerton College were converted to remote instruction. This halted the regular operations of the Math Club, Math Colloquium, and math competitions for the AMATYC and Putnam Exam. The loss of these central meetings, which were some of the Math Department's strengths, may have contributed to the decrease in the number of math majors and hence the number of degrees awarded. The department will re-instate these offerings on campus in Spring 2022, and this will hopefully return our math major count to growth mode.

Between 2015 and 2020, the number of math majors who transferred to a 4-year college increased on average by about 2 students per year, peaking at 69 in 2020. It is not clear why there is a significant dip away from this trend in 2016. One possibility is that the end of the Engage in STEM program drastically reduced the department's ability to support enrichment activities that stimulate interest in mathematics as a major. In 2021, there was a major decrease of 90% in the number of transfer students. This could be explained by the sudden COVID-19 shutdown and the loss of central meetings as explained above.



**3.2.2** Please pay special attention to equity issues -- where a group of students has an achievement rate that is below average. What factors can explain this?

Course completion rates and course success rates were below average among African-American, Latinx, and Native Hawaiian/Pacific Islanders students (see below). This could be explained by two main factors: First, in response to AB 705, the Math Department stopped offering MATH 20 in 2019 and made MATH 40 an advisory course; second, in-person classes were converted to remote in 2020 due to the COVID-19 shutdown, and students were not well-equipped for remote learning.

In addition, moving support centers such as the Math Lab and Academic Support Center online made it harder for students to get help. This is especially true for low-income students who cannot afford to pay for high-speed internet connections.

Note: According to the OIE, each negative number in the Gap columns in the two tables below is (the negative of) the number of additional students in that group who needed to complete a math course successfully in order for the group's course completion rate to be at the average for all students.

### Course Completion for 2016-2021 Combined

<b>by Race   Ethnicity   Ancestry</b>			
	Enrollments	Course Co..	Gap
Amer. Indian   Alaska Native	171	70.2%	
Asian	9,590	79.7%	
Black   African Amer.	1,912	63.6%	-121
Filipino	2,239	74.1%	
Latinx	45,701	66.5%	-3,606
Native Hawaiian   Pacific Island..	236	60.6%	-22
Two or More	2,541	72.1%	
Unknown	2,748	70.9%	
White	13,282	73.5%	

<b>by Gender</b>			
	Enrollments	Course Co..	Gap
Different Id..	2,323	67.5%	
Female	36,283	69.9%	
Male	39,794	69.7%	

<b>by DSS</b>			
	Enrollments	Course Completion	Gap
Not DSS	73,217	69.9%	
DSS	5,183	67.1%	

<b>by Foster Youth</b>			
	Enrollments	Course Completion	Gap
Not Foster Y..	77,964	69.8%	
Foster Youth	436	63.5%	-27

<b>by LGBT</b>			
	Enrollments	Course Completion	Gap
Not LGBT	74,703	69.8%	
LGBT	3,697	68.4%	

<b>by Low Income</b>			
	Enrollments	Course Completion	Gap
Not Low Income	14,145	74.7%	
Low Income	64,255	68.7%	-3,901

<b>by Military Status</b>			
	Enrollments	Course Completion	Gap
Not Military	76,361	69.5%	-6,376
Military	2,039	78.0%	

## Course Success for 2016-2021 Combined

<b>by Race   Ethnicity   Ancestry</b>			
	Enrollments	Course Success	Gap
Amer. Indian   Alaska Native	215	48.0%	
Asian	12,770	65.9%	
Black   African Amer.	2,493	39.2%	-240
Filipino	2,883	58.3%	
Latinx	87,701	44.9%	-5,384
Native Hawaiian   Pacific Islander	295	36.9%	-29
Two or More	3,236	54.5%	
Unknown	3,454	53.2%	
White	16,972	57.1%	

<b>by Gender</b>			
	Enrollments	Course Success	Gap
Female	46,250	50.8%	
Male	50,820	49.8%	
Different Id..	2,949	52.6%	

<b>by DSS</b>			
	Enrollments	Course Success	Gap
Not DSS	92,787	50.7%	
DSS	7,232	46.1%	-503

<b>by Foster Youth</b>			
	Enrollments	Course Success	Gap
Not Foster Youth	99,411	50.4%	
Foster Youth	608	46.6%	-37

<b>by LGBT</b>			
	Enrollments	Course Success	Gap
Not LGBT	95,438	50.3%	
LGBT	4,581	51.9%	

<b>by Low Income</b>			
	Enrollments	Course Success	Gap
Not Low Income	17,475	58.1%	
Low Income	82,544	48.6%	-7,540

<b>by Military</b>			
	Enrollments	Course Success	Gap
Not Military	97,285	50.2%	
Military	2,734	55.8%	

**3.2.3** *Does the department have regular discussions about equitable grading, attendance, late-work, and extra credit policies, or about other strategies for helping students succeed? Could reforming classroom policies help more students succeed? Please explain.*

The Math Department often holds meetings to discuss pedagogy, especially more so since the COVID-19 shutdown in Spring 2020. Topics of discussion include online teaching software, how to facilitate group activities online, rules and regulations pertaining to Title V, equitable grading, attendance check-ins, etc. In addition, the Math Department also maintains a share space on Canvas where faculty can ask questions and/or share their teaching approaches.

Since basic skills courses such as MATH 15 and MATH 20 were removed due to AB 705, the Math Department hopes to appoint lead teachers to create materials that will be used in all courses with support. We also hope to develop workshops that will provide review materials in all courses.

**3.2.4** *Please write a brief Equity Action Plan. What strategies can you implement to close this gap in student achievement within the next five years? What professional learning, curriculum development, or other forms of support does your department need?*

In response to AB 705, basic skills courses such as MATH 15 and MATH 20 were removed from the course offerings since 2019. There is a possibility that MATH 40 will be completely removed as well. To provide an equitable learning environment, we need to provide students the support they need. In doing so, co-requisite courses were created, but it will take some time for students to learn about these new courses. As mentioned in Section 3.2.3, we hope to appoint lead teachers to create materials that will be used in all courses with support, and to develop workshops that will provide review materials in all courses. We will need faculty training in teaching the support courses in all modes: in-person, synchronously, and asynchronously. When classes return to campus, we wish to explore new pedagogical approaches that are more adaptable to the new normal, such as how to facilitate group activities among vaccinated and unvaccinated students. This will require purchasing new technological equipment. Moreover, we want to maintain the online tutoring services provided by the Math Lab, in addition to the traditional in-person Math Lab. For in-person tutoring, we wish to hire roaming tutors to help provide a more approachable learning environment for students. There are also greater needs for more embedded tutors and Math Lab tutors for higher level courses.

Faculty members will continue to hold meetings to discuss pedagogy, and will attend workshops related to equitable teaching and classroom practices. Practices that we can employ include equitable grading strategies, creating equity-minded syllabi, making culturally relevant course materials, and creating a welcoming and collaborative learning environment. The faculty is also working with its Instructional Support Team created by Guided Pathways.

We also aim to increasingly institutionalize high impact enrichment for our students, since these activities are well known to increase success rates in mathematics and upward mobility for

underrepresented groups in the mathematical sciences, including Latinx and Black/African American students. We have found that encouraging *all* students, not just math majors, to engage in competitions such as the Putnam and AMATYC Competitions, and encouraging all students to participate in mathematical research activity broadens participation and makes mathematical science on our campus more equitable. In the past, it was held that only elite students should be engaging in these activities and that everyone else should be funneled into other majors and activities. We do not feel that it is equitable for our students to be treated this way, so we will continue to promote these activities. We will be asking the College to support the dissemination of these activities in one of our Strategic Action Plans below.

### **3.3 Student Achievement and Pathways**

**3.3.1** *Using the data provided by the OIE, briefly describe how students have moved through the program over the past five years: unit accumulation, prerequisites, corequisites, substitutions, gateway courses, and bottleneck courses. (Not all of these measures apply to every program.)*

During the last five years, nearly all basic skills courses have been eliminated from our course offerings, including MATH 15, 20, 41, and 43. These cuts were mandated by AB 705. For the same reason, offerings of our last remaining pre-transfer course, MATH 40, have been dramatically reduced as well, with students being steered directly into transfer-level courses. Since all prerequisite courses have been removed from introductory-level transfer courses due to AB 705, our unit accumulation has been dramatically reduced.

Another result of removing these prerequisites is that there are a substantial number of withdrawals in our introductory-level transfer courses, like MATH 100, 120, and 141. More students need to be steered toward courses with support. We are hoping to appoint lead teachers to create materials that will be used throughout all of these courses.

For STEM students, there are many concepts for which some students need just-in-time remediation, which is why our calculus courses (MATH 151, 152, and 251) have a high percentage of students who repeat the course. We would like to develop ongoing workshops that will provide reviews of these topics. Bootcamps can provide a pre-semester review of the topics as well. Also, since MATH 151 is often an entry level course for many STEM students, we are discussing a support option for this course, as has been done for MATH 120 and 141.

It is worth noting that although the table below shows a 100% withdrawal rate for MATH N01, this is inaccurate. MATH N01 is the Math Lab “Supervised Tutoring” course, which students register for in order to use Math Lab services. This is an ungraded, noncredit course. We are unsure why the table provided by the OIE contains this inaccuracy.

Within the last 5 years, courses by course success rate (ascending 5 courses).		Within the last 5 years, the 5 courses with highest % of students repeating the course (NOTE: Some courses may allow for repeat enrollment)		Within the last 5 years, the 5 courses with the highest # of withdrawals		Within the last 5 years, the 5 courses with the highest % of withdrawals	
MATH 020 F	36.4%	MATH 151 F	24.6%	MATH 040 F	3,671	MATH N01 F	100.0%
MATH 041 F	38.4%	MATH 040 F	23.5%	MATH 120 F	3,157	MATH 041 F	39.3%
MATH 040 F	42.1%	MATH 152 F	22.7%	MATH 020 F	2,497	MATH 020 F	37.7%
MATH 030 F	42.5%	MATH 020 F	22.2%	MATH 141 F	2,260	MATH 031 F	37.2%
MATH 043 F	43.2%	MATH 251 F	21.0%	MATH 100 F	1,682	MATH 141HF	36.1%

**3.3.2** For transfer degree programs: Are your current requirements in line with the Transfer Model Curriculum, or have you added extra steps, such as prerequisites? If you added extra steps, please explain.

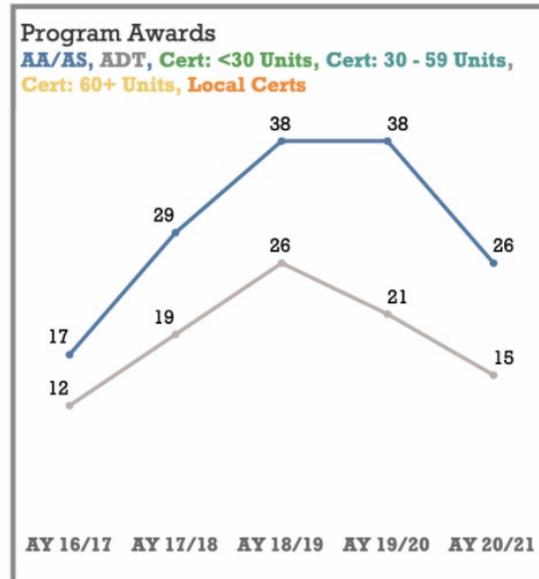
The prerequisites are specified on the C-ID descriptor for MATH 151, which is the first course on the Math Transfer Model Curriculum. We did not add any extra steps.

**3.3.3** Please provide an update on the curriculum mapping you have done, perhaps in collaboration with Counseling. Are all programs (degrees and certificates) mapped? Based on course offerings for the last two to three years, could a student complete the map(s) you have created? If so, please demonstrate this with some facts from your schedules. If not, how will you address these discrepancies?

The math department has completed a 2-year and a 3-year map for our students. If a student begins in MATH 151, the first class in our Transfer Model Curriculum, the student can complete the degree requirements in 2 years. If the student begins at the College Algebra/Trigonometry level (MATH 141/142), it is possible to finish in 3 years. It may be advantageous, however, to take more courses at the community college that will be required for the university degrees.

**3.3.4** Do the data reveal differences among your AA, ADT, or certificate programs (in enrollment, completion, or success, for example)? Please explain.

As shown in the graph below, the number of Math AS-T degrees awarded is generally lower than the number of Math AS degrees awarded. One possible explanation for the difference is that students with the intention to transfer might not see the need to apply for the degree; or, perhaps, they are not aware that they can apply for the degree.

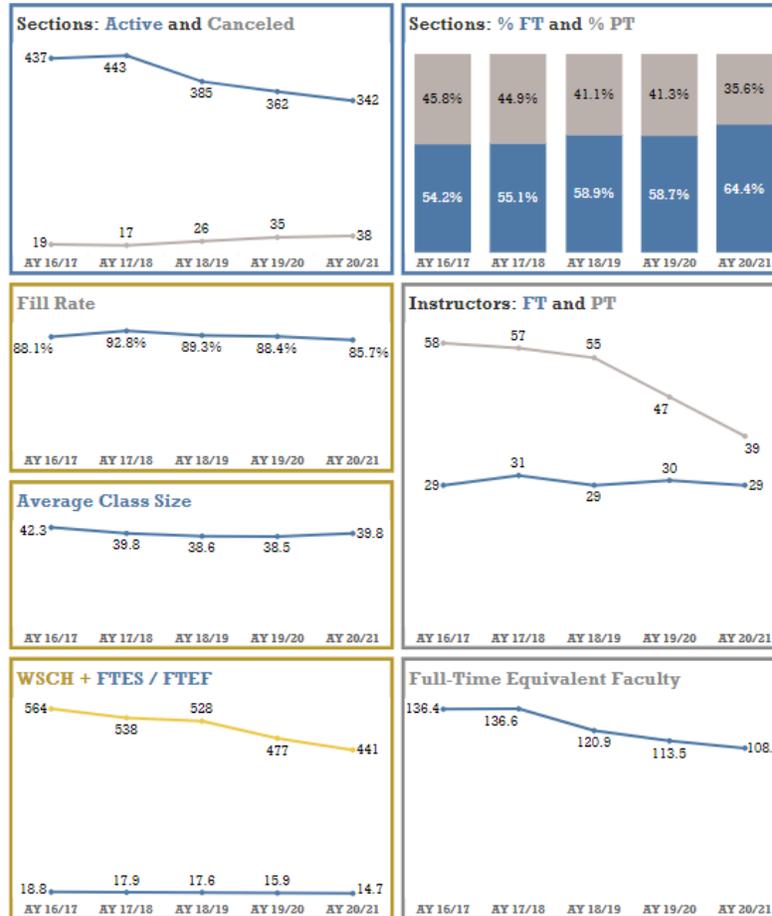


### 3.4 Faculty

**3.4.1** Using the data provided by the OIE, briefly describe the faculty workload over the past five years: FTF (full-time faculty), PTF (part-time, or “adjunct” faculty), FTEF (full-time equivalent faculty), WSCH per FTEF (weekly student contact hours). (Not all of these measures apply to every program.)

Over the past five years, the Math Department has lost 19 part-time instructors while maintaining the same number of full-time instructors on average. FTES/FTEF in the department has fluctuated from a low of 14.7 in 2020-21 to a high of 17.9 in 2017-18.

Also, WSCH have steadily decreased from 564 in 2016-17 to 441 in 2020-21. FTEF have dropped by approximately 21% from 136.4 in 2016-17 to 108.3 in 2020-21. The drops in WSCH and FTEF are consistent with class cancelations and a number of low-enrolled sections in the last two years.



The percentage of active sections has decreased by 22% over the past five years from 437 in 2016-17 to 342 in 2020-21. The number of canceled sections doubled from 19 in 2016-17 to 38 in 2020-21. The percentage of sections taught by full-time faculty has steadily increased from a low of 54.2% in 2016-17 to 64.4% in 2020-21. The fill rates in the program have fluctuated from a low of 85.7% in 2020-21 to a high of 92.8% in 2017-18.

**3.4.2** *If your department plans to request hiring a full-time faculty member, this is the place to make the argument. Please discuss hiring needs in reference to data analyzed in sections 3.1 to 3.4.*

Unless enrollment increases, we do not foresee the need to hire additional full-time faculty beyond replacing retirees.

### **3.5 Covid-19**

*Using the data provided by the OIE, briefly describe how the Covid-19 pandemic affected your department and how your department has adjusted. Did you make temporary changes? Or have you adopted new, long-lasting practices that enhance teaching?*

AB 705 had already caused a decrease in the number of sections offered and a corresponding increase in the number of sections canceled. AB 705 went into effect January 1, 2018, with compliance required by Fall 2019. It is hard to separate the effects of AB 705 from COVID-19, but the downward trend of sections offered appears to be continuing. While not in the current OIE data packet, our Fall 2021 course offerings have been markedly reduced. In Academic Year 2016/17 we had 437 active sections, whereas in Academic Year 2020/21 we had 342 active sections.

In response to AB 705, the math department aimed to achieve a balance of course modalities under the restrictions of the pandemic – some synchronous via Zoom or Big Blue Button, some asynchronous online, and some hybrid. We offered a higher percentage of Zoom classes than many other departments to give students a “live” class experience. Math teachers have learned how to use Zoom effectively with features such as chat, breakout rooms, polls, etc. Going forward beyond the pandemic, we plan to continue offering Zoom classes as a third modality, in addition to asynchronous online and on-campus classes, for students who cannot come to campus but want the interaction of a live class.

All our faculty have gained new skills in online teaching. Some of these skills, such as using discussion boards and creating supplemental videos, may continue to be used to enhance face-to-face learning.

### **3.6 What has not been asked?**

*Please tell us about other ways your department has been successful, ways that the previous questions might have missed.*

Since it was enacted, we have made significant strides in not only complying with AB 705, but creating models to best help our students. We created separate support classes, as well as enhanced classes with embedded support, in order to determine which method is more effective. We are transitioning to the embedded support model after a thorough evaluation and comparison of the two models.

Prior to AB 705, our remedial classes made up about 60% of our FTES. We have removed MATH 15 Prealgebra, MATH 20 Elementary Algebra, MATH 24 Pre-Statistics, MATH 30 Geometry, and MATH 41 Combined Elementary and Intermediate Algebra. Beginning in Spring 2022, all students will be directed into transfer-level courses; only with counseling approval will students be able to take MATH 40 Intermediate Algebra. The department is still discussing MATH 40 and whether it belongs at the college, since NOCE is currently not offering any remedial mathematics courses.

Our department and our division have met formally at least biweekly since the pandemic began in order to discuss best practices and issues with online instruction, as well as how to implement best practices surrounding AB 705 and equity. Moreover, several of our faculty members have been involved with task forces and professional development activities focused on equity and antiracism in order to bring this information to the department. For example, Abraham Romero-Hernandez and Nicole Rossi were members of the Antiracist Grading and Curriculum Taskforce. Robert Diaz, Laura Loney, and Juan Zaragoza participated in the Racial Equity in Mathematics Leadership Institute, held by the USC Race and Equity Center, where participants were provided with tools to implement equity-minded practices and policies in math classrooms. Laura Loney and Juan Zaragoza completed the Curriculum Transformation Seminar, sponsored by the district, in order to create more culturally relevant materials. Dana Clahane serves on the Board of Directors of the Pacific Math Alliance, which provides mentoring in the mathematical sciences for students coming from underrepresented groups. He also is the founder and Chair of the American Mathematical Association of Two-Year Colleges (AMATYC) Research and Mentoring Experiences for Students and Faculty Committee. This committee aims to promote high impact practices such as mentoring and student research activity in mathematics, as well as faculty research, as these practices are known to have a positive impact on the success rates of mathematics students coming from under-represented groups. These practices also provide opportunities for faculty to strengthen their mathematical knowledge and, in turn, to pass on this knowledge to their students through collaboration and teamwork.

Furthermore, Robert Diaz and Nicole Rossi attended the USC Race and Equity Center Leadership Alliance eConvening in April. Caleb Petrie attended the Orange County Civil Rights History event that was part of the Pluralism, Inclusion, and Equity series. Nicole Rossi, Scott Malloy, and Caleb Petrie attended California Acceleration Project webinars on equity and completion in the spring of 2021. Tim Cobler and Caleb Petrie participated in the Guided Pathways Symposium in August of 2019, on the Implementation of AB 705 and Other Legislation in Equitable Ways, as well as multiple California Acceleration Project webinars dealing with issues regarding equity and success.

## 4.0 Outcomes

### 4.1 Program Student Learning Outcomes (PSLOs)

*Since the last self-studies, the College adopted new Institutional Student Learning Outcomes (ISLOs) and new design principles for PSLOs. Please describe your department's PSLO revisions to date, and your PSLO plans.*

The math department revised its PSLOs in workshops organized by the college. We included higher order thinking skills and applications of knowledge. The NACE core competencies of Critical Thinking/Problem Solving and Oral/Written Communication are represented in our PSLOs.

PSLO 1: Analyze and synthesize information from functions, equations, models, or data sets in order to gain insights and draw conclusions.

PSLO 2: Distinguish between the multiple possible methods to solve mathematical problems in order to apply the appropriate problem-solving strategy and explain the process and solution to others.

### 4.2 PSLO Assessment

*The new PSLO design principles encourage departments to use PSLOs as a way of gauging student learning once they have completed a degree or certificate, not just when they have completed a single course. Please describe how PSLOs are assessed or will be assessed in your department.*

Currently, our PSLOs are assessed through CSLOs in MATH 151, 152, and 251 that are mapped to the PSLOs. We plan to create a free-response assessment in MATH 251. With a multiple-part question or questions, we can thoroughly assess all aspects of the PSLOs. At least one of several higher-level courses must be taken for an associate's degree in mathematics, but MATH 251 is the highest level course that all math majors must complete, and students have completed nearly all of their degree-required coursework in mathematics by the time they take this course. Therefore, MATH 251 is the natural place for a PSLO assessment.

### 4.3 CSLO Assessment

*Briefly describe the timeline your department uses to assess CSLOs on a regular basis and how you use the results to make improvements. This discussion should be based on SLO data, which is available on eLumen. (Your division's SLO reps can help with this.) Please include relevant CSLO charts or graphs in an Appendix. Since the last self-study, you should have assessed the CSLOs of every course that you have taught, at least once. If that is not the case, please describe how you will accomplish this as soon as possible.*

In the past our practice was to assess CSLOs every three years; every class is on a rotating cycle. This is being changed to match the program review timeline and have each course assessed every four years. The course coordinators organize the assessments and discuss the results with the department, and faculty provide suggestions for how to improve the results. Math courses that were not assessed from Summer 2016 to Spring 2021 are MATH 30, 32, 33, 34, 121, 143, 255, 290H, 291H, and 299. There have been many changes in course offerings due to AB 705 - some courses are no longer offered and new courses have been created. Some new corequisite courses were offered, but may no longer be offered as we switch to a different model of corequisite support. MATH 30 is no longer being offered. MATH 32, 33, 34, 121, and 143 are new courses. As the dust settles from all the new courses retired and created due to AB 705, we plan to assess the new course SLOs once we settle into a pattern of regularly offering them. Since the corequisite support courses MATH 32-34 may be retired soon, it is unlikely we will assess the CSLOs for these. MATH 299 last ran in Fall 2017 and is an independent study course. MATH 255 has been offered, but each time it has been canceled due to low enrollment. MATH 290H and 291H have not run regularly since COVID started. The courses have repeatedly been canceled during COVID, and have not been assessed during this the cycle. We aim to assess MATH 290H, 291H, and 299 the next time they are scheduled to be assessed, but we of course will only do so if those courses are being offered during the scheduled term of assessment. If MATH 255 becomes a regular course offering, then we will add it to our assessment schedule as well.

We have made our SLO assessments more authentic by moving away from multiple choice questions to free response questions, where students' processes can be evaluated. When students do not meet an SLO, some foundational or prerequisite knowledge often seems to be lacking. We are increasing support to students through boot camps, workshops, FC miles, Hornets Tutoring, and enhanced courses with an extra unit of support embedded. Even with a return to campus we want to continue our virtual Math Lab offerings.

#### 4.4 SLO Equity Analysis

- *Looking at CSLO attainment data, do you find significant differences by race, ethnicity, gender, and other categories? Please include some illustrations of this data in the Appendix. Describe here what the data shows. What strategies will you use to close the attainment gaps among groups of students? What kinds of professional learning would help?*

For SLOs specifically, we have relatively equitable achievement among racial groups. The spread between the lowest (African Americans with 59.83%) and highest (Asian with 72.54%) success rates is 12.71%. Despite that, we can always try to lessen this gap by employing strategies to create more equitable outcomes. Other categories, such as economically disadvantaged status, had even smaller gaps in achievement.

There are numerous strategies that could be employed to address the achievement gaps. One example is to conduct a syllabus review for all faculty. A professional expert could be identified in order to help faculty create welcoming and equity-minded syllabi for their courses. There are pedagogical strategies that could be explored to create a sense of belonging for all students in the classroom, including collaboration and making math culturally relevant by leading with applications. More use of asset-framing language could draw in students to seek resources such as the Math Lab and office hours. Further professional learning on the topics of students' racialized experiences in math, including creating a sense of community, could be beneficial as well. Supporting faculty with release time and/or stipends to engage in high-impact practices such as math research involvement and mentoring can enhance equity for students in our program, so we are requesting funds for these activities in our Strategic Action Plans below.

For our entry level transfer courses, we initially offered separate 2-unit corequisite support courses. Instead of this model, we are moving towards embedding 1-unit of support into an existing class. For these classes with support, we desire professional expert pay to support a lead teacher who would design course materials that could be used by all faculty teaching those courses. Having robust support in our entry level transfer courses should help with equity gaps. Another practice that could lead to improvements here is the use of early alert systems, such as Starfish. Lastly, designing alternative assessments in addition to traditional exams could help lead to more equitable results.

- *Compare the equity analysis in this section to the equity analysis in Section 3.2. Are there some groups who have lower completion and success rates AND lower SLO attainment rates than other groups? Can new departmental strategies close both gaps? Please explain. [For example, many departments found that their SLO attainment gaps are quite a bit smaller than their success gaps (or the gaps don't exist). This might mean that many students who get a D or lower in a course are actually learning the material (i.e. attaining the SLOs) but they are winding up with a failing grade for other reasons: absences, tardies, missed assignments, missed exams, poor performance on high-stakes assignments.]*

There are some significant gaps between the SLO success rates and course success rates, all with the SLO success rates being higher. Some of this may be explained by the fact that the SLOs are assessed on final exams and not all students take the final exam. Those who persist until the end and take the final will have higher success on SLOs than the general population. The final exam is a cumulative assessment in which students show their mastery of content from the entire semester, which is why we use them to assess SLOs. We could reexamine the SLO questions to ensure they are more representative of the content and scope of the course. Furthermore, we can look at our grading policies to make sure they more accurately reflect the knowledge gained in the course.

## 5.0 Other Areas of Program Effectiveness

### 5.1 Your Department and General Education

*5.1.1 Using the data provided by the OIE, please look at students who take your courses for GE credit.*

Over the last 5 years, non-GE and GE enrollments break down as follows:

	% of Enrollments	Enrollments
Non-GE Enrollments	40.3%	31,585
GE Enrollments	59.7%	46,815

*5.1.2 What role does your department play in helping students complete the GE pathway?*

For the Associate Degree, students need to complete the Fullerton College GE requirement B2, consisting of at least 3 units of coursework in mathematics. Students need to complete a course of MATH 40 or higher. Since AB 705, we have all but eliminated MATH 40, so students take transferable courses to meet the math requirement. To help students complete the GE pathway, we have ongoing communication with counselors about the mapping of course requirements to complete the GE pathway. The department also offers multiple resources, such as math workshops (in non-Covid times), and the Math Lab, to enhance students' success in completing their GE pathway. We also direct students to other resources such as the Tutoring Center, FC Miles, and Hornets Tutoring.

*5.1.3 Do you offer GE courses at a variety of time slots and at a frequency that allows students to fulfill GE requirements?*

Yes, see the next item.

*5.1.4 Please take into account daytime, evening, weekend, and online classes to provide a brief sketch of your GE course availability.*

We are very cognizant of the need to offer classes during all time frames and in all modalities. Classes are provided from the early morning to the late evening, and on Fridays and weekends. Online, remote, and in-person or synchronous remote sections are offered every semester and in summer. Each course has sections starting as early as 7:00 AM, and as late as 8:00 PM. Prior to Covid, we offered in-person, online, and hybrid courses. During Covid, we have offered all GE courses in both asynchronous ("Online") and synchronous ("Zoom") formats. We plan to continue offering a combination of in-person, Zoom, and Online courses in the future.

The Zoom format is new for us, introduced in response to the COVID pandemic. So we now have a new delivery method for those students who still want the experience of a “live” classroom setting, but are unable to make it to campus and/or not do want to be in a physical classroom. We anticipate continuing to offer classes via Zoom even after the current pandemic as an option for students that cannot come to campus, but who want a live, synchronous class experience.

Below are examples of our offerings of MATH 100, our primary general education mathematics course, both before and since COVID. A wide variety of days, times and modalities are available:

MATH 100 Offerings, Fall 2019

CRN	Day	Time	Modality
12078	M-W	07:00am - 08:25am	In-Person
11715	M-W	07:30am - 08:55am	In-Person
10654	T-Th	07:55am - 09:20am	In-Person
14164	S	09:00am - 12:15pm	In-Person
10652	M-W	10:00am - 11:25am	In-Person
14163	T-Th	10:35am - 12:00pm	In-Person
11326	M-W	11:45am - 01:10pm	In-Person
14165	T-Th	12:45pm - 02:10pm	In-Person
14167	M-W	02:20pm - 03:45pm	In-Person
14166	T-Th	02:20pm - 03:45pm	In-Person
14168	M-W	03:30pm - 04:55pm	In-Person
14169	T-Th	04:30pm - 05:55pm	In-Person
10747	M-W	05:35pm - 07:00pm	In-Person
12357	T-Th	07:10pm - 08:35pm	In-Person
14170	M-W	07:50pm - 09:15pm	In-Person
10761	F	09:00am - 10:25am	Hybrid
10763	F	10:35am - 12:00pm	Hybrid
10657			Online
14171			Online

MATH 100-Fall 2021

CRN	Day	Time	Modality
14476	T-Th	07:45am - 09:10am	ZOOM
14477	M-W	09:00am - 10:25am	ZOOM
14482	T-Th	10:10am - 11:35am	ZOOM
14484	T-Th	11:45am - 01:10pm	ZOOM
14485	M-W	12:15pm - 01:40pm	ZOOM
14486	M-W	02:00pm - 03:25pm	ZOOM
14487	T-Th	05:30pm - 06:55pm	ZOOM
14481	M-W	10:10am - 11:35am	ZOOM
14478	F	09:00am - 10:25am	Hybrid, meet on Zoom on Friday
14479	T	08:30am - 09:55am	Hybrid, meet on Zoom on Tuesday
14480	Th	08:30am - 09:55am	Hybrid, meet on Zoom on Thursday
14483	F	10:35am - 12:00pm	Hybrid, meet on Zoom on Friday
14490			Online
14491			Online
14492			Online
14493			Online
14496			Online
14500			Online
14501			Online
14502			Online
14504			Online
14489			Online
14488			Online

## 5.2 Outside Influences on Your Department

**5.2.1** Describe any laws, regulations, trends, policies, procedures, or other influences that have an impact on your program. Please include any other data that may be relevant to student achievement, learning, and trends within your Basic Skills, CTE, or Transfer Education programs.

It is impossible to overstate the impact that AB 705 has had on our program in recent years, from the courses we offer to the level of preparation of students in our entry level transfer courses. Enrollment in these courses, especially MATH 100 and 120, has surged now that students can enroll in them without having to take prerequisite courses. Unfortunately, without that preparatory coursework, many students entering these courses do not have the necessary skills to succeed in these courses. However, AB 705 forced us to radically reduce or completely eliminate those non-transferable courses, from MATH 7 to 43, that students previously took in preparation for transfer level coursework. Indications from the state are that we will not be able to offer these courses again.

This table shows the enrollment changes in our courses over the last five years. Note especially the sharp increase in MATH 100 and 120, and the near elimination of enrollment in courses below the transfer level.

**SECTION 3.1.1:** Using the data provided by the OIE, briefly describe the enrollment trends in your program over the past five years.

**Enrollments (Seat Count) by Course for: Mathematics**

Course	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21	Comparison	
						1 Year Comparison AY 19/20 v. AY 20/21	5 Year Comparison AY 16/17 v. AY 20/21
MATH 007 F	44	49					
MATH 015 F	1,108	949	293				-100%
MATH 020 F	3,152	2,756	723				-100%
MATH 024 F			538	188		-100%	
MATH 026 F				523	825	58%	
MATH 030 F	248	213	186	42		-100%	-100%
MATH 031 F			8	373	593	59%	
MATH 033 F					32		
MATH 034 F					129		
MATH 040 F	3,065	2,969	2,043	1,231	1,054	-14%	-66%
MATH 041 F	888	1,020	1,294	619	309	-50%	-65%
MATH 043 F	224	70	118				-100%
MATH 100 F	1,172	1,171	1,462	2,313	2,110	-9%	80%
MATH 120 F	1,753	1,859	1,940	2,435	2,498	3%	42%
MATH 120HF	18	19	5	24	24	0%	33%
MATH 129 F	714	683	635	605	448	-26%	-37%
MATH 130 F	636	631	612	537	510	-5%	-20%
MATH 141 F	1,579	1,298	1,289	1,382	1,446	5%	-8%
MATH 141HF	6	4		17	9	-47%	50%
MATH 142 F	1,061	941	919	1,000	955	-5%	-10%
MATH 150AF	1,196	213					-100%

As a result of the virtual elimination of basic skills math course offerings, we created new concurrent support courses to help students succeed in their transfer level courses, such as MATH 26 Support for Introductory Statistics, MATH 31 Support for College Algebra, MATH 33 Support for Liberal Arts Mathematics, and MATH 34 Support for Trigonometry.

The model of a concurrent support course linked to certain sections of the transfer course has created difficulties for students confused about the section linkage, possibly related to the additional logistical difficulties in the schedule and Banner. Therefore, we have created “enhanced” versions of Business Calculus, Statistics, College Algebra and Trigonometry which incorporate an extra unit of support. Going forward, students will be able to choose between two versions of the same transfer course – with or without additional support - rather than asking students that need support to enroll in a separate support course. These new courses currently add the word “Enhanced” to the title, which in some cases has led students to believe these classes are more advanced, rather than more supportive. So we now have title changes in progress which will replace “enhanced” by “with support.”

To make these “with support” courses more effective, there is a need for better development of course materials and support for faculty members teaching the courses. We would like to identify a lead teacher for each course who will create materials for the additional support in the course and will also mentor and offer workshops to other faculty teaching the course. Each lead teacher will need to be compensated with professional expert pay.

**5.2.2** *Make sure you are including all degree and certificate programs, including the College’s GE program.*

The Mathematics Department offers the Mathematics Associate in Science Degree, designed to prepare students to transfer to colleges and universities that offer bachelor's degrees in mathematics. This degree requires a total of 18-21 units of coursework in mathematics. Students planning to transfer to a local CSU may also want to consider the Mathematics AS-T Degree.

**5.2.3** *Please also consider not only your courses, but also prerequisite and corequisite courses that might be offered by a different department.*

Besides Mathematics, many other departments were also affected by AB 705. For example, the course CHEM 107 added MATH 141 and MATH 143 F as advisories. Other departments, including Biology and Economics, had to add the statement “assessment through the college’s multiple measures placement processes” in place of the previous MATH 40 prerequisite.

**5.2.4** *If AB 705 applies to the program then how are you meeting its mandates?*

Since its implementation in 2018, the Math Department has offered courses needed to align us with CSU EO 1100 and AB 705. These include MATH 26 and 31, currently fast-tracking through curriculum. Beginning this semester, Fall 2021, the department has begun offering enhanced model courses such as MATH 121 and 143. MATH 121 contains the same content as MATH 120 (statistics), along with a fifth unit of instruction to help students who can benefit from additional support; and, similarly, MATH 143 contains the same content as MATH 141 (college algebra), along with a fifth unit of support instruction. We also offer MATH 32 and 34 as support classes for MATH 130 and 142, respectively. We are moving to the single class with support model over the corequisite model such as MATH 121, 143, 131, and 144.

### 5.3 Your Program's Active and Applied Learning and High-Impact Practices

*5.3.1 The College wants to create an inventory of faculty efforts to make learning active and applied. Please briefly describe opportunities your students have to apply and deepen knowledge and skills through projects, internships, co-ops, clinical placements, group projects outside of class, service learning, study abroad, and other experiential learning activities that you intentionally embed in coursework, or elsewhere in your program.*

The mathematics department offers and connects students to a variety of enrichment opportunities. Students are encouraged to train for and compete in the national AMATYC and Putnam exam competitions. There is a robust Math Club, Math Colloquium, and 2-unit stacked Math Seminar course which includes two honors courses. As part of the colloquium, the department invites monthly external guest speakers to give talks on various math research topics that can be understood by students with various math backgrounds. In the seminar courses, students learn advanced problem solving, how to read and understand unsolved problems in mathematics, how to engage in research, and how to professionally typeset their mathematical work using LaTeX. The Math Department also supports student talks and poster presentations at local conferences, which students prepare with typesetting packages such as Beamer, ShareLaTeX, and Overleaf.

The Department believes that the college should do more to actively encourage all students to excel in mathematical science, rather than funneling these students into other majors and leaving them unmentored with no support. In Spring 2019, Ulises Rojas became the first LatinX student to win the Putnam Mathematical Competition locally; in other words, he was the top student among all FC students in the December 2018 U.S./Canada competition. Only one student in FC history has obtained a higher score than Mr. Rojas.

In Spring 2021, FC Hornet Alejandra Arjon became the first LatinX student in school history to be awarded an NSF-sponsored math research stipend. She worked with Dr. Clahane on the open problem of determining how many natural numbers are less than their tangents. She was awarded a \$3,000 grant from the Research Experiences in Community College National Science Foundation grant, which Dr. Clahane has also worked under while mentoring her and other FC students. Alejandra became a Pacific Math Alliance scholar that semester and, since then, seven FC students have continued to build on her results with Dr. Clahane. Subsequently, Ms. Arjon became the first student in FC history to participate in an NSF-sponsored Research Experience for Undergraduates program; for ten weeks during Summer 2021, Ms. Arjon worked as a paid research intern at Oregon State University.

We believe that more FC students, particularly those coming from underrepresented groups, need and deserve financial support from the college for mathematical research, so that these students can get on and stay on this particular pathway. It should be noted that prior to receiving this external support, Ms. Arjon successfully completed several talks at the Math Colloquium and a seminar-required thesis on the open problem of finding the smallest Skewes number. Ms. Arjon is now a successful math major at CSU

Dominguez Hills. The College should seriously consider scaling these outcomes up, and this will take real dollars and corrected vision – math research is not an activity that should be restricted to four-year college students or “elite” math students. True equity makes available not just basic opportunities for our students, but deeper experiences as well, and the higher levels of achievement that come with them.

The Mathematics Department hosted the Women in Math Mixer in Spring 2019, which helped female students discover more about the math program at Fullerton College, scholarship opportunities, research opportunities, and different job options for math majors. During the event, a student presented a talk on Newton's method, which is a numerical algorithm used to approximate the roots of a real-valued function. This topic is an optional topic in Math 151 Calculus I, but most often is not discussed in that course.

The Mathematics Department also collaborates with the Hornet Tutoring center to run the Embedded Tutoring program, where the students themselves can become tutors in the program. The goal of this program is to create a nurturing environment for learning that helps students become independent learners with strong study, time management, and collaborative learning skills. This program provides a unique and excellent experience for the tutor, as well as for the students being helped.

In addition, some MATH 100, 120, and 141 instructors have students do group projects to enhance students' understanding of the subject matter. For example, one project for MATH 120 is to collect data and subject it to hypothesis testing.

**5.3.2** *Are there institutional barriers hindering your department's ability to offer or enhance these learning experiences for students? Please explain.* 

The institutional barriers that hinder our department's ability to offer or enhance the learning experiences for students are:

1. Class cancelation for low enrollment of the seminar courses. Students will lose valuable training on how to engage in mathematical research, collaborate with faculty and other students on unsolved problems, and write up and present their results.
2. Failure of the College to institutionalize Math Department funding for previous ENGAGE-in-STEM Grant activities that supported our student involvement in mathematics, such as flyer creation for our enrichment activities, financial support for Department research interns, and failure to support these activities if enrollment in the seminars does not reach the contractual minimum, sometimes leaving up to ten students per term without a mathematical community to join. Contrary to the national trend toward increasing math research as a high impact teaching practice, the College seems to be reticent to support these activities, which actually help even under-prepared students who are NOT math majors. The Department feels that making our math research activities a low priority because of a misconception that they do not

serve under-prepared students or math education in general is a mistake that is adversely affecting our ability to increase the number of math majors. Instead, our math major count has fallen due to this lack of support from the College.

3. Lack of math classrooms fully equipped with furniture and technology. We need to create multiple classrooms with moveable tables and chairs so that students can be engaged and collaborate to enhance their learning experiences. Most computers in our classrooms are not up to date with mathematical software which prevents instructors from sharing a deeper understanding of the subject with our students.

## 6.0 Planning

### 6.1 Progress on Previous Strategic Action Plans

1. *Please briefly describe the goals (Strategic Action Plans, SAPs) from your last self-study. How much progress have you made on them? If you have reached a goal, explain how it allows ongoing improvement, especially if you received additional funding.*
2. *If additional funds were NOT allocated to you in the last review cycle, how did the LACK of funds have an impact on your program.*

Note: Due to the tremendous impact that the pandemic has had on everything, it is difficult to measure increases in success and retention that occurred specifically due to progress on any SAPs.

**FORMER SAP #1: Maintain control of all current classrooms for which the Math/CS Division has primary responsibility: 611C, 615, 616, 617, 618, 623, 624, 1901, 1902, 1903, 1904, 1957, 1958, 1959, 1960, 719; and regain control of 620, 621, 622A, 622B, 626, and Computer Lab (room 611L). In addition, to meet demand we request ownership of 724 and 728**

The rooms that the Math/CS Division now has primary responsibility for are 121, 122, 127, 615, 616, 617, 618, 621, 623, 624, 719, 1029, 1957, 1958, 1959, 1960.

Thus, the division has gained primary responsibility for Rooms 121, 122, 127, and 621 since the last Program Review. The division has maintained primary control/responsibility over Rooms 615, 616, 617, 618, 623, 624, and 719.

Since the last Program Review in 2018, the Division has lost primary control/responsibility for Rooms 611C, 1901, 1902, 1903, and 1904. Room 611C was given to NOCE for a series of non-credit classes in lower-level mathematics, while 1901- 1904 were turned into swing space for programs relocated as part of the 300/500 building remodel.

Since the last Program Review, the department has failed to reach its goal of gaining primary control/responsibility over Rooms 620, 622A, 622B, 626, 724, and 728. Moreover, as of Fall 2021 the Department is using no classrooms due to math classes not being held in person during the COVID-19 emergency. Our office manager has clarified that some of these room issues are in flux.

**FORMER SAP #2: Offer boot camps, review sessions, content specific workshops, and final exam review sessions to increase sense of community and success rates.**

Spring 2016 was very robust with 90 exam review sessions. (12 MATH 40's, 10 MATH 120's, 3 MATH 129's; 12 MATH 130's; 3 MATH 141's; 20 MATH 142's; 18 MATH 150A's; and 13 MATH 150B's). However, this was before our last program review was done. In Fall 2017, there was no data found by

math lab or office staff. In Spring 2018, we had a technology workshop for instructors about Canvas. In Fall 2018, no data was found by Math Lab or office staff. In Spring 2019, there were several MATH 141 workshops, and Kara Pham held a Women in Math workshop for students. In Summer 2019, there were MATH 141 and 151 bootcamps for entering students. In Fall 2019, Kenny Shah held review sessions for his classes. In Spring 2020, we held MATH 141, 142, and 151 bootcamps for entering students. Also, 40 workshops were scheduled, but due to Covid-19 only 13 of the 40 workshops were held. The completed sessions included MATH 120 held 4 of 10; MATH 130 held 1 of 5; MATH 142 held 2 of 3; MATH 151 held 3 of 9; MATH 152 held 3 of 10; MATH 251 held 0 of 1; and MATH 252 held 0 of 2.

We are unable to conclude that any of these workshops and bootcamps courses have promoted greater student success or narrowed any achievement gaps. Our objective was to address the needs of under-prepared students; increase course retention and success rates; and increase the persistence rate of students. In particular, the department would like to have increased the success rate, retention rate, and the persistence rate of Hispanic and African American students by at least 2%.

**FORMER SAP #3 : Appoint lead teacher(s) for each “new” course – MATH 24 (Pre-Statistics), MATH 26 (Support for Statistics, taken concurrently with MATH 120), MATH 31 (Support for College Algebra, taken concurrently with MATH 141), MATH 41 (Combined Elementary and Intermediate Algebra), and other support courses planned – with reassigned time or professional expert pay to design course material, lead training workshops, and mentor faculty (including adjuncts) assigned to teach each new class.**

The department elected Nicole Rossi and Scott Malloy as coordinators of MATH 24 (pre-stats). We also elected Tanomo Taguchi-Trieu and Nick Huerta as coordinators of MATH 41(combined elementary and intermediate algebra. Due to AB 705, the courses are no longer offered by our department. The department elected Scott Malloy and Dao Vo as coordinators of MATH 26 (Support for MATH 120 Statistics). We also elected Razvan Verzeanu, Minh Bui, and Kenny Shah and coordinators of MATH 31 (Support for MATH 141 College Algebra). There was no reassigned time or professional expert pay to help facilitate the design of course material, lead training workshops, and mentoring faculty. Most of this was not done. We do have a Canvas shell created for MATH 26/31 materials and while there are some MATH 31 materials, there are no MATH 26 materials in it.

We are unable to conclude that what we did actually promoted greater student success or narrowed any achievement gaps. Our objective was to address the needs of under-prepared students; increase course retention and success rates; and increase the persistence rate of students. In particular, the department would like to have increased the success rate, retention rate, and the persistence rate of Hispanic and African American students by at least 2%. We do know that the lack of funds combined with Covid-19 made it difficult to create such materials. Also, our students are not enrolling in the support courses and so we are transitioning from support courses to having courses with embedded support in them.

**FORMER SAP #4: Provide math-specific distance education training for instructors and develop Division/Department requirements and policies regarding distance education by electing a Distance Education Coordinator.**

The Math Department elected Robert Diaz as the Distance Education Coordinator. The Distance Education Coordinator attended training related activities. The Distance Education Coordinator reviewed current online courses to ensure they met interaction and accessibility requirements. Due to the pandemic, in March 2020 the college required on campus courses to transition to online and or remote instruction. During this transition, The Distance Education Coordinator provided assistance in setting up courses to those math faculty who were new to online or remote instruction. The Distance Education Coordinator was able to help instructors become proficient in teaching distance education classes. The Distance Education Coordinator was compensated with professional expert pay.

The Distance Education Coordinator and The Math Department discussed developing department standards for distance education courses however, these standards have yet to be agreed upon and adopted.

**FORMER SAP #5: Pilot instructor led (ILD) sessions, outside of class time to support classroom instruction as an alternate to Supplementary Instruction. Sessions are to be held and coordinated with classes to ensure maximal participation.**

Due to the lack of funding and classroom availability, The Mathematics Program was unable to pilot instructor led (ILD) sessions as an alternate to Supplementary Instruction. In addition, due to the pandemic, on campus courses were moved to remote or online instruction during March 2020.

**FORMER SAP #6: Offer more support, interventions and services to our students by using alternate models in the Math Lab. Hire additional tutors to serve as “roaming” tutors to augment the traditional model of tutoring service. Acquire space for additional interventions, such as group tutoring, workshops, SI etc.**

The SAP Goal was to hire additional tutors to serve as “roaming” tutors to augment the traditional model of tutoring service. Additionally, we hoped to acquire space for additional interventions, such as group tutoring, workshops. We did hire additional tutors but do not have any roaming tutors as of now. We started offering workshops, but due to COVID-19, we were forced to stop. We hope to resume workshops soon.

**FORMER SAP #7: Purchase class sets of 53 Chromebooks and/or iPads for student use in classrooms, along with necessary ancillaries. Fund training for the use of these newer technologies.**

The SAP Goal was to purchase class sets of 53 Chromebooks and/or iPads for student use in classrooms, along with necessary ancillaries. An additional goal was to fund training for the use of these newer technologies. We purchased 70 Surface Go tablets for student use for \$51,217.95, and they are being utilized by instructors in their classes. For example, they were used in an almost weekly basis to assist students with MyStatLab in the MATH 026 support course for MATH 120. This provided many students the opportunity to work on their online homework with the assistance of the professor and peers. It also allowed the professor to work through the registration with the online homework system, including showing them how to access the free trial. Because of this technology, every student in at least one particular course, registered for the online homework, and there was increased participation in the use of online homework.

With many instructors using online homework programs, having the in-class Surface Go tablets have allowed students to work on portions of their homework in the classroom setting. This allowed the opportunity for immediate help from the instructor. In addition, students were able to work in groups and help each other with their questions. Looking ahead to the future and accommodating various instructional styles, these Surface Go tablets will be helpful for a “flipped classroom” environment. Having a classroom set of these Surface Go tablets allows all students to have access to technology within the classroom, regardless of whether or not they own their own personal computer.

We did not get training on using the new technology, but that has not been an issue. Due to Covid-19, we have been unable to use the Surface Go tablets since the shutdown, but we do plan on resuming the use of them when classes resume on campus.

**FORMER SAP #8: Support the equipment and technology needs of faculty and staff.**

While requested total amount of \$60,200 was not funded fully, the Math Division Office was able to purchase below items with partial funds from different fund resources:

- Wireless Dongles –  $15 \times \$35 = \$525$ : 8 were purchased
- Headsets-  $15 \times \$50 = \$750$ : A few sets were purchased
- Whiteboards –  $10 \times \$280 = \$2,800$ : A few sets of lap white boards purchased from Lottery Funds
- iMacs w/ trackpads –  $5 \times \$1,928 = \$9,640$ : Not purchased.
- iPad Pros –  $10 \times \$1,530 = \$15,300$ : A total of 14 – 15 purchased over the last few years. Some were purchased via Instructional Equipment one time funding and 9 others were purchased from General Division Funds.
- MS Surface Pros –  $10 \times \$1,750 = \$17,500$ : Some were purchased via Instructional Equipment one time funding and 9 others were purchased from General Division Funds.

- HP Laptop – 5 x \$1,060 = \$5,300: A few sets were purchased.
- Camtasia – 15 x \$130 = \$1,950: A few versions were purchased out of Lottery Funds.
- Socrative - \$60/yr: Not funded/purchased.
- Quizlet - \$35/ yr: Not funded but purchased a subscription for a year out of the Department Funds. One or 2 faculty used it and there was no interest in continuing its subscription.
- Overleaf -\$240/yr: Not funded/purchased.

The use of items such as the iPads and Surface Pros within the classroom has allowed instructors to present their material on the projection screen while still being able to face the students while speaking. It also gives instructors the capability to save their notes in a digital format if needed for future use. In addition, these devices were essential in the successful transition to remote learning due to the Covid-19 pandemic, giving instructors the technology they needed to create instructional videos for online classes, as well as the ability to present topics successfully in a Zoom shared screen learning environment. These are skills that instructors will now be able to make use of in all classes, whether remote or in person.

**FORMER SAP #9: Upgrade 4 demo stations to provide more consistency in their operation, along with better Wi-Fi support for classrooms.**

With the above requested funds, the Division planned to standardize classroom technology to:

1. Improve the Wi-Fi connection in remote classrooms used by the math department and install iPad and tablet USB cables at all demo stations.
2. Update screen control systems at demo stations, upgrade the pull-down projection screens, sound jacks in all computers.
3. Install additional electrical outlets closer to the demo stations.

Upgrade at least 1 room to accommodate student technology needs such as electrical outlets at every desk.

- Extron Demo Station – 4 x \$14,000 = \$56,000 (One demo station was funded by the Program Review/PBSC and purchased via Instructional Equipment; there are additional funds to upgrade 4 other demo stations)
- Upgrade Wi-Fi for classrooms - 15 x \$1,000 = \$15,000
- **Total requested amount: \$71,000**

**FORMER SAP #10: In our last self-study, our Strategic Action Plan #10 was to support colloquia, math seminar courses, undergraduate math research activity, informal learning seminars, mathematics competitions, and practices for them, including the AMATYC Competition and the Putnam Math Competition.**

Funding was requested for these student supports in our last Program Review under SAP #10. Below is an update on what was funded or not funded, and some of the results of the relevant decisions on these items:

- The Department has continued to offer six stacked Math Seminar courses held, stacked Math Seminar courses: MATH 290 Pure Math Seminar, MATH 290H Honors Pure Math Seminar, MATH 291 Applied Math Seminar, MATH 291H Honors Applied Math Seminar, MATH 295 General Math Seminar, and MATH 295H Honors General Math Seminar, as recently as Summer 2021, but not in Fall 2021, since total enrollment has fallen below the contractual minimum for the classes to continue. For example, the seminars were canceled in Fall 2021 due to enrollment peaking at ten students. The Colloquia and Seminars were not offered in Fall 2019-Spring 2020, because no faculty were interested in teaching the courses while Dana Clahane was on sabbatical, and also partially due to the pandemic's severity during that academic year. He has been meeting with a research group of five to seven students throughout Spring 2021, Summer 2021, and in Fall 2021, but the students have no class to take nor are they financially supported to work on math research. A budget for one to four student research interns to work with a faculty member in a Math Laboratory setting on mentored math research projects would be an upgrade to our program, in the absence of the Math Seminars being allowed to continue during some academic terms based on enrollment patterns.
- In the 2018 Program Review, it was proposed that additional informal learning seminars be held, but these seminars were not funded and therefore have not been held.
- The Math Colloquium continued to be offered weekly jointly throughout Spring 2020 despite the pandemic, but it was done via Big Blue Button, and only enrolled seminar students could participate. The pandemic shut down the ability of the Colloquium to continue to strengthen ties with the community and four-year colleges and universities, but perhaps in Spring 2022, the pandemic situation will permanently improve and public events will be held in the form of Math Colloquia that are well attended in person.
- Dana Clahane pre-launched MATH 296 and MATH 297, two additional seminars on Probability and Statistics, in 2018, in Curricunet. Once all staff and students are back on campus after the pandemic is abated, the Department can continue to determine whether or not to offer these additional Seminars. However, if offered in stacked format, the instructor of record will then have eight to ten sections stacked, causing quite a bit of legwork for that instructor. The Department will continue to discuss this issue next year if warranted.
- Since March 2020, student colloquium speakers have been discontinued due to the pandemic. At that point, the honorarium for external guest faculty/industry speakers was still at \$175, the same honorarium given at the start of the Colloquium series in 2009.

- The request for \$30 per guest speaker colloquium for hospitality was not funded, so the proposed dinner events to facilitate ties between students and four-year college faculty who served as speakers were not held.
- The request for two daily hours of lab hours for faculty to work with students on research was not funded, and therefore, these hours have not been held. Dana Clahane has been meeting with a student research group through Summer and Fall 2021 during the pandemic on a limited *ad hoc* basis, but students are not currently supported at Fullerton College to conduct math research activities in mathematics at the present time.
- The request for a sound barrier in the Math Lab Annex was not approved. Loudness in the area remained an issue before March 2020 when the campus closed due to the COVID-19 emergency.
- The Department continued to fund overnight shipping of the Putnam Competition exams to the organizers of the competitions in 2018 and 2019, but in 2020, the Putnam Competition was essentially canceled due to the COVID-19 emergency. The Department will continue to fund shipping and lunch for the participants once the competition resumes and coaches are identified. In 2018 and 2019, several students earned positive scores on the Putnam, as in past competitions, putting these students in the top half of all undergraduate students including juniors and seniors at four-year colleges and universities.
- The request for funding for ShareLaTeX/Overleaf to be used by math research students was not funded. Thus although students are able to join Overleaf.com for free, their ability to share with collaborators is limited. The current "professional" cost for Overleaf is \$360 per year.
- The request for funding to support students to give talks and travel to conferences was not approved. As a result, no students from FC have been travelling to math conferences, nor are they giving talks at math conferences, for the past couple of years.
- The Department currently does not financially support any student work on math research experiences during Fall 2021. This high impact practice is now absent from the Department, with the exception of an unsupported, small *ad hoc* group of students who are working with Dana Clahane on an unsolved trigonometry problem.
- The Department has seen some declines in persistence and success in the calculus sequence. Some of this decline may be the cessation of significant research-oriented enrichment and math career pathways that occur during the Colloquia/Seminars and that was once meaningfully supported by the College when the ENGAGE in STEM grant was in place. Another important factor in some of the decline is of course, the difficulties students are facing while having no other choice but to learn in a virtual environment during the pandemic.
- The absence of math research-based communities and guest speakers that once may have attracted prospective students to mathematical science may be a factor in declining enrollments in the Department overall and is likely to also result in a decrease in students who declare math as a major. Indeed, we have seen a dramatic decrease in the number of math majors, which is cause for concern among our faculty.

The following is a brief description of the effect of no longer supporting enrichment activities in the Math Department as described in Strategic Action Plan #10 in the previous Program Review: During the

years in which the ENGAGE in STEM FC grant supported teams of math research interns, informal learning seminars, and lab hour time for interested math faculty to engage these students in creative mathematical activity, the Colloquium was highly attended. Now that almost all financial support for these activities has fizzled, nearly all of the activities are not being held. This undermines efforts to build mathematics research communities which have supported our STEM students over the years. A failure to institutionalize the items that were heavily supported through the now expired ENGAGE in STEM grant endangers the existence of what was once a pretty vital enrichment program for our students. Engaging students in high-impact math research experiences is crucial for their success, but without sufficient support, we can only hope for sporadic activity here and there, and we will see fewer FC students interested in being math majors or going to graduate school in math-related fields. These funding scarcities undermine the Department's efforts in increasing equity for our under-represented groups who may have once been motivated by these activities when they were supported during the ENGAGE in STEM FC grant period.

**FORMER SAP #11: Continue to increase the numbers of full-time faculty members. Together with the adjunct faculty and full-time instructors, we can meet ever-changing demands of our students. Students, however, are better served with more full-time instructors because they are more readily accessible out of class during office hours and the consistency in instruction. As a result, additional full-time hires are welcome in the Division, but it will need to be adjusted in conjunction with the campus-wide need.**

Since 2018, we have hired an additional faculty member. Due to AB 705 and Covid-19, we have seen a dramatic decrease of students and so most courses are being taught by full-time instructors.

## 6.2 New Strategic Action Plans

Please write brief, concrete plans that you will accomplish over the next four years. Your plans might include requests for additional funds. The Program Review Committee will read these and either endorse the request or ask for more information. Please keep in mind that the Committee's endorsement does not guarantee additional funding. The President's Advisory Council and Faculty Allocation Committee play major roles in allocating funds and prioritizing new faculty hires.

STRATEGIC ACTION PLAN # 1	
Describe Strategic Action Plan:	<p>Create support through workshops and/or bootcamps at all levels to help remedy learning loss due to Covid-19. Boot camps, workshops, and review sessions will be led by Math faculty, as decided upon by the Math Department.</p> <p><b>Discussed in Sections: 3.3, 5.1 and 6.1</b></p>
List College goal/objective the plan meets:	<p><b>Goal #1: Promote success for every student</b></p> <p><b>Objectives:</b></p> <p>1.3: Improve student critical thinking skills</p> <p>1.4: Increase completion of courses, certificate and degree programs, and transfer-readiness</p>
Explain how the request helps the College attain student equity.	<ul style="list-style-type: none"> <li>• Boot camps offered prior to the start of the semester will prepare students for the expectations of upcoming coursework</li> <li>• Workshop topics may include, but are not limited to: course specific topics, note-taking skills, test-taking, time management, and math anxiety.</li> <li>• Review sessions will be held throughout the semester.</li> </ul> <p>All of above will help our students with lower success rates in our courses and therefore help the college attain student equity.</p>
What <i>Measurable Outcome</i> is anticipated for this SAP?	<ul style="list-style-type: none"> <li>• Increased retention and success rates</li> <li>• Increased persistence rate in math courses</li> <li>• Increased retention and success rates for Hispanic and African-American students in math courses</li> </ul>

	<ul style="list-style-type: none"> <li>Increased persistence rate of Hispanic and African-American students in math courses</li> </ul>	
What specific aspects of this SAP can be accomplished without additional financial resources?	In order to hold the boot camps, workshops, and review sessions, faculty would need access to rooms with sufficient seating for participating students. This SAP cannot be accomplished without funding for the instructors involved, using professional expert pay.	
Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	Approximately 200 hours per year at \$55 per hour professional expert pay	College Funds
Facilities		
Equipment		
Supplies	Copies for printed handouts Estimated cost of \$250	Possible Equity Funding
Computer Hardware		
Computer Software		
Training		
Other		
<b>Total Requested Amount</b>	<b>About \$11,250 per year</b>	

## STRATEGIC ACTION PLAN # 2

Describe Strategic Action Plan:	<p>Identify a lead teacher for each support and/or enhanced course for Statistics, College Algebra, Trigonometry and Business Calculus. Lead teacher will create a complete set of course materials for the support course (or the additional support component of an “enhanced” course) available to all teachers of the course. Lead teacher may offer workshops and/or mentor other teachers.</p> <p><b>Discussed in Sections: 1.0, 3.2, 3.3, 4.4 and 5.2</b></p>
List College goal/objective the plan meets:	<p><b>Goal #1: Promote success for every student</b></p> <p><b>Objectives:</b></p> <p>1.3: Improve student critical thinking skills</p> <p>1.4: Increase completion of courses, certificate and degree programs, and transfer-readiness</p>
Explain how the request helps the College attain student equity.	<p>Having a lead teacher for support and/or enhanced courses will allow students to have more resources than they would otherwise. The support/enhanced courses themselves are helping with equity, as research shows that Latinx and Black students are more successful in courses with support. The workshops/mentoring will enable the dissemination of equitable practices in math and how these best practices can be implemented in the particular course.</p>
What <i>Measurable Outcome</i> is anticipated for this SAP?	<ol style="list-style-type: none"> <li>1. Compared to other math courses, higher retention, success, and persistence rates are expected in these courses with “lead” teacher support</li> <li>2. Increased retention and success rates in courses taken following success in MATH 41</li> <li>3. Increased retention and success rates for Hispanic and African-American students in math courses with “lead” teacher support</li> <li>4. Increased persistence rate for Hispanic and African-American students in math courses with “lead” teacher support</li> </ol>
What specific aspects of this SAP can be	<p>This plan is highly dependent on funding.</p>

accomplished without additional financial resources?		
Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	Professional Expert pay, \$55 per hour x 100 hours per academic year. Total annual cost: \$5500 x 4 lead teachers = \$22,000	College Funds
Facilities		
Equipment		
Supplies		
Computer Hardware		
Computer Software		
Training		
Other		
<b>Total Requested Amount</b>	<b>\$22,000 per year</b>	

### STRATEGIC ACTION PLAN # 3

Describe Strategic Action Plan:

Continue to support and impact high-impact enrichment-oriented activities, such as advanced problem-solving seminars, the AMATYC Student Math League and practice sessions for it, the William Lowell Putnam Mathematical Competition and practice sessions for it, the Joint Math Club and Colloquium, and Informal Learning Seminars. Provide financial support for two to six students to work as math research outreach interns for five to ten hours per week. Ideally these students will have completed at least one Math Seminar course successfully and will be leaders among the students in our Math Research group. These enrichment activities and financial supports are known to have a high impact on students, especially for students coming from under-represented groups.

Fund four to eight hours per week for one to two instructors to work with a group of four to eight students on math research problems in an in-house, year-round undergraduate research experience.

Participating faculty on this project include Dana Clahane.

We propose to fund \$200 as an honorarium each month (10 months) for external faculty and industry speakers on open problems and emerging applications of mathematics at the Math Colloquium, which has been institutionalized by the Math and Computer Science Division since Fall 2009 and is now a nationally recognized series of talks that feature student and university faculty speakers and community-building. We propose four talks to be funded at the same rate during the summer, additionally, for the Pacific Summer Open Mathematics Seminar, which has been held at Fullerton College since 2010.

We propose to fund two hours daily, of special extra lab/office hours in the Math Lab Annex or other suitable classroom held by faculty who are interested in helping students with

	<p>challenging math problems in our advanced courses and their research projects either as ad hoc researchers or as students who are enrolled in the Math Seminar courses.</p> <p>Participating faculty will include and be recruited by Dana Clahane.</p> <p>We propose to continue funding of the overnight shipping of the Putnam Competition exams, and lunch/subsistence for the participants on the first Saturday of each December. It is very important that students not experience food insecurity on that date in particular as these students represent the College in this national competition.</p> <p>We propose to fund one to two faculty professional subscriptions to Overleaf, a collaboration and document preparation tool involving LaTeX, the current state-of-the-art typesetting for STEM. The faculty subscriptions will allow an unlimited students to join projects at no cost.</p> <p><b>Discussed in Sections: 1.0, 2.0, 3.2, 5.3 and 6.1</b></p>
<p>List College goal/objective the plan meets:</p>	<p><b>Goal #1: Promote success for every student</b></p> <p><b>Objectives:</b></p> <p>1.3: Improve student critical thinking skills</p> <p>1.4: Increase completion of courses, certificate and degree programs, and transfer-readiness</p> <p><b>Goal #2: Cultivate a culture of equity</b></p> <p><b>Objectives:</b></p> <p>2.3: Increase outreach to and recruitment of students from underserved populations</p> <p>2.4: Foster a sense of belonging where all are welcome and student basic needs are addressed</p> <p><b>Goal #3: Strengthen connections with our community</b></p>

	<p><b>Objectives:</b> 3.1: Create and expand partnerships with local K-12 and higher education institutions 3.2: Create and expand relationships with local businesses and civic organizations</p> <p><b>Goal #4: Commit to accountability and continuous quality improvement</b></p> <p><b>Objectives:</b> 4.3: Provide professional and career development opportunities for students, faculty, and staff</p>
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<p>Explain how the request helps the College attain student equity.</p>	<p>As the Department continues to broaden success to eliminate mathematical achievement gaps, it is important that we pay attention to ensuring that we offer all students, particularly our under-represented minority students, an increasingly full set of inspiring enrichment opportunities. It is natural for students who engage in math competitions or mentoring work with faculty and other students with the aim of obtaining careers in mathematical science, to enjoy mathematical science more than students who simply take regular courses. Thus we would like to see, for example, LatinX students winning the Putnam Competition or AMATYC competitions, on a regular basis. These and other underrepresented minorities at the College have previously not had substantial financial support to work on math activities that are now well known nationally and declared by the American Association of University Professors (AAUP) to have a “high impact” on these students, increasing retention and success rates. The Department wants to make sure that it is offering a full range of mathematical opportunities to engage in high impact enrichment, because our faculty have found that under-represented students who participate are winning competitions and are even attaining graduate degrees, including Ph.D.’s. Previously, our under-represented minority math majors had no offers from REU (Research Experiences for Undergraduate) paid internships, but our department now sees an opportunity for our students to be supported to do this work.</p> <p>More under-represented students in math at the College should be able to experience the full range of math research and competition activities that their peers at four-year schools do. They should get real experiences that prepare them for upper division math courses, and they should be able to learn in these enrichment activities what it is like to be a mathematician, as their peers at four-year schools, even in lower division, do. Not paying attention to this important need puts these students at a systematic disadvantage upon transfer, compared to their peers who have these</p>
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	<p>undergraduate enrichment opportunities supported on their campuses. Fully funding high impact math activities should be a returning trend for purposes of equity on this campus.</p>
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<p>What <i>Measurable Outcome</i> is anticipated for this SAP?</p>	<p>Increased retention and success in the calculus sequence, the seminars, and our 200-level math sequence, and in particular, increased retention and success for DIY populations in STEM at FC. We would also like to see an increase in the number of students who transfer to a four-year school STEM program, and in particular, we would like to see an increase in the number of students from DIY populations at FC who transfer to a STEM program at a four-year school. In addition, we would like to see a rank of fifth or higher by FC nationally in the AMATYC Competition, and at least six students scoring positively in the Putnam Competition. Finally, we would like to see at least one student from FC rank in the top 900 or higher, in the Putnam Competition, with at least one of these students being a student from a DIY population and at least two being female. Annually, we would like to see at least four of our students (with at least two of these students coming from DIY populations) receive a promotion to be funded by an external, more advanced Research Experience for Undergraduates (REU) at a four-year institution, subsequent to their work while supported in our in-house REU, if it is funded as requested.</p>
<p>What specific aspects of this SAP can be accomplished without additional financial resources?</p>	<p>The Math Seminar courses are already part of our program, and the Math Colloquium honoraria were institutionalized by the Math &amp; Computer Science Division in the 2016-17 AY. Also, the Division currently has institutionalized sustenance for the AMATYC and Putnam practice sessions and the Putnam Competition, which has been supported by the Division for several years now with good success. However, during the COVID emergency, the Seminars have had just a few students below the contractual minimum to continue. Typically, at least ten students per term are interested in pursuing math research activities, so we need a backup plan in case the Seminar courses do not run, and we have found great success among students who have been employed under the ENGAGE in STEM grant as research interns, with the majority of such students having since then completed STEM degrees including master's and doctoral degrees.</p>

	<p>The Department can include in syllabi language that introduces the Math Seminar and Colloquium to students in the Pre-calculus and Calculus sequence. As of Fall 2021 such language was not included in syllabi, and not all students who might be interested have been informed about the nature of the Colloquia/Seminar courses in Math at the College. No funding will be required to make students aware of the Math Seminars in syllabi for STEM-oriented math courses.</p>
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Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel	\$20,000	Math Lab funds/Guided Pathways/COVID Relief funds
Facilities		
Equipment		
Supplies		
Computer Hardware		
Computer Software (Overleaf Subscriptions)	\$720	Division Technology Funds
Training		
Other: Sustenance for competitions and practices and student conference registration fees	\$3,000	
<b>Total Requested Amount</b>	<b>\$23,720 per year</b>	

## STRATEGIC ACTION PLAN # 4

Describe Strategic Action Plan	<p>Offer more support, interventions and services to our students by using alternate models in the Math Lab. Hire additional tutors to serve in the virtual tutoring environment and as “roaming” tutors to augment the traditional model of tutoring service. Acquire space for additional interventions, such as group tutoring, workshops, bootcamps, review sessions, supplemental instruction, etc.</p> <p><b>Discussed in Sections: 2.0, 3.2, 3.3, 4.3, 5.1 and 6.1</b></p>
List College goal/objective the plan meets:	<p><b>Goal #1: Promote success for every student</b></p> <p><b>Objectives:</b></p> <p>1.3: Improve student critical thinking skills</p> <p>1.4: Increase completion of courses, certificate and degree programs, and transfer-readiness</p> <p><b>Goal #2: Cultivate a culture of equity</b></p> <p><b>Objectives:</b></p> <p>2.3: Increase outreach to and recruitment of students from underserved populations</p> <p>2.4: Foster a sense of belonging where all are welcome and student basic needs are addressed</p> <p><b>Goal #3: Strengthen connections with our community</b></p> <p><b>Objectives:</b></p> <p>3.1: Create and expand partnerships with local K-12 and higher education institutions</p> <p><b>Goal #4: Commit to accountability and continuous quality improvement</b></p> <p><b>Objectives:</b></p> <p>4.3: Provide professional and career development opportunities for students, faculty, and staff</p>

<p>Explain how the request helps the college attain student equity.</p>	<p>As the Math Department strives to offer a program that provides not only equity in the classroom and its support services, but also make progress towards equitable completion of transfer-level mathematics courses. To accomplish these goals, hiring additional tutors would allow the program to be expanded to offer services to a wider range of students. This would allow students to work collaboratively and have a tutor come to them will allow for a more student-centered math experience. The virtual tutoring creates greater access for students, especially those who are unable to be on campus when seeking assistance. Acquiring space for interventions such as group tutoring, workshops, supplemental instruction and active learning seminars would be necessary to provide access to all students.</p>	
<p>What <i>Measurable Outcome</i> is anticipated for this SAP?</p>	<ol style="list-style-type: none"> <li>1. Higher retention, success, and persistence rates are expected in math courses at all levels</li> <li>2. Increased student use in the Math Lab</li> </ol>	
<p>What specific aspects of this SAP can be accomplished without additional financial resources?</p>	<p>All aspects of this SAP require additional financial resources.</p>	
Type of Resource	Requested Dollar Amount	Potential Funding Source
<p>Personnel</p>	<p>For each additional instructor per hour at Lab rate:  approx. \$55/hr for 70 hrs/wk for 37 wks/yr  =\$142,450 per year.</p> <p>For each additional student tutor per hour at hourly rate:  \$17/hr for 70 hrs/wk for 37 wk/yr</p>	<p>College Funds</p>

	= \$44,030 per year.	
Facilities	Additional room	
Equipment		
Supplies		
Computer Hardware		
Computer Software		
Training		
Other		
<b>Total Requested Amount</b>	<b>\$186,480 per year</b>	

## STRATEGIC ACTION PLAN # 5

Describe Strategic Action Plan	Replace the furniture, including desks and chairs, of several classrooms to create collaborative spaces that are conducive for improved student engagement and more significant student-student and student-instructor relationships.
List College goal/objective the plan meets:	<p><b>Goal #1: Promote Success for every student.</b></p> <p><b>Objectives:</b></p> <p>1.3: Improve student critical thinking skills.</p> <p>1.4: Increase completion of courses, certificate and degree programs, and transfer-readiness.</p> <p><b>Goal #2: Cultivate a culture of equity.</b></p> <p><b>Objectives:</b></p> <p>2.1: Remove institutional barriers to student equity and success.</p> <p>2.4: Foster a sense of belonging where all are welcome and student basic needs are addressed.</p>
Explain how the request helps the college attain student equity.	<p>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.</p> <p>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.</p> <p>Participating faculty will include Juan Zaragoza who can assist faculty who wish to develop curriculum that is based on team-</p>

	based learning, inquiry-based learning, and other relevant strategies that can be aligned with collaborative spaces.
What <i>Measurable Outcome</i> is anticipated for this SAP?	Higher retention, success, and persistence rates are expected in courses taught in the converted classrooms. Increased student satisfaction with their course and an improved relationship with peers and the instructor.
What specific aspects of this SAP can be accomplished without additional financial resources?	All aspects of this SAP require additional financial resources.

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Type of Resource	Requested Dollar Amount	Potential Funding Source
Personnel		
Facilities	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.	College funds
Equipment		
Supplies		
Computer Hardware		
Computer Software		
Training		
Other		
<b>Total Requested Amount</b>	<b>\$90,000</b> 	

### **6.3 Optional: Long-Term Plans**

*Your department might have more plans than just immediate requests for funding. If so, please describe them here.*

The Department is discussing plans to develop a course that serves as an introduction to proofs in a way that can be integrated with the Colloquium. To accomplish this task, the Department will have to decide what proof techniques can be extracted from MATH 171 Discrete Mathematics, and which other topics, including research problems, should be included in such an introduction to proofs course. During Dana Clahane's sabbatical, he surveyed past student colloquium speakers and found that a high percentage of our former math majors are pursuing or have started data science careers. We will investigate ways to enhance the math curriculum with preparation for such careers, including seminars devoted to probability, statistics, and data science in general.

## **7.0** Executive Summary

*Please provide the reader with a brief overview of the highlights, themes, and key elements of this self-study. Please don't include new information you did not discuss earlier. Although you will likely write this section last, please remember to put this summary at the front of your report.*

See section 1.0.

## 8.0 Publication Review

The College wants to maintain integrity in all representations of its mission, programs, and services. Please help this effort by reviewing your publications: professional social media profiles, websites, brochures, pamphlets, etc. Please tell us the date they were last reviewed and if you found them to be accurate in all representations of the College and program missions and services. Information on the college's graphic standards is available [here](#).

Publication	Date last reviewed	Is the information accurate?	URL of publication
Math and Computer Science Division Website	Ongoing	Yes	<a href="http://math.fullcoll.edu/">http://math.fullcoll.edu/</a>

**Fullerton College  
Instructional Program Review  
Fall 2021**

**APPENDIX A**

**Mathematics**

**The following packet of information contains data for the comprehensive Instructional Program Review process for the Mathematics program.**

**Data cover a five-year period: Summer 2016 - Spring 2021, which includes the 2016-2017 academic year through the 2020-2021 academic year. Data are current through August 1, 2021.**

*NOTE: An academic year includes the Summer, Fall, and Spring terms, so the AY 16/17 includes the Summer 2016, Fall 2016, and Spring 2017 terms.*

*If you have questions about the data packet, please contact the Office of Institutional Effectiveness.*

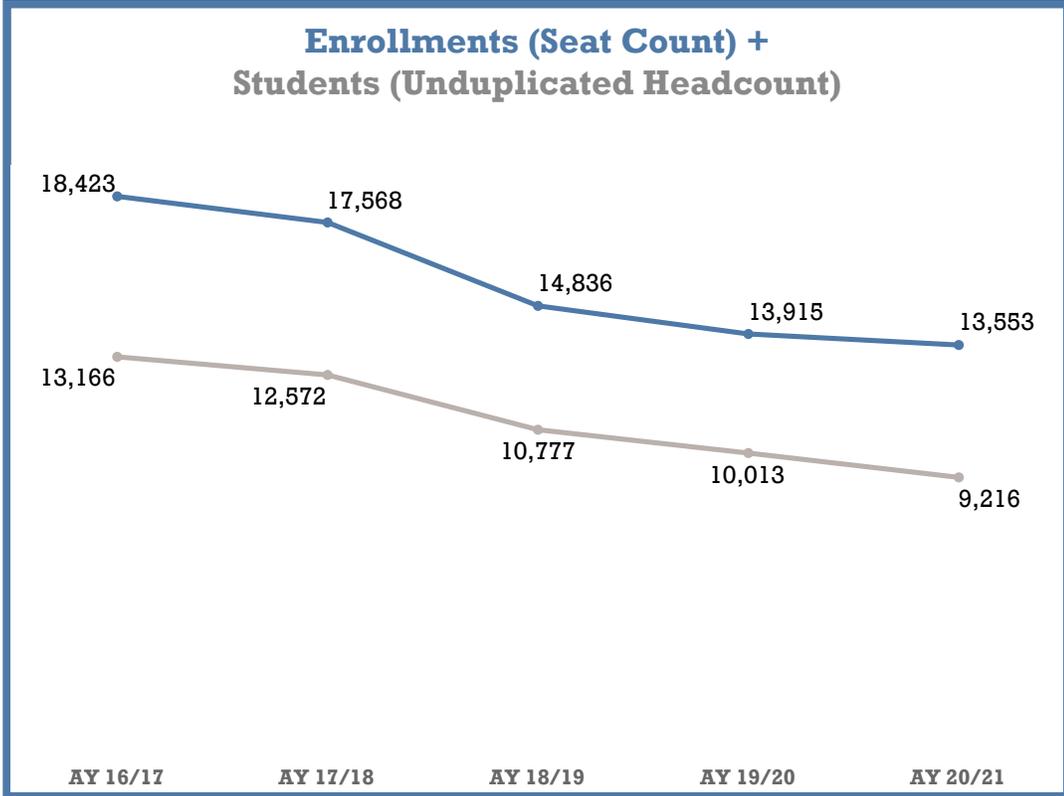
**Program Selector:**

Mathematics

**APPENDIX A**  
**Fall 2021 Instructional Program Review**

**Mathematics**

**SECTION 3.1.1: Enrollment Demographics:** Using the data provided by the OIE, briefly describe the enrollment trends in your program over the past five years.



The "Enrollments and Students" graph to the left shows the number of **enrollments (seat count)** and the number of **unique students (headcount)** enrolling each academic year in the **Mathematics** program.

**5-Year Change Calculation**

The following table calculates the % change in **enrollments** and **headcount** between AY 16/17 and AY 20/21.

Note the table shows the change for "**This Program**" as well as the change for all other programs combined at the College.

5-Year % Change in Enrollments	All Other Programs	-9.8%
	This Program	-26.4%
% Change in Headcount	All Other Programs	-11.5%
	This Program	-30.0%

**1-Year Change Calculation**

The following table calculates the % change in **enrollments** and **headcount** between AY 19/20 and AY 20/21.

Note the table shows the change for "**This Program**" as well as the change for all other programs combined at the College.

% Change in Enrollments	All Other Programs	-3.7%
	This Program	-2.6%
% Change in Headcount	All Other Programs	-3.5%
	This Program	-8.0%

**SECTION 3.1.1:** Using the data provided by the OIE, briefly describe the enrollment trends in your program over the past five years.

**Enrollments (Seat Count) by Course for: Mathematics**

		<b>1 Year Comparison</b>		<b>5 Year Comparison</b>	
		<b>AY 19/20 v. AY 20/21</b>		<b>AY 16/17 v. AY 20/21</b>	
Course	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
MATH 007 F	44	49			
MATH 015 F	1,108	949	293		
MATH 020 F	3,152	2,756	723		
MATH 024 F			538	188	
MATH 026 F				523	825
MATH 030 F	248	213	186	42	
MATH 031 F			8	373	593
MATH 033 F					32
MATH 034 F					129
MATH 040 F	3,065	2,969	2,043	1,231	1,054
MATH 041 F	888	1,020	1,294	619	309
MATH 043 F	224	70	118		
MATH 100 F	1,172	1,171	1,462	2,313	2,110
MATH 120 F	1,753	1,859	1,940	2,435	2,498
MATH 120HF	18	19	5	24	24
MATH 129 F	714	683	635	605	448
MATH 130 F	636	631	612	537	510
MATH 141 F	1,579	1,298	1,289	1,382	1,446
MATH 141HF	6	4		17	9
MATH 142 F	1,061	941	919	1,000	955
MATH 150AF	1,196	213			
MATH 150BF	721	100			
MATH 150HF	20				
MATH 151 F		992	1,051	1,010	1,012
MATH 151HF		9	9	12	15
MATH 152 F		652	710	641	681
MATH 152HF		3	3	9	12
MATH 171 F	117	129	160	155	154
MATH 172 F	60	60	70	120	117
MATH 203 F	39	40	36	39	33
MATH 250AF	337	69			
MATH 250BF	160	32			
MATH 250CF	64	10			
MATH 251 F		322	352	323	311
MATH 252 F		193	222	194	197
MATH 253 F		70	121	101	79
MATH 260 F	9	9			
MATH 290 F	8	10	9	4	
MATH 290HF	6	6	13	3	
MATH 291 F	7	2	3	6	
MATH 291HF	2	8	4	3	
MATH 295 F	2	3	7	4	
MATH 295HF	7	4	1	2	
<b>Grand Total</b>	<b>18,423</b>	<b>17,568</b>	<b>14,836</b>	<b>13,915</b>	<b>13,553</b>

*Note: This page(s) is for any program that would like to add commentary on course-level enrollment trends for Section 3.1.1. This table shows course-specific enrollments from AY 16/17, AY 19/20, and AY 20/21. If additional data are needed, please consult FC's KPI Dashboard or connect with OIE.*

**The number of different courses offered by the Mathematics Program over the last 5 years:**

**43**

## Course Enrollment for: Mathematics

*NOTE: For programs with < 45 courses, this page will be blank.*

1 Year Comparison	5 Year Comparison
AY 19/20 v. AY 20/21	AY 16/17 v. AY 20/21

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The number of different courses offered by the Mathematics Program over the last 5 years:

**43**

## Course Enrollment for: Mathematics

*NOTE: For programs with < 90 courses, this page will be blank.*

1 Year Comparison	5 Year Comparison
AY 19/20 v. AY 20/21	AY 16/17 v. AY 20/21

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The number of different courses offered by the Mathematics Program over the last 5 years:

**43**

**SECTION 3.1.2:** Using the data provided by the OIE, describe the student population your department serves. Do you have a way of determining which students are your majors, for example through a gateway course? Please explain...

### Enrollments in Mathematics Compared to All Other Programs: AY 20/21

% Degree   Transfer	All Other Programs	77%	This Program	82%
% Certificate	All Other Programs	3%	This Program	1%
% Career Dev.	All Other Programs	6%	This Program	4%
% Special Admit	All Other Programs	3%	This Program	1%
% Age: Under 20	All Other Programs	32%	This Program	37%
% Age: 20 - 24	All Other Programs	42%	This Program	40%
% Age: 25+	All Other Programs	26%	This Program	22%
% Majors	All Other Programs	23%	This Program	2%
% 3+ Program Courses / Year	All Other Programs	6%	This Program	13%
% Special Admit Last Year	All Other Programs	7%	This Program	12%
% 24+ Unit Attempts This Year	All Other Programs	23%	This Program	43%
% College Grad	All Other Programs	7%	This Program	5%
% DSS	All Other Programs	6%	This Program	5%
% Foster Youth	All Other Programs	1%	This Program	0%
% LGBT	All Other Programs	9%	This Program	9%
% Low-Income	All Other Programs	74%	This Program	76%
% Veteran	All Other Programs	1%	This Program	2%

**AY 20/21 Enrollments (Seat Count) for "This Program" Mathematics**

**13,553**

**AY 20/21 Enrollments (Seat Count) for "All Other Programs"**

**116,430**

### Mathematics Enrollments by Race | Ethnicity | Ancestry

	All Other Prog..	This Program
Amer. Indian   Alaska N..	0.2%	0.2%
Asian	11.1%	12.4%
Black   African Amer.	2.9%	2.3%
Filipino	2.7%	3.0%
Latinx	57.6%	58.2%
Native Hawaiian   Pacifi..	0.2%	0.2%
Two or More	3.5%	3.3%
Unknown	5.6%	5.8%
White	16.2%	14.7%

### Mathematics Enrollments by Gender

	All Other Programs	This Program
Female	53.7%	47.5%
Male	41.7%	48.2%
Different Ident..	4.6%	4.2%

**SECTION 3.1.2:** Using the data provided by the OIE, describe the student population your department serves. Do you have a way of determining which students are your majors, for example through a gateway course? Please explain...

**AY 20/21  
Enrollments in  
Mathematics  
courses for Majors**

**294**

**AY 20/21  
Enrollments in  
Mathematics  
courses for  
Non-Majors**

**13,259**

% Degree   Transfer	Non-Majors	82%
	Majors	71%
% Certificate	Non-Majors	1%
	Majors	1%
% Career Dev.	Non-Majors	4%
	Majors	6%
% Special Admit	Non-Majors	1%
	Majors	0%
% Age: Under 20	Non-Majors	37%
	Majors	31%
% Age: 20 - 24	Non-Majors	41%
	Majors	39%
% Age: 25+	Non-Majors	22%
	Majors	30%
% Majors	Non-Majors	0%
	Majors	100%
% 3+ Program Courses / Year	Non-Majors	13%
	Majors	30%
% Special Admit Last Year	Non-Majors	12%
	Majors	6%
% 24+ Unit Attempts This Year	Non-Majors	43%
	Majors	37%
% College Grad	Non-Majors	4%
	Majors	15%
% DSS	Non-Majors	5%
	Majors	5%
% Foster Youth	Non-Majors	0%
	Majors	0%
% LGBT	Non-Majors	9%
	Majors	8%
% Low-Income	Non-Majors	76%
	Majors	72%
% Veteran	Non-Majors	2%
	Majors	2%

	Non-Majors	Majors
Amer. Indian   Alaska N..	0.2%	
Asian	12.3%	17.0%
Black   African Amer.	2.2%	3.9%
Filipino	3.0%	
Latinx	58.4%	51.9%
Native Hawaiian   Pacifi..	0.2%	
Two or More	3.3%	
Unknown	5.7%	8.4%
White	14.7%	14.6%

	Non-Majors	Majors
Female	47.7%	39.4%
Male	48.2%	51.9%
Non-Binary	0.6%	
Unknown	3.5%	6.6%

**SECTION 3.1.3:** Which classes have the highest demand and why? Are they offered regularly -- at different times of the day and week, in different formats (in-person, online, hybrid)? Please explain.

**SECTION 3.1.5:** Does enrollment vary by semester? Please describe how course offerings are adjusted to meet student demand and help students reach their academic goals.

<b>5 Courses with Most Enrollments (5 Year Totals)</b>				
Course	Enrollments	Sections	% Online	% Evening
MATH 120 F	10,485	251	4%	24%
MATH 040 F	10,362	232	9%	21%
MATH 100 F	8,228	200	7%	18%
MATH 141 F	6,994	164	0%	26%
MATH 020 F	6,631	147	12%	27%

<b>Average* Number of Sections Offered and Enrollment by Semester</b> <i>*(5-Year Avg.)</i>		
	Avg. Sections	Avg. Enrollments
Summer	48	1,580
Fall	188	7,563
Spring	181	6,515

<b>Number of Summer, Fall, and Spring Terms, respectively, a course has been offered in the last 5 years.</b>			
<i>(5 = Course has been offered every Fall term in the last 5 years; 4 = Course has been offered 4 of the last 5 fall semesters, etc.)</i>			
Course	Summer	Fall	Spring
MATH 007 F		2	2
MATH 015 F	3	3	2
MATH 020 F	3	3	2
MATH 024 F		2	1
MATH 026 F	1	2	2
MATH 030 F		4	3
MATH 031 F	1	2	3
MATH 033 F			1
MATH 034 F			1
MATH 040 F	5	5	5
MATH 041 F	4	5	5
MATH 043 F		2	2
MATH 100 F	5	5	5
MATH 120 F	5	5	5
MATH 120HF		5	
MATH 129 F	5	5	5
MATH 130 F	5	5	5
MATH 141 F	5	5	5
MATH 141HF		2	2
MATH 142 F	5	5	5
MATH 150AF	2	1	1
MATH 150BF	2	1	1
MATH 150HF		1	
MATH 151 F	3	4	4
MATH 151HF		4	

<b>Number of Summer, Fall, and Spring Terms, respectively, a course has been offered in the last 5 years.</b>			
<i>(5 = Course has been offered every Fall term in the last 5 years; 4 = Course has been offered 4 of the last 5 fall semesters, etc.)</i>			
Course	Fall	Spring	Summer
MATH 152 F	4	4	3
MATH 152HF		4	
MATH 171 F	5	5	5
MATH 172 F	5	5	2
MATH 203 F		5	
MATH 250AF	1	1	2
MATH 250BF	1	1	2
MATH 250CF	1	1	1
MATH 251 F	4	4	3
MATH 252 F	4	4	3
MATH 253 F	4	4	3
MATH 260 F		2	
MATH 290 F	4	3	2
MATH 290HF	4	4	2
MATH 291 F	4	3	1
MATH 291HF	3	4	1
MATH 295 F	3	4	1
MATH 295HF	3	2	
MATH N01 F	5	5	5

**SECTION 3.1.5:** Does enrollment vary by semester? Please describe how course offerings are adjusted to meet student demand and help students reach their academic goals.

Fall and spring course offerings are generally very similar, however we typically offer more sections of MATH 151 and MATH 251 in the fall, and MATH 152 and MATH 252 in the spring due to the sequential nature of the courses.

MATH 203 is only offered in the spring, since students typically take the prerequisite (any 100-level course) in the fall.

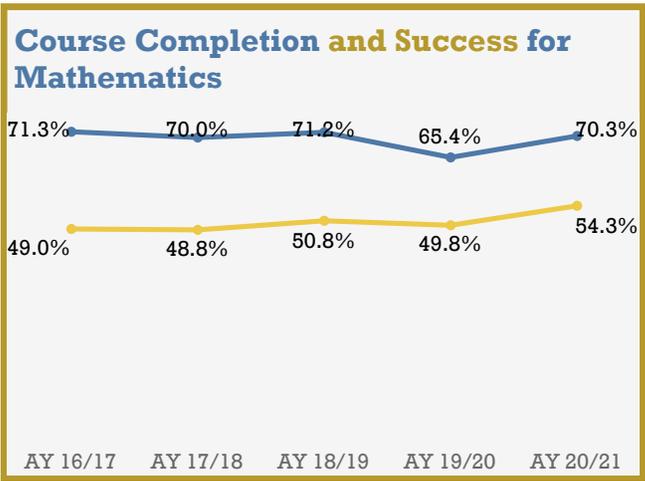
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**Course Completion + Course Success**

Section 3.2.1: Using the data provided by the OIE, briefly describe student achievement rates in your program over the past five years: **completion**, **success**, degrees/certificates, transfer, licensing, job placement, wage improvements (not all of these measures apply to every program).

**Course Completion and Success for Mathematics**

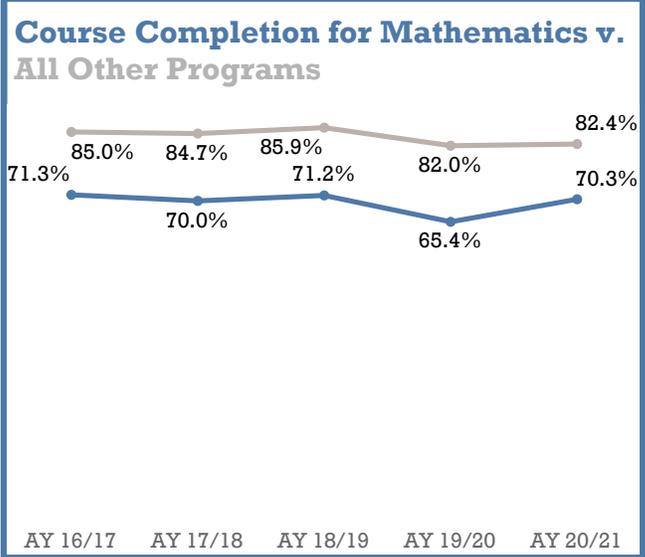
	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
Course Completion	71.3%	70.0%	71.2%	65.4%	70.3%
Course Success	49.0%	48.8%	50.8%	49.8%	54.3%



**Course Completion and Success for Mathematics Relative to All Other Programs**

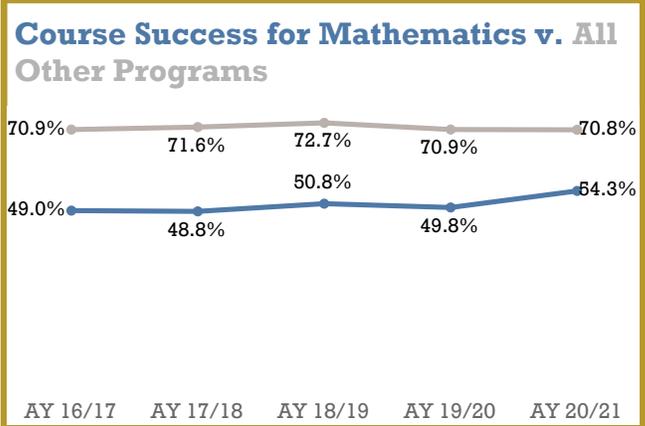
**Course Completion for Mathematics**

	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
Program Match	71.3%	70.0%	71.2%	65.4%	70.3%
All Other Progra..	85.0%	84.7%	85.9%	82.0%	82.4%



**Course Success for Mathematics**

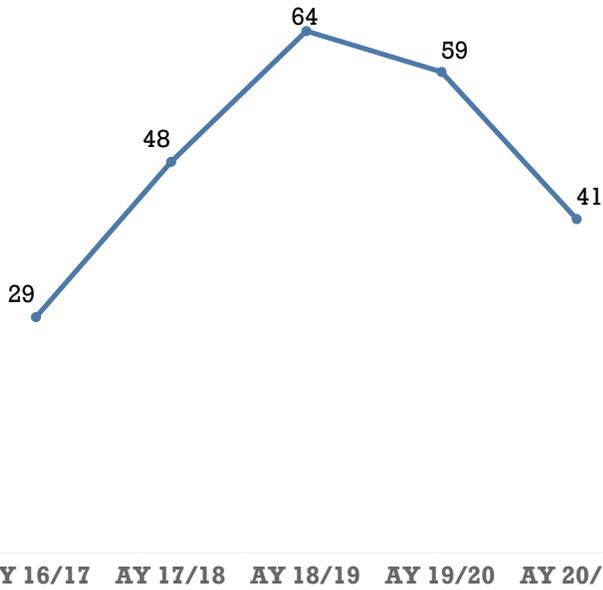
	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21
Program Match	49.0%	48.8%	50.8%	49.8%	54.3%
All Other Progra..	70.9%	71.6%	72.7%	70.9%	70.8%



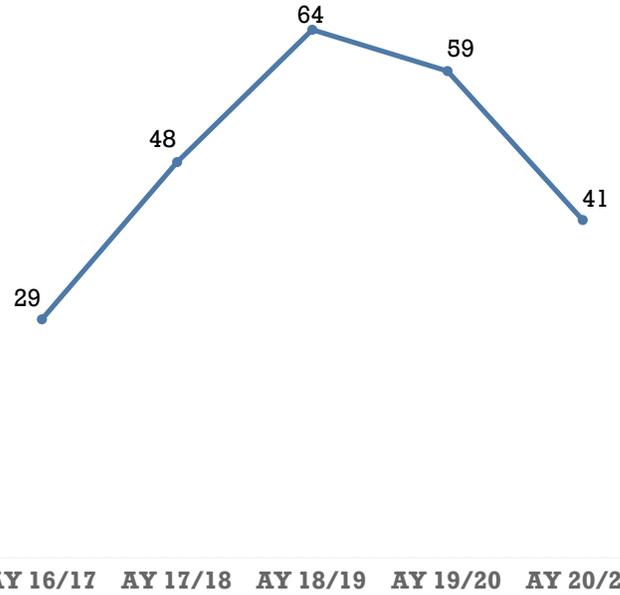
**Section 3.2.1:** Using the data provided by the OIE, briefly describe student achievement rates in your program over the past five years: completion, success, **degrees/certificates**, transfer, licensing, job placement, wage improvements (not all of these measures apply to every program).

<p><b># of Unique Students Earning a Program Award in Last 5 Years in Mathematics</b></p> <p style="font-size: 2em; font-weight: bold;">219</p>	<p><b># of Unique Students Earning a Program Award by Type in Last 5 Years in Mathematics</b></p> <p style="font-size: 2em; font-weight: bold;">219</p> <p style="font-size: 0.8em;">Associate</p>
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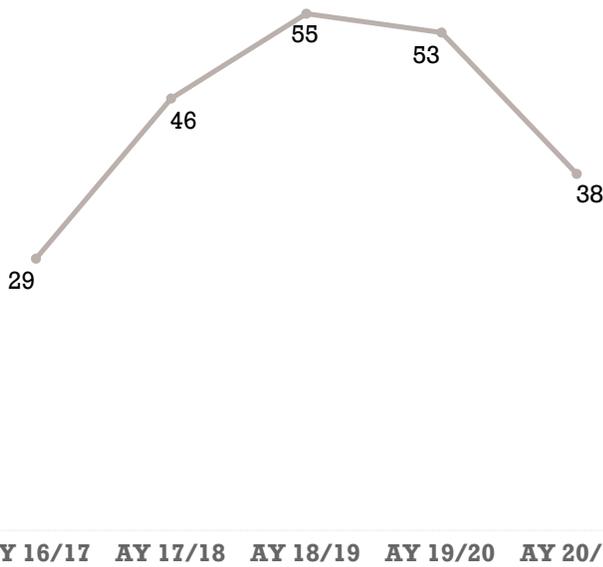
**Program Awards by Year**  
**Total Awards**



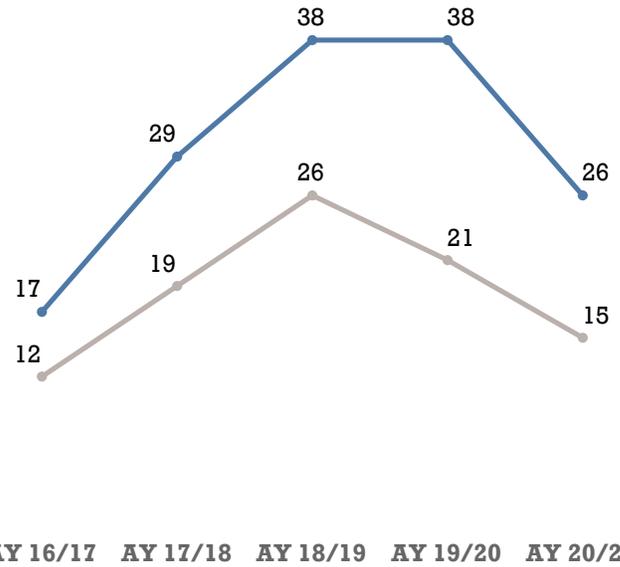
**Program Awards by Type**  
**Degrees, State Approved Certs + Local Certs**



**Students Earning an Award by Year**  
**Unique Students**



**Program Awards**  
**AA/AS, ADT, Cert: <30 Units, Cert: 30 - 59 Units, Cert: 60+ Units, Local Certs**



**Section 3.2.1:** Using the data provided by the OIE, briefly describe student achievement rates in your program over the past five years: completion, success, **degrees/certificates**, transfer, licensing, job placement, wage improvements (not all of these measures apply to every program).

<b># of Unique Students Earning a Program Award in Last 5 Years in Mathematics</b>	<b>Total Program Award in Last 5 Years in Mathematics</b>
<b>219</b>	<b>241</b>

<b># of Students Earning a Program Award by Award Type</b>						
	Year					Grand Total
	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21	
Associate	29	46	55	53	38	219
Total: Unique Students	29	46	55	53	38	219

<b>Program Award Details for Mathematics</b>						
<b>Unique Students by Award Type by Year</b>						
	Year					Grand Total
	AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21	
AS	17	29	38	38	26	148
AS-T	12	19	26	21	15	93
Unique Students	29	46	55	53	38	219

<b>Program Award Details for Mathematics</b>								
<b>Total Specific Awards by Year</b>								
		AY 16/17	AY 17/18	AY 18/19	AY 19/20	AY 20/21	Grand Total	
AS	AS Mathematics	2S03871	17	29	38	38	26	148
AS-T	Mathematics AS-T	2S30708	12	19	26	21	15	93
Total Awards			29	48	64	59	41	241

## Transfer

Section 3.2.1: Using the data provided by the OIE, briefly describe student achievement rates in your program over the past five years: completion, success, degrees/certificates, **transfer**, licensing, job placement, wage improvements (not all of these measures apply to every program).

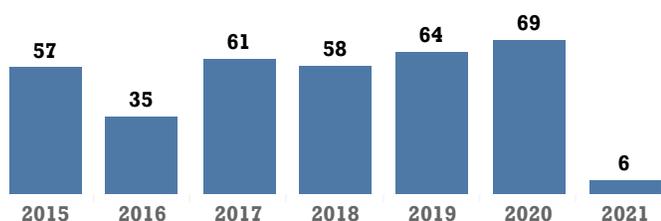
### Total **Transfer** Students from Mathematics

**350**

### Transfers by **Award Earners or Majors**

Degree / Cert.	206
Major	144

### Starting Year @ 4-Year College



### Transfer by Destination

CSU	194
UC	103
Other	53

### Transfer by Race | Ethnicity | Ancestry

	Transfers	%
Asian	97	28%
Black   African Amer..	5	1%
Latinx	124	35%
Two or More	12	3%
Unknown	15	4%
White	97	28%

### Transfer by Destination by Award Earner or Major

	Degree / Cert.	Major
CSU	121	73
UC	70	33
Other	15	38
<b>Total</b>	<b>206</b>	<b>144</b>

### Most Popular 4-Year College Destination (Top 7)

CALIFORNIA STATE UNIVERSITY - FULLERTON	110
CALIFORNIA STATE POLYTECHNIC UNIVERSITY POMONA	44
CALIFORNIA STATE UNIVERSITY - LONG BEACH	29
UNIVERSITY OF CALIFORNIA - IRVINE	23
UNIVERSITY OF CALIFORNIA - BERKELEY	23
UNIVERSITY OF CALIFORNIA-LOS ANGELES	21
UNIVERSITY OF CALIFORNIA-SAN DIEGO	12

**Job Placement + Wage Improvement**

Section 3.2.1: Using the data provided by the OIE, briefly describe student achievement rates in your program over the past five years: completion, success, degrees/certificates, transfer, licensing, **job placement, wage improvements** (not all of these measures apply to every program).

**Strong Workforce Program  
(TOP Code)**

Chancellor's Office Strong Workforce Program dashboard. That dashboard, and additional documentation, can be found at: [calpassplus.org/Launchboard/SWP.aspx](http://calpassplus.org/Launchboard/SWP.aspx)

Program Selector  
Mathematics

**SWP Students:** All students enrolled in the selected year who took at least 0.5 units in any single credit course or who had at least 12 positive attendance hours in any noncredit course(s) excluding Special Admit students on a TOP code that is assigned to a vocational industry sector.

**SWP Units:** Among all Strong Workforce Program students, the proportion who successfully completed nine or more career education semester units in the selected year within a single district

**SWP: Job Close to Field of Study:** Among students who responded to the CTE Outcomes Survey and did not transfer to any postsecondary institution, the proportion who reported that they are working in a job very closely or closely related to their field of study

**Attained the Living Wage:** Among students who exited college and did not transfer to any postsecondary institution, the proportion who attained the district county living wage for a single adult measured immediately following academic year of exit

**Median Change in Earnings:** Among Strong Workforce Program students who exited and who did not transfer to any postsecondary institution, median change in earnings between the second quarter prior to the beginning of the academic year of entry (for the first time ever as a non-Special Admit or return to any community college after an absence of one or more academic years) and the second quarter after the end of the academic year of exit from the last college attended

**Median Annual Earnings:** Among students who exited the community college system and who did not transfer to any postsecondary institution, median earnings following the academic year of exit.

# COURSE COMPLETION: Equity Analysis for Mathematics

**Section 3.2.2. Equity Analysis:** Please pay special attention to equity issues -- where a group of students has an achievement rate that is below average. What factors can explain this?

## by Race | Ethnicity | Ancestry

	Enrollments	Course Co..	Gap
Amer. Indian   Alaska Native	171	70.2%	
Asian	9,590	79.7%	
Black   African Amer.	1,912	63.6%	-121
Filipino	2,239	74.1%	
Latinx	45,701	66.5%	-3,606
Native Hawaiian   Pacific Island..	236	60.6%	-22
Two or More	2,541	72.1%	
Unknown	2,748	70.9%	
White	13,262	73.5%	

## by Gender

	Enrollments	Course Co..	Gap
Different Id..	2,323	67.5%	
Female	36,283	69.9%	
Male	39,794	69.7%	

## by DSS

	Enrollments	Course Completion	Gap
Not DSS	73,217	69.9%	
DSS	5,183	67.1%	

## by Foster Youth

	Enrollments	Course Completion	Gap
Not Foster Y..	77,964	69.8%	
Foster Youth	436	63.5%	-27

## by LGBT

	Enrollments	Course Completion	Gap
Not LGBT	74,703	69.8%	
LGBT	3,697	68.4%	

## by Low Income

	Enrollments	Course Completion	Gap
Not Low Income	14,145	74.7%	
Low Income	64,255	68.7%	-3,901

## by Military Status

	Enrollments	Course Completion	Gap
Not Military	76,361	69.5%	-6,376
Military	2,039	78.0%	

## COURSE SUCCESS: Equity Analysis for Mathematics

**Section 3.2.2. Equity Analysis:** Please pay special attention to equity issues -- where a group of students has an achievement rate that is below average. What factors can explain this?

### by Race | Ethnicity | Ancestry

	Enrollments	Course Success	Gap
Amer. Indian   Alaska Native	215	48.0%	
Asian	12,770	65.9%	
Black   African Amer.	2,493	39.2%	-240
Filipino	2,883	58.3%	
Latinx	57,701	44.9%	-5,364
Native Hawaiian   Pacific Islander	295	36.9%	-29
Two or More	3,236	54.5%	
Unknown	3,454	53.2%	
White	16,972	57.1%	

### by Gender

	Enrollments	Course Success	Gap
Female	46,250	50.8%	
Male	50,820	49.8%	
Different Id..	2,949	52.6%	

### by DSS

	Enrollments	Course Success	Gap
Not DSS	92,787	50.7%	
DSS	7,232	46.1%	-503

### by Foster Youth

	Enrollments	Course Success	Gap
Not Foster Youth	99,411	50.4%	
Foster Youth	608	46.6%	-37

### by LGBT

	Enrollments	Course Success	Gap
Not LGBT	95,438	50.3%	
LGBT	4,581	51.9%	

### by Low Income

	Enrollments	Course Success	Gap
Not Low Income	17,475	58.1%	
Low Income	82,544	48.6%	-7,540

### by Military

	Enrollments	Course Success	Gap
Not Military	97,285	50.2%	
Military	2,734	55.8%	

## Degrees + Certificates: Equity Analysis for Mathematics

**Section 3.2.2. Equity Analysis:** Please pay special attention to equity issues -- where a group of students has an achievement rate that is below average. What factors can explain this?

### # of Unique Students Earning a Program Award by Type in Last 5 Years in Mathematics

Associate

**219**

## Mathematics Majors in Mathematics Courses

vs.

## Mathematics Award Earners

### Enrollments Among Mathematics Majors by Race | Ethnicity | Ancestry

American Indian   Alaska Na..	0%
Asian	20%
Black   African American	3%
Filipino	2%
Latinx	47%
Native Hawaiian   Pacific Isl..	1%
Two or More	3%
Unknown	5%
White	19%

### Program Awards in Mathematics by Race | Ethnicity | Ancestry

	Total Awards	% of Total Awards
Asian	57	24%
Filipino	6	2%
Latinx	92	38%
Two or More	12	5%
Unknown	13	5%
White	61	25%

**Section 3.3.1: Gateway Course Information.** Using the data provided by the OIE, briefly describe how students have moved through your program over the past five years: unit accumulation, prerequisites, corequisites, substitutions, **gateway courses**, and bottleneck courses. (Not all of these measures apply to every program.)

### 5 Most Enrolled Courses in Mathematics

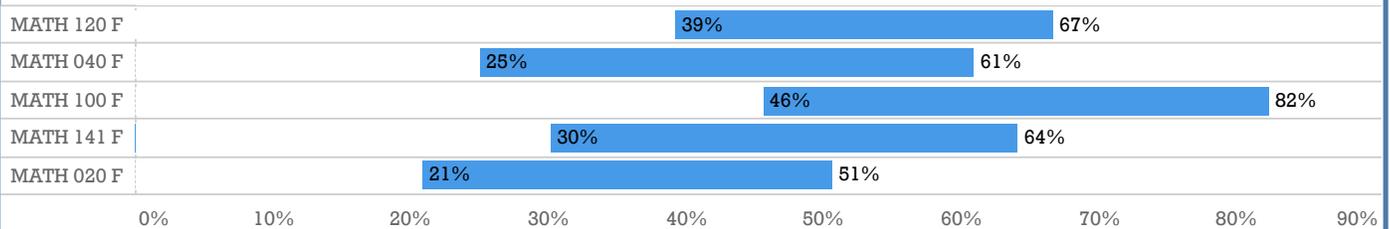
**NOTE: 5-year totals**

	Enrollments	Students Repeating	% of Students who Repeated	Course Completion	Course Success	Withdraw Rate
MATH 120 F	10,485	1,420	16.1%	70%	53%	30%
MATH 040 F	10,362	1,893	23.5%	65%	42%	35%
MATH 100 F	8,228	938	13.2%	80%	64%	20%
MATH 141 F	6,994	1,132	20.1%	68%	48%	32%
MATH 020 F	6,631	1,172	22.2%	62%	36%	38%

### Range of Success Rates by Section:

#### 20th Percentile v. 80th Percentile

(At least 10 Sections Offered)



### Disproportion Impact in Top 5 Enrolled Courses by Course by Race | Ethnicity | Ancestry

**NOTE: Only Identities with Calculated Disproportion Impact Appear**

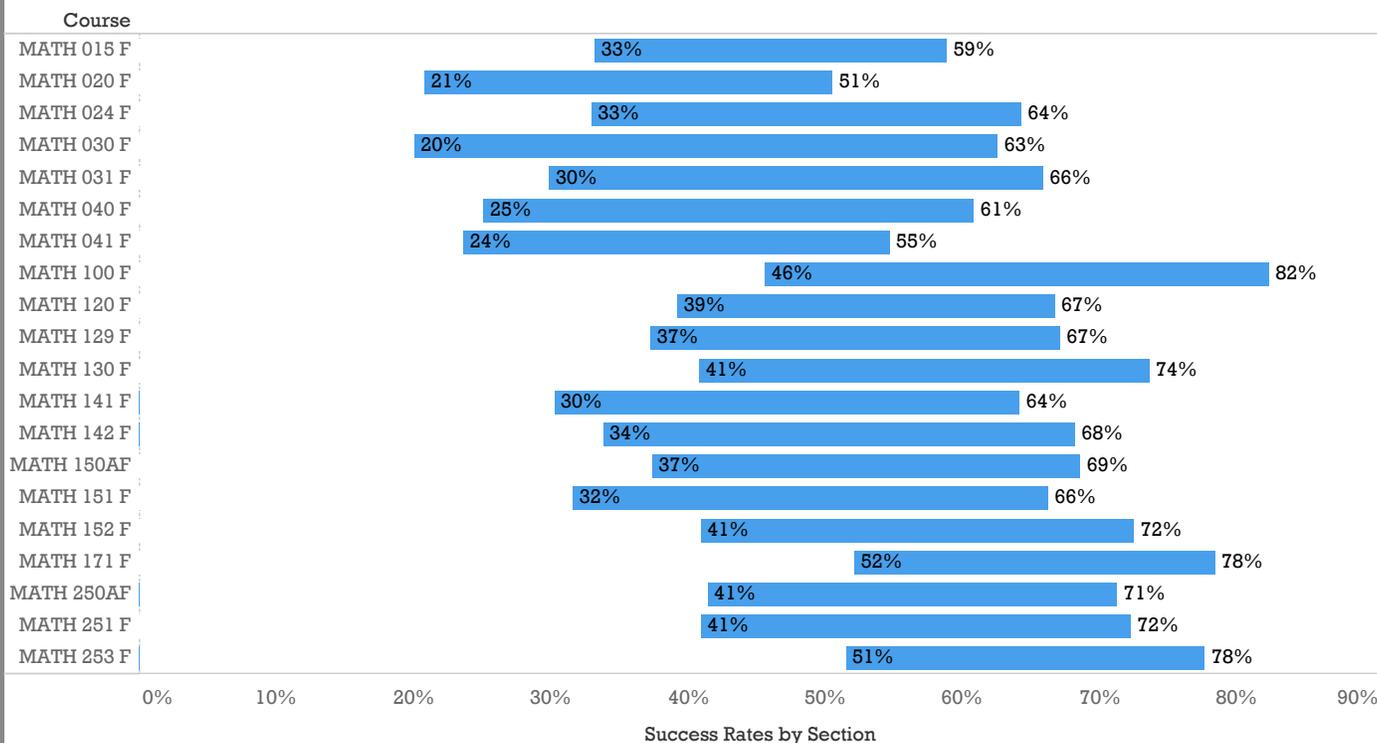
		Enrollments	Course Success	Gap
MATH 120 F	Black   African Amer.	259	41.7%	-29
	Latinx	6,290	46.1%	-1,010
	Native Hawaiian   Pa..	26	26.9%	-7
MATH 040 F	Black   African Amer.	259	28.2%	-37
	Latinx	6,927	39.2%	-611
	Native Hawaiian   Pa..	42	23.8%	-8
MATH 100 F	Black   African Amer.	315	55.9%	-28
	Latinx	5,156	60.4%	-554
MATH 141 F	Black   African Amer.	153	33.3%	-23
	Latinx	3,967	41.3%	-604
MATH 020 F	Black   African Amer.	210	27.8%	-19
	Latinx	4,622	33.7%	-423

**Section 3.3.1: Bottleneck Analysis:** Using the data provided by the OIE, briefly describe how students have moved through your program over the past five years: unit accumulation, prerequisites, corequisites, substitutions, gateway courses, and **bottleneck** courses. (Not all of these measures apply to every program.)

Within the last 5 years, courses by course success rate (ascending 5 courses).		Within the last 5 years, the 5 courses with the highest % of students repeating the course (NOTE: Some courses may allow for repeat enrollment)		Within the last 5 years, the 5 courses with the highest # of withdrawals		Within the last 5 years, the 5 courses with the highest % of withdrawals	
MATH 020 F	36.4%	MATH 151 F	24.6%	MATH 040 F	3,671	MATH N01 F	100.0%
MATH 041 F	38.4%	MATH 040 F	23.5%	MATH 120 F	3,157	MATH 041 F	39.3%
MATH 040 F	42.1%	MATH 152 F	22.7%	MATH 020 F	2,497	MATH 020 F	37.7%
MATH 030 F	42.5%	MATH 020 F	22.2%	MATH 141 F	2,260	MATH 031 F	37.2%
MATH 043 F	43.2%	MATH 251 F	21.0%	MATH 100 F	1,682	MATH 141HF	36.1%

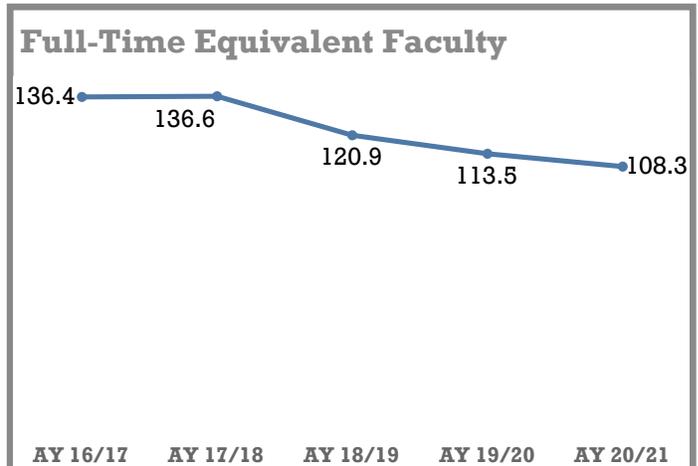
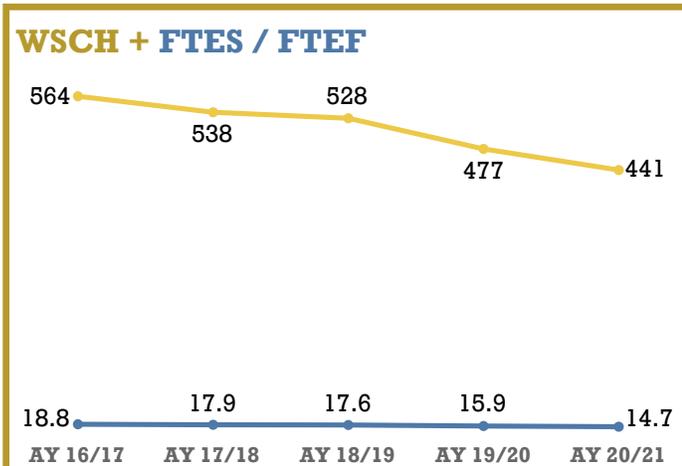
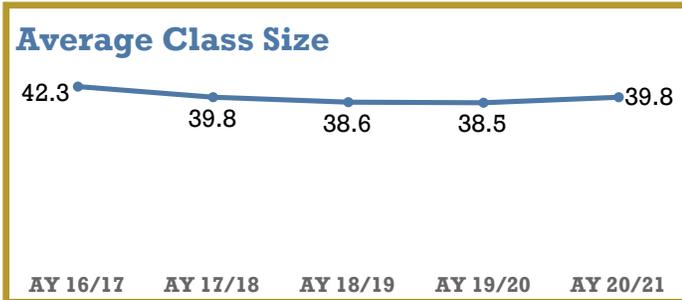
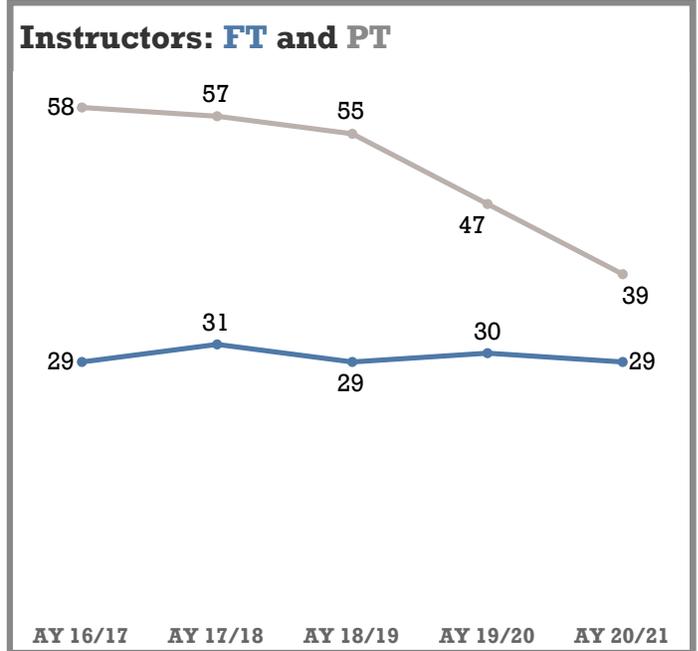
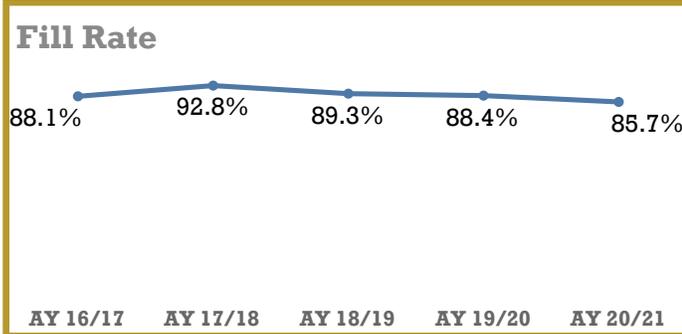
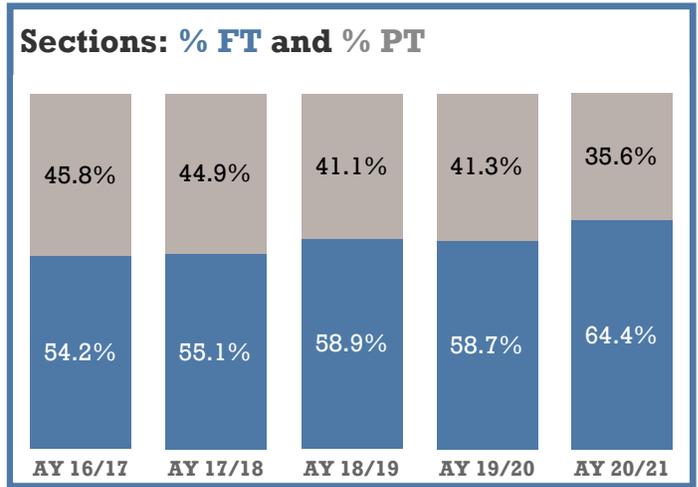
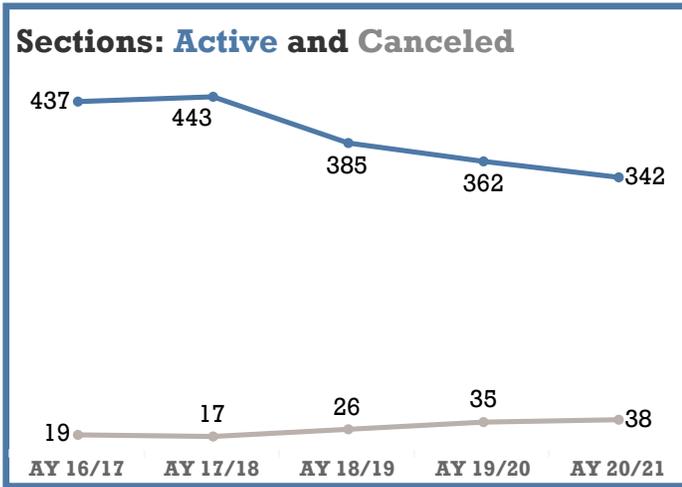
### Range of Success Rates by Section: 20th Percentile v. 80th Percentile

(>=10 Sections, 100+ Enrollments, >=25 % Point Difference)



## Mathematics Faculty:

**Section 3.4.1 Faculty:** Using the data provided by the OIE, briefly describe the faculty workload over the past five years: FTF (full-time faculty), PTF (part-time, or “adjunct” faculty), FTEF (full-time equivalent faculty), WSCH per FTEF (weekly student contact hours). (Not all of these measures apply to every program.)



**Mathematics General Education:**  
**Section 5.1:** Your Department and General Education.

**% of Enrollments Over the Last 5 Years in  
 GE Courses**

	% of	
	Enrollments	Enrollments
Non-GE Enrollments	40.3%	31,585
GE Enrollments	59.7%	46,815

**Courses that Fulfill CSU General Education Requirements or the Intersegmental General  
 Education Transfer Curriculum (IGETC)**

(CSU and IGETC: 1 = Yes; 0 = No)

Course	CSU	IGETC	Enrollments	% Majors	Avg. First-Time	% Age: Under 20	% Evening	% Online
MATH 100 F	1	1	8,228	0%	20%	40%	18%	7%
MATH 120 F	1	1	10,485	1%	17%	38%	24%	4%
MATH 120HF	1	1	90	4%	24%	58%	0%	0%
MATH 129 F	1	0	3,085	1%	18%	38%	40%	0%
MATH 130 F	1	1	2,926	1%	5%	21%	29%	0%
MATH 141 F	1	1	6,994	3%	23%	49%	26%	0%
MATH 141HF	1	1	36	0%	28%	49%	0%	0%
MATH 142 F	1	0	4,876	3%	14%	40%	21%	0%
MATH 151 F	1	1	4,065	4%	15%	38%	25%	0%
MATH 151HF	1	1	45	4%	56%	69%	0%	0%
MATH 152 F	1	1	2,684	6%	7%	28%	31%	0%
MATH 152HF	1	1	27	0%	7%	59%	0%	0%
MATH 171 F	1	1	715	5%	2%	15%	0%	0%
MATH 172 F	1	1	427	4%	1%	10%	0%	0%
MATH 251 F	1	1	1,308	11%	4%	23%	41%	0%
MATH 252 F	1	1	806	15%	1%	14%	41%	0%
MATH 260 F	1	1	18	22%	0%	6%	0%	0%
<b>Grand Total</b>	1	*	46,815	3%	16%	37%	25%	2%

## Appendix B: SLO data

This data is still off-limits to the OIE because it is housed in eLumen. The Faculty Senate only allows faculty members to have access to SLO data on eLumen. The Senate's SLO Assessment Committee will work with its division reps to help departments disaggregate SLO data, just as KPI data is disaggregated in Appendix A.

### Overall by Demographic Element for Demographic Category: Ethnicity

	Greatly exceeds expectations.		Exceeds expectations		Meets expectations		Does not meet expectations but developing		Does not meet expectations	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
African American	0	0.00%	0	0.00%	353	59.83%	0	0.00%	237	40.17%
American Indian/Alaskan Native	0	0.00%	0	0.00%	68	64.15%	0	0.00%	38	35.85%
Asian	0	0.00%	0	0.00%	2166	72.54%	0	0.00%	820	27.46%
Filipino	0	0.00%	0	0.00%	550	68.32%	0	0.00%	255	31.68%
Hispanic	0	0.00%	0	0.00%	7389	62.17%	0	0.00%	4496	37.83%
Pacific Islander	0	0.00%	0	0.00%	45	64.29%	0	0.00%	25	35.71%
Unknown	0	0.00%	0	0.00%	138	67.98%	0	0.00%	65	32.02%
Unspecified	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
White Non-Hispanic	0	0.00%	0	0.00%	2721	67.30%	0	0.00%	1322	32.70%

### Overall by Demographic Element for Demographic Category: Gender

	Greatly exceeds expectations.		Exceeds expectations		Meets expectations		Does not meet expectations but developing		Does not meet expectations	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
F	0	0.00%	0	0.00%	6340	63.08%	0	0.00%	3711	36.92%
M	0	0.00%	0	0.00%	6890	66.68%	0	0.00%	3443	33.32%
N	0	0.00%	0	0.00%	227	65.61%	0	0.00%	119	34.39%
X	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

### Overall by Demographic Element for Demographic Category: Economically Disadvantaged Status

	Greatly exceeds expectations.		Exceeds expectations		Meets expectations		Does not meet expectations but developing		Does not meet expectations	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
UNKNOWN	0	0.00%	0	0.00%	11945	65.75%	0	0.00%	6223	34.25%
Y	0	0.00%	0	0.00%	1512	59.02%	0	0.00%	1050	40.98%

### Overall by Demographic Element for Demographic Category: Veteran Status

	Greatly exceeds expectations.		Exceeds expectations		Meets expectations		Does not meet expectations but developing		Does not meet expectations	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
Y	0	0.00%	0	0.00%	373	69.85%	0	0.00%	161	30.15%

Appendix C: Curriculum mapping for Mathematics AST

# HORNET PATHWAYS PROGRAM

## 2-Year Map

PROGRAM NAME: MATH

FACULTY NAMES

ROBERT DIAZ/ CITLALLY SANTA

PROGRAM TYPE: AST

DATE

12/17/2020

SEMESTER	UNITS	ADDITIONAL INFORMATION		
		CE	MAJOR	ELECTIVE
<b>SEMESTER ONE</b>				
ENG 100F or 101F	4 OR 5	1A		
MATH 151F	4	2A	X	
AREA 3A	3	3A		
AREA 4	3	4		
<b>Total Units for Semester 1</b>		<b>14 OR 15</b>		
<b>SEMESTER TWO</b>				
AREA 1B (PHIL 172F-REC)	4 OR 3	1B		
MATH 152F	4		X	
AREA 3B	3	3B		
AREA 4	3	4		
AREA 1C* (CSU REQ)	3	1C		
<b>Total Units for Semester 2</b>		<b>16 OR 17</b>		
<b>SEMESTER THREE</b>				
AREA 3A/B	3	3A/B		
MATH 251F	4		X	
PHYS 221F	4	5A/5C		
AREA 4	3	4		
<b>Total Units for Semester 3</b>		<b>14</b>		
<b>SEMESTER FOUR</b>				
UC ELECTIVE (CSCI 123F-REC)	4			X
MATH 252F	4		X	
MATH 253F	2		X	
AREA 5B	3	5B		
<b>Total Units for Semester 4</b>		<b>13</b>		

**Total Units for Program 57-59**