2021 INSTRUCTIONAL ANNUAL PROGRAM PLANNING WORKSHEET

CURRENT YEAR: 2020-2021 **PROGRAM: MATHEMATICS**
CLUSTER: AHMS **LAST YEAR CPPR COMPLETED: 2017**
NEXT SCHEDULED CPPR: 2022 **CURRENT DATE: 1/28/2021**

The Annual Program Planning Worksheet (APPW) is the process for:

- reviewing, analyzing and assessing programs on an annual basis
- documenting relevant program changes, trends, and plans for the upcoming year
- identifying program needs, if any, that will become part of the program's resource plan
- highlighting specific program accomplishments and updates since last year's APPW
- tracking progress on a Program Sustainability Plan if established previously

Note: Degrees and/or certificates for the ***same*** program ***may be consolidated*** into one APPW.

This APPW encompasses the following degrees and/or certificates:

A.S.T. Mathematics

GENERAL PROGRAM UPDATE

Describe significant changes, if any, to program mission, purpose or direction. *If there are not any, indicate: NONE.*

AB705 requires community colleges to maximize the probability that a student will complete transfer level English and transfer level Mathematics. Partial implementation of AB705 began Spring of 2019 with full implementation in Fall 2019. The Math Division helped create a Guided Self Placement tool to help students choose an appropriate course for their educational goals based on their academic background and their area of study in order to help students make an informed decision about both the type of course and whether they want to choose to take a preparatory course or the statistics support course with the parent course or do some independent review. The initial data from Fall 2019 as compared to Fall 2018 has shown than many more non-STEM students have completed their transfer level math requirement than in pre-AB705 semesters. For example, Fall 2018 and Fall 2019 had similar math enrollments (2781 and 2766 respectively), but Fall 2018 only had 442 successful completions of Math 230 and Math 247, whereas Fall 2019 had 827 successful completions. The Math Division continues to work hard to make appropriate shifts in offerings, enhance student support, and collaborate across campus to increase success.
Teaching online has become a focus since the pandemic began in March 2020. It is very difficult to assess program success during this unprecedented time, however the new online skills adopted by more faculty and students will positively enhance our courses and our program offerings well into the future.

PROGRAM SUSTAINABILITY PLAN UPDATE

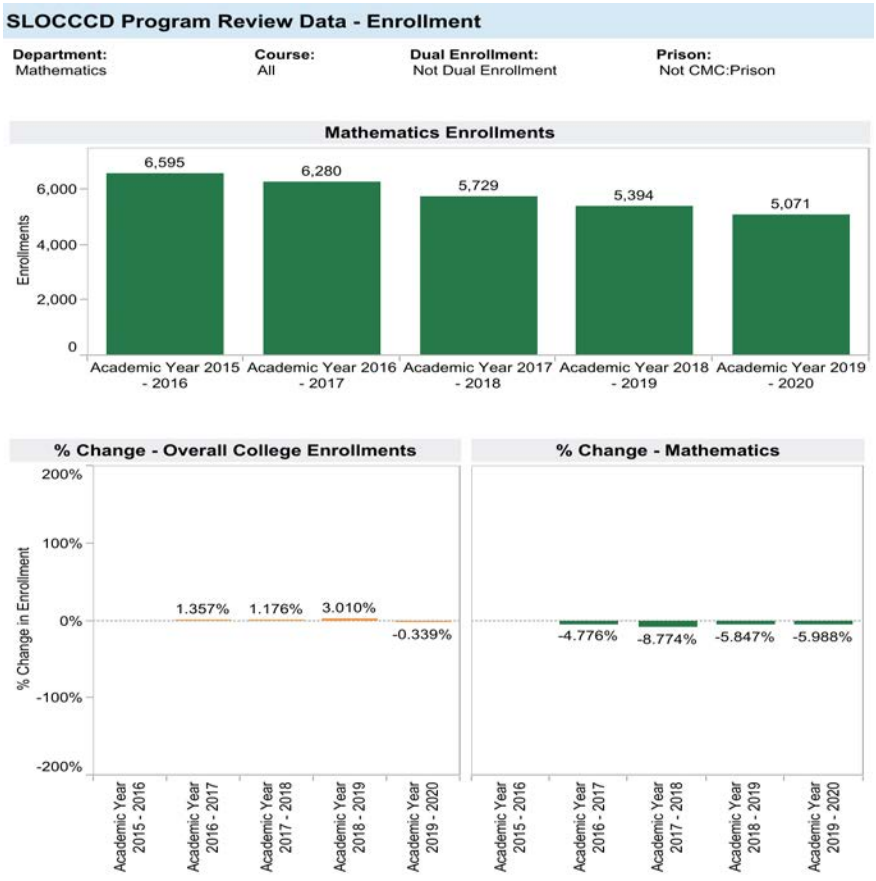
Was a Program Sustainability Plan established in your program's most recent Comprehensive Program Plan and Review?

Yes ☐ If yes, please complete the Program Sustainability Plan Progress Report below.
No ☒ If no, you do not need to complete a Progress Report.

DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS

General Enrollment (Insert Aggregated Data Chart).

Math Enrollment excluding CMC and Dual Enrollment

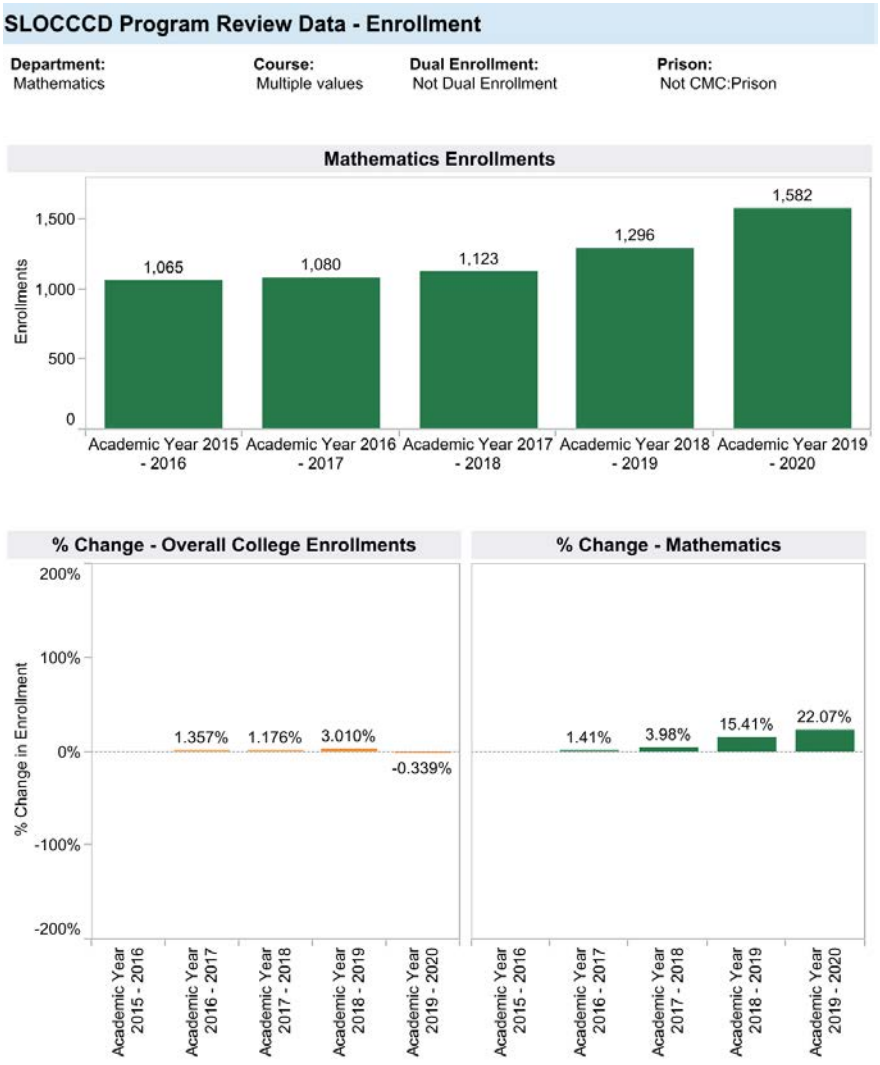


The bar graph on math enrollments does not include CMC and dual enrollment. The headcount for Math has decreased over the last few years. A large contributing factor to the decline in math headcount is likely the result of our success and hard work in helping our students finish their math requirement in fewer semesters than they had in the past. Initially, we created a shortened pre transfer math pathway for non-STEM majors with Math 128, which grew in offerings with it's peak enrollment in Fall 2018. In addition, new placement with MMAP during Fall 2018 and AB705 during Spring 2019 resulted in students starting at a higher level math

class, which for many non-STEM majors translates to taking a single 3 or 4 unit class rather than a series of 5 unit courses. We anticipate with the continued success of AB705 implementation and our increased collaboration with the Success Center, that our headcount will decline a little further over the next year or so and then will level off to a more predictable level.

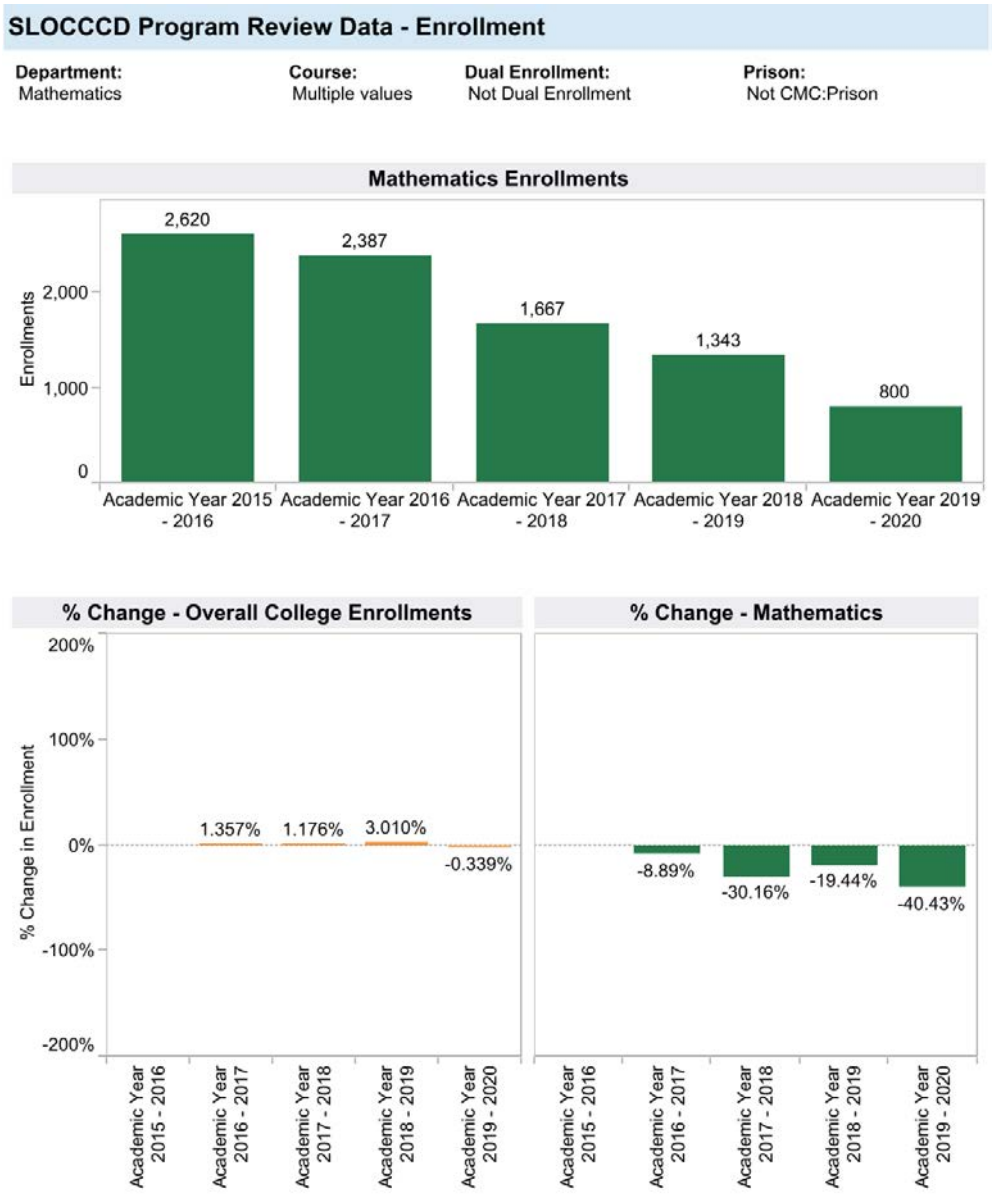
An additional impact to enrollment numbers in 2019-2020 was the college's generous assignment of EW's for students who were failing courses due to the abrupt move online from the pandemic.

Statistics (Math 247 and 236)



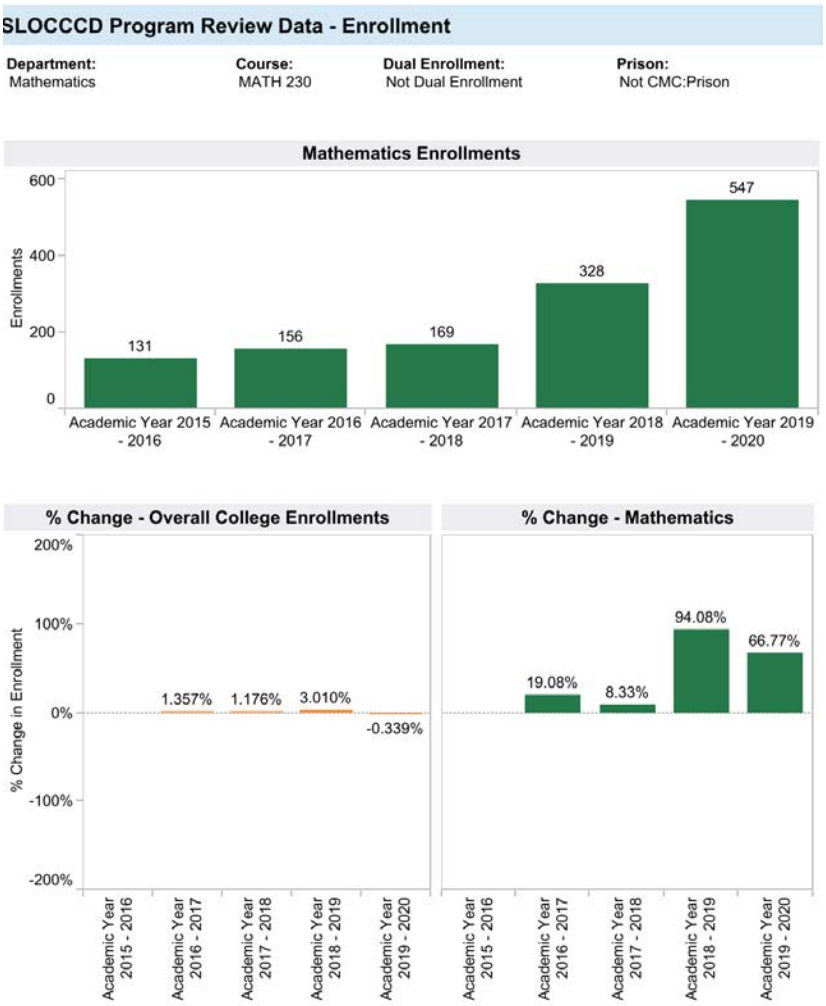
The implementation of AB705 has created in significant increase in demand for statistics, which is the required math course for most non-STEM majors.

Pre-Transfer Courses (Math 003, 007, 123, 127, 128)



The implementation of AB705 has significantly reduced the number of students taking pre-transfer level math. In 2015-2016, the typical course most incoming students were placed in with the multiple measures placement (which included an assessment test) was intermediate algebra. Fall 2018, MMAP placed more students at higher levels of math by using their high school grades and coursework. Starting Spring 2019, incoming students were able to start right at transfer level mathematics with AB705.

Math for Humanities, Math 230

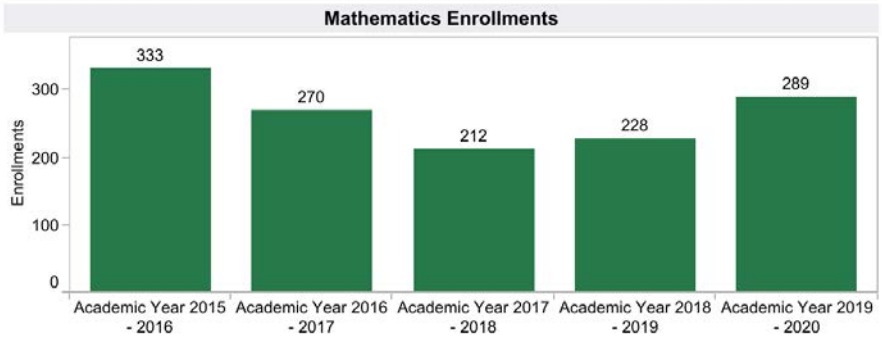


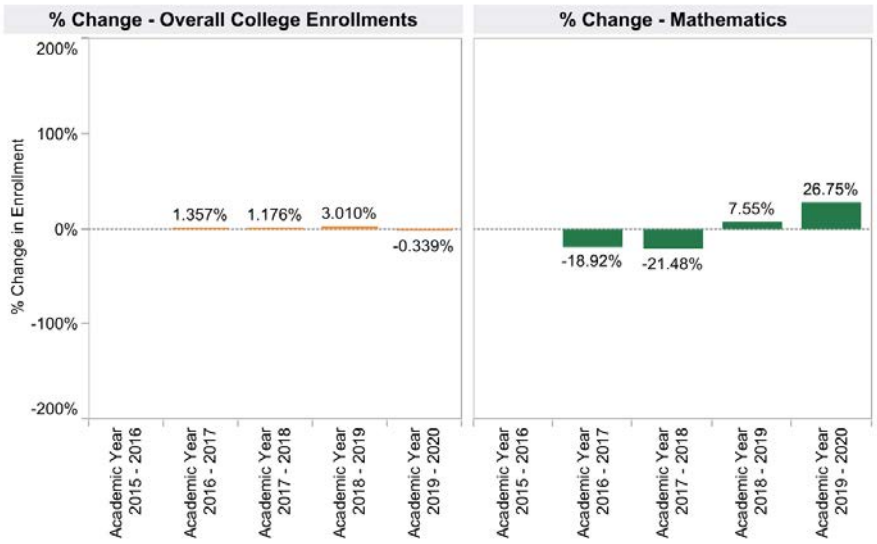
AB705 allowed open enrollment starting Spring 2019 for both continuing students and new students. Math 230 was a popular course for students who had given up on math and/or were currently in a low level math to jump into since it does not require strong math skills. It is now being recommended for some Associates degrees instead of 127 or 128. Although it had significant growth, in 2020-2021 we are seeing a decline from the 2019-2020 peak due to continuing students having already successfully completed the course and due to the change in in many popular non-STEM majors at Cal Poly to no longer require a second math class for admission, beginning Fall 2020.

College Algebra, Math 232

SLOCCCD Program Review Data - Enrollment

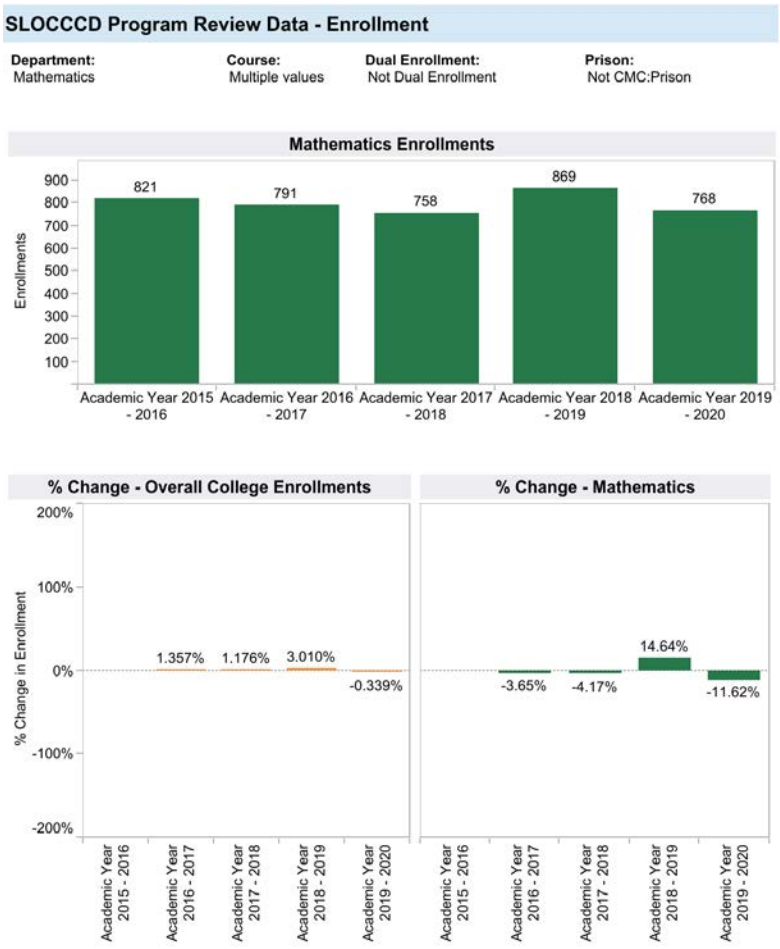
Department:	Course:	Dual Enrollment:	Prison:
Mathematics	MATH 232	Not Dual Enrollment	Not CMC:Prison





Previously, demand for Math 232 was declining due to change in requirements in many majors needing statistics instead of college algebra. Math 232 has experienced an increase in demand with the new allowance of Math 232 as an option for a pre-requisite for business calculus in addition to the more rigorous Math 242, precalculus. However, with AB705, students are entering this course who have skipped algebra II or have extremely weak algebra backgrounds and so we need to work on both our support and our counseling for the course.

Calculus: Math 265A, 265B, 283, 287

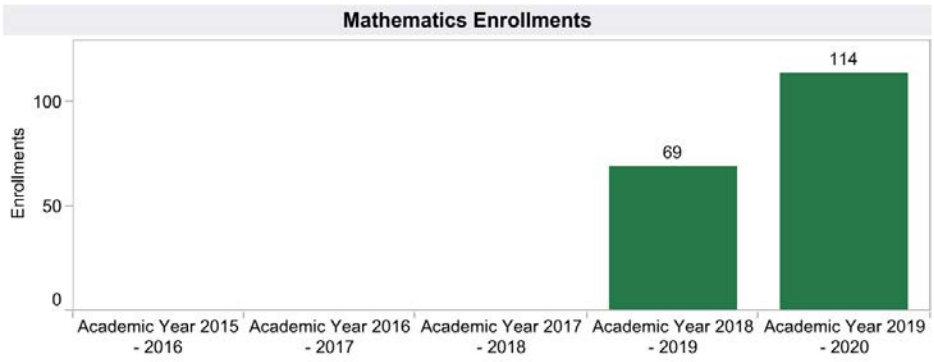


The peak in 2018- 2019 in calculus enrollments was when MMAP was first implemented with no guidance about placement related to a student's major and so numerous students were taking calculus when it was not required for their major. Our guided self placement tool was implemented Fall 2019 with AB705 and it made an impact in ensuring students were taking math courses that fit their intended educational goals. In addition, faculty have worked hard to make sure students are in the correct course during the first week of instruction. As a result, faculty have noticed an improvement in students taking an appropriate course for their major.

DUAL Enrollment

SLOCCCD Program Review Data - Enrollment

Department:	Course:	Dual Enrollment:	Prison:
Mathematics	All	Dual Enrollment	Not CMC:Prison

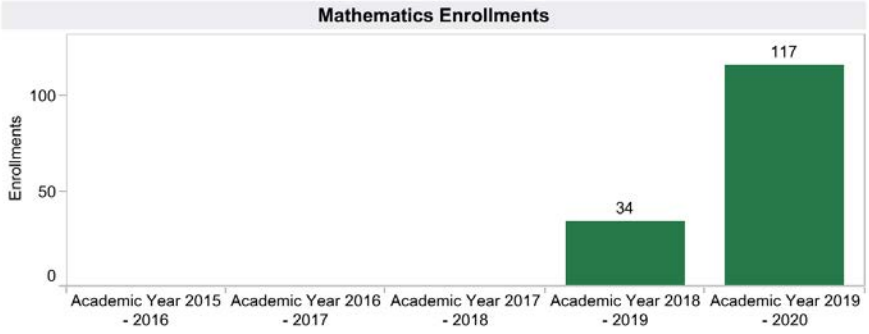


Two courses at Atascadero High School began in the dual enrollment program in 2018-2019 followed by the addition of statistics courses at Nipomo High School in 2019-2020. It is challenging to grow the dual enrollment program in Math as it is difficult to find high school teachers with the required minimum qualifications.

CMC

SLOCCCD Program Review Data - Enrollment

Department:	Course:	Dual Enrollment:	Prison:
Mathematics	All	Not Dual Enrollment	CMC:Prison

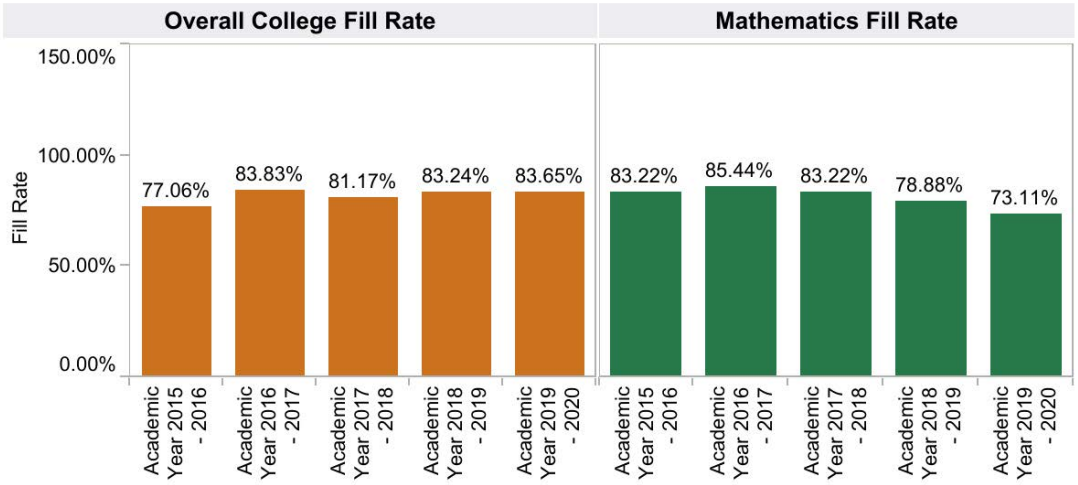


A single Math 230 course was offered at CMC Spring 2019. Fall 19 and Spring 20 each had a Math 230 and a Math 247 offered. Fall 2020 has increased to three courses. A single instructor is teaching these courses and the prison could use more offerings.

General Student Demand (Fill Rate) (Insert Aggregated Data Chart)

SLOCCCD Program Review Data - Student Demand (Fill Rate)

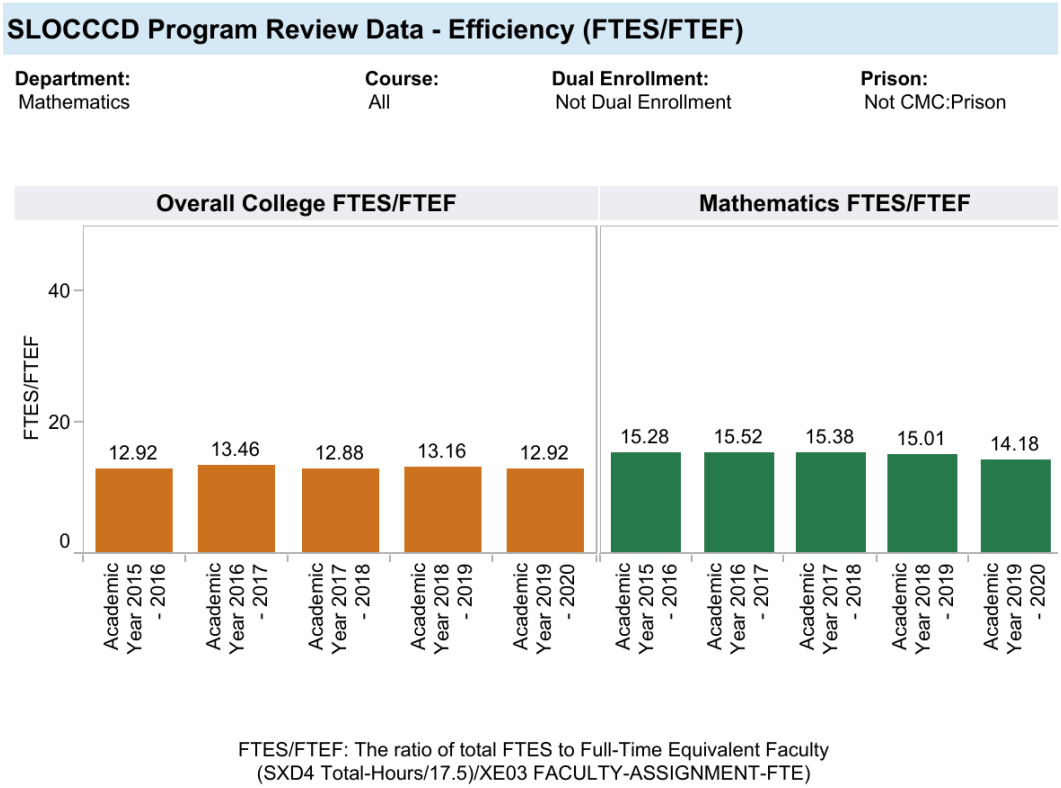
Department:	Course:	Dual Enrollment:	Prison
Mathematics	All	Not Dual Enrollment	Not CMC:Prison



Fill Rate: The ratio of enrollments to class limits. Cross listed class limits are adjusted appropriately. Also, courses with zero class limits are excluded from this measure.

It should be noted that math classes generally have a cap of 40, which is much higher than many classes across the campus. Hence, this data is not as relevant as the FTES/FTEF. However, there continues to be challenges in trying to create a schedule that meets the rapid changes in demand levels of the different types of math courses due to AB705. In addition, students are being guided to take math fall semester with the implementation of AB705, and many students only need a single course, which results in a huge disparity in demand for spring.

General Efficiency (FTES/FTEF) (Insert Aggregated Data Chart)



Math FTES/FTEF continues to be much stronger than the college as a whole. This is remarkable over the last two school years considering the challenge in creating a schedule of offerings to accurately meet the rapid shifts in demand due to MMAP and AB705. It is likely this number will increase over time, once the patterns of math enrollments level out.

[Student Success—Course Completion by Modality (Insert Data Chart)]

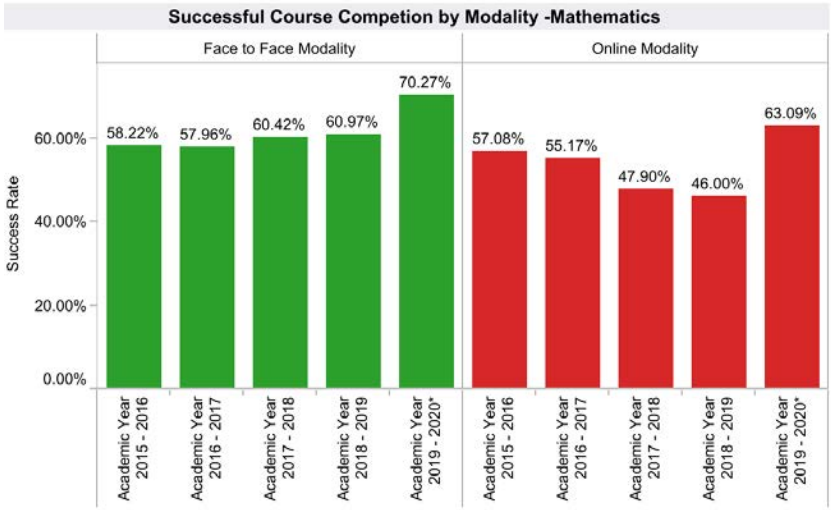
Math 123, 127, 230, 232, 242, 247, 255 Face to Face and Online

SLOCCCD Program Review Data: Successful Course Completion

Select Department: Mathematics

Course: Multiple values

Legend: Face to Face Modality, Online Modality



Successful Course Competion by Modality Table - Mathematics

		Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018	Academic Year 2018 - 2019	Academic Year 2019 - 2020*
Face to Face Modality	Department Success Rate	61.20%	60.05%	61.01%	60.91%	70.90%
	Total Department Enrollments	6,378	6,023	5,372	5,096	4,700
Online Modality	Department Success Rate	57.08%	55.17%	47.90%	46.00%	63.09%
	Total Department Enrollments	219	261	357	401	606

Prior to 2019-2020, we offered Math 123, 127, 232, and 247 online. In 2019-2020 we added Math 230, 242, and 255. We anticipate a continued increase in offerings as a result of the experience all faculty have gained through training and the move online for 2020-2021 due to the pandemic. In addition, since students throughout the education system will have experience with online learning, the demand will likely go up. Now that most faculty have online training and experience there has been much more regular robust dialogue about online teaching pedagogy and technology that will likely enhance everyone's teaching and assist in trouble shooting challenges specific to online math courses.

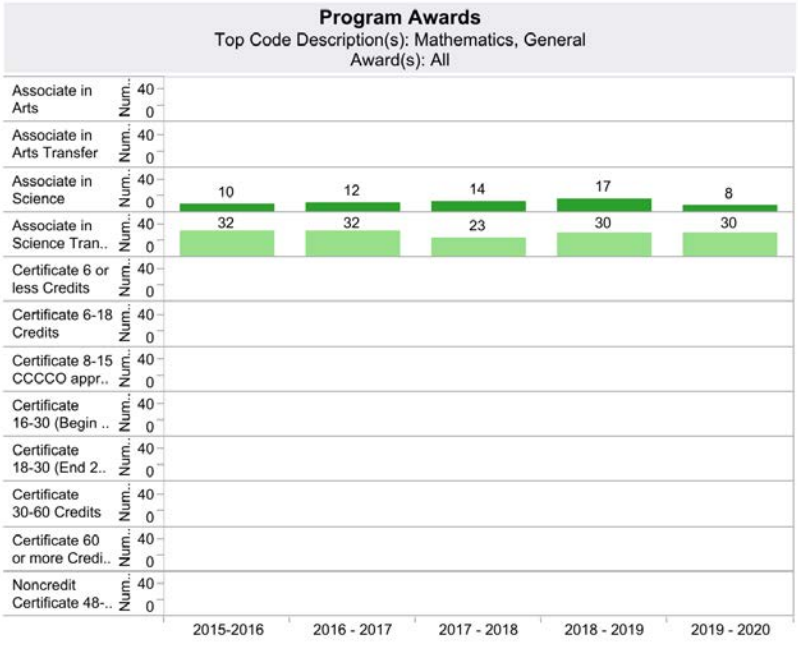
Success rates are hard to interpret for 2019-2020 since the instant move online from the pandemic included generous awarding of EW's for unsuccessful students, which skewed the numbers. The Tableau tool did not allow for removing the spring semester to compare Fall 2019.

[Degrees and Certificates Awarded (Insert Data Chart)]

SLOCCCD Program Review Data: Degrees and Certificates Awarded

Program: Mathematics, General

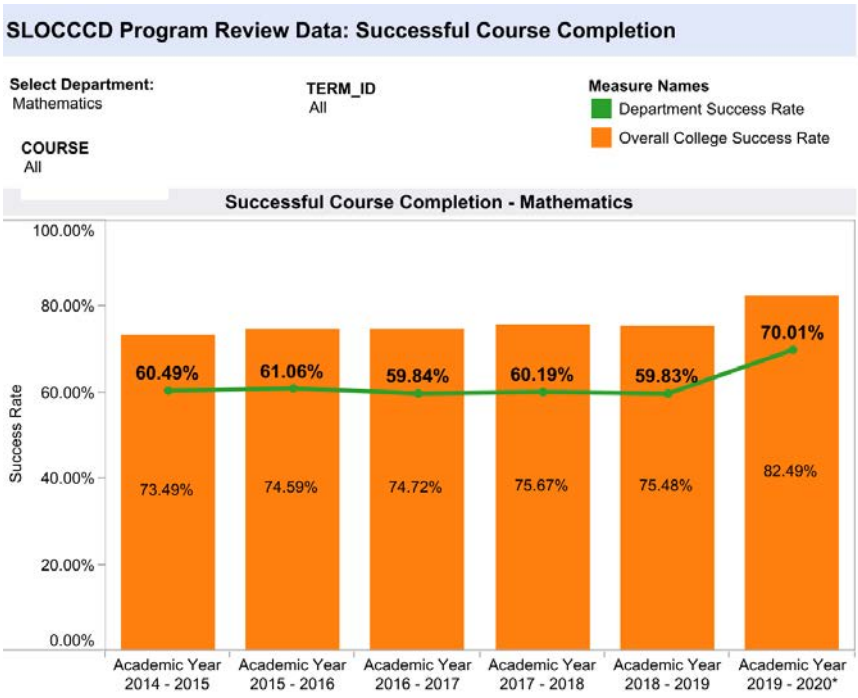
Award Type: All



The Mathematics Division's main role on campus is supporting all of the degrees and certificates offered at the College. We continue to have a small group of students who earn an associates degree in mathematics. At the recommendation of Counseling and Curriculum, we discontinued the A.S. in Mathematics in order to steer students toward the A.S.T. There was significant overlap and the A.S.T is a better fit for students who will be applying for transfer.

[General Student Success – Course Completion (Insert Aggregated Data Chart)]

Success Rates, including Spring 2020 Data (the semester with significant EW's)



Mathematics Success Rate Table

	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018	Academic Year 2018 - 2019	Academic Year 2019 - 2020*
Department Success..	61.06%	59.84%	60.19%	59.83%	70.01%
Total Enrollments	6,597	6,284	5,729	5,497	5,306

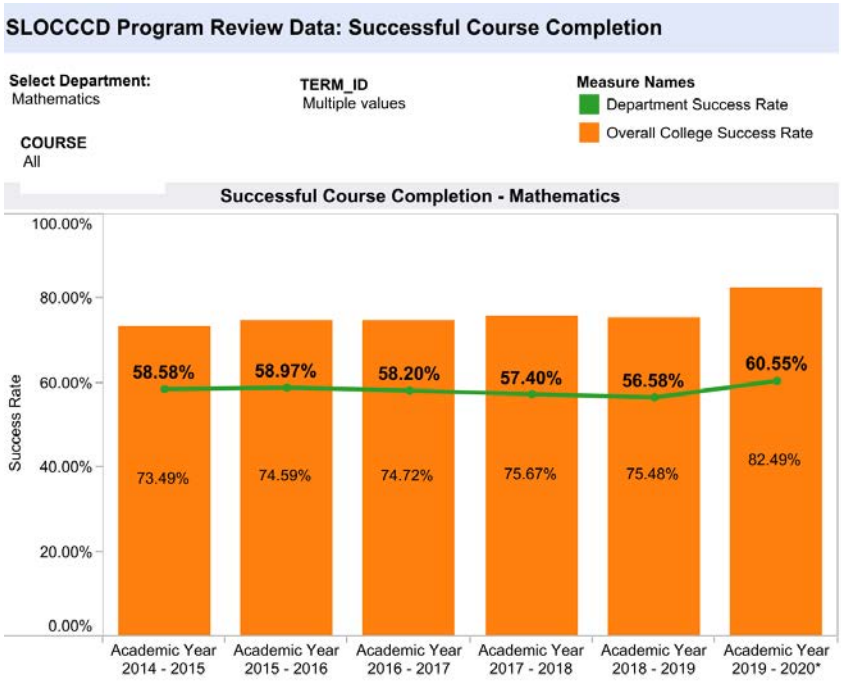
Success: The Percentage of student enrollments resulting in a final grade of "C" or better

The success rates for Mathematics have remained relatively steady from 2014-2015 through 2018-2019. From Fall 2014 through Spring 2018, students were placed in their initial math class via our old Multiple Measures assessment which took into account assessment test results, courses completed in high school, grades in those courses, and time lapsed since last math class. Most students were placed at the intermediate algebra level. For Fall 2018 the new MMAP matrix was used for placement and Spring 2019 transitioned to AB705 placement, allowing open access to all first tier transfer level math courses. It is impressive that the first year MMAP and then AB705 were implemented, 2018-2019, the success rates remained similar

to previous year, given that the bulk of students in 2018-2019 were starting directly in transfer level courses. This reinforces the RP group's research on placement methods and is also a testament to the high level of commitment of the Math faculty to collaborate and work on ways to best support our students.

When looking at 2019 -2020, it is not appropriate to include Spring 2020 since the school awarded large numbers of EW's due to the abrupt shift online with the pandemic Spring 2020. Hence we included the graphic below with data focusing on Fall semesters. The overall success rate in Fall 2019 with the increase in underprepared students in our courses, both in foundational math skills and college study skills, is a testament to the extensive work done by Math faculty and the Success Center staff to support our students with the sweeping changes in placement with AB705. In addition, the increase of focus in the last two years on professional development related to equity minded teaching has likely helped contribute to student success. It is also likely students were more motivated to succeed in a single math course that counted toward their educational goal than trying to complete multiple pre-requisite algebra courses that overlapped in content from high school. We will continue to assess and create plans for improvement in collaboration with the Success Center to continue to improve student success in light of AB705.

Fall Semesters



Mathematics Success Rate Table

	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018	Academic Year 2018 - 2019	Academic Year 2019 - 2020*
Department Success..	61.06%	59.84%	60.19%	59.83%	70.01%
Total Enrollments	6,597	6,284	5,729	5,497	5,306

Summer Session

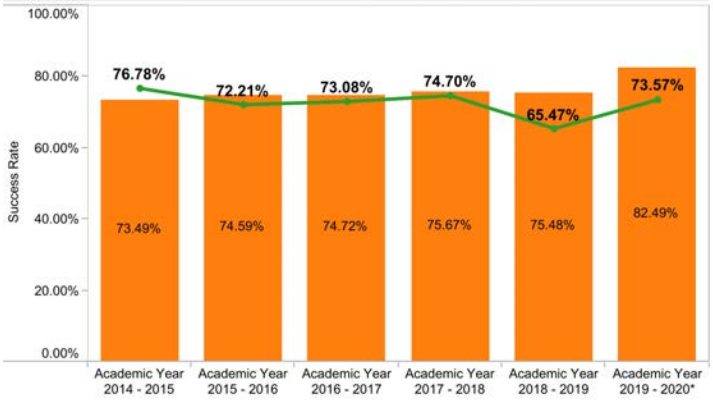
SLOCCCD Program Review Data: Successful Course Completion

Select Department: Mathematics

TERM_ID Multiple values

Measure Names
- Department Success Rate
- Overall College Success Rate

COURSE All



Mathematics Success Rate Table

	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018	Academic Year 2018 - 2019	Academic Year 2019 - 2020*
Department Success..	61.06%	59.84%	60.19%	59.83%	70.01%
Total Enrollments	6,597	6,284	5,729	5,497	5,306

Summer session tends to have higher success rates in math. Students determine quickly if the intense pace will work out and those who remain in the course after a few days tend to be highly committed and realistic about the intense workload. Often the cohorts include high achieving high school students and university students. In the last couple years, offerings have been proportionally more at the transfer level than the pre-transfer level. Summer 2020 was the first year Math 265B was offered during the summer.

Statistics (Math 236 and 247) Fall Semesters

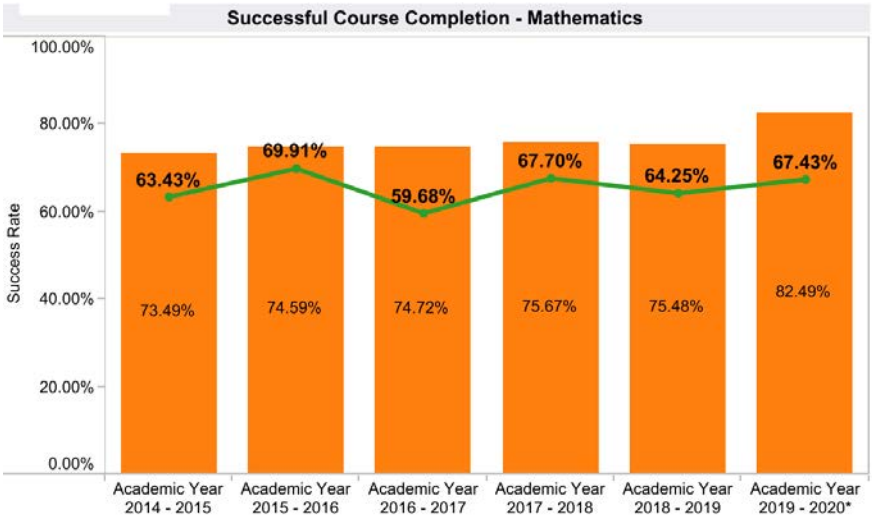
SLOCCCD Program Review Data: Successful Course Completion

Select Department: Mathematics

TERM_ID Multiple values

Measure Names
- Department Success Rate
- Overall College Success Rate

COURSE Multiple values



Mathematics Success Rate Table

	Academic Year 2015 - 2016	Academic Year 2016 - 2017	Academic Year 2017 - 2018	Academic Year 2018 - 2019	Academic Year 2019 - 2020*
Department Success..	70.80%	63.06%	64.65%	64.63%	74.22%
Total Enrollments	1,065	1,080	1,123	1,296	1,678

The largest proportion of math enrollment post AB705 is in Statistics courses. Statistics faculty have been extremely committed to supporting students in light of AB705. They have implemented the support course, Math 147S, collaborated with the Stats Lab tutors, used embedded tutors, incorporated just in time skills into their course, and pivoted to a more applied pedagogy (following the principles of GAISE). Statistics faculty have worked tirelessly to ensure the best opportunity for student success. The Fall 2019 success rates are remarkable considering significantly more students took the course and significantly more underprepared students were in the cohort due to AB705.

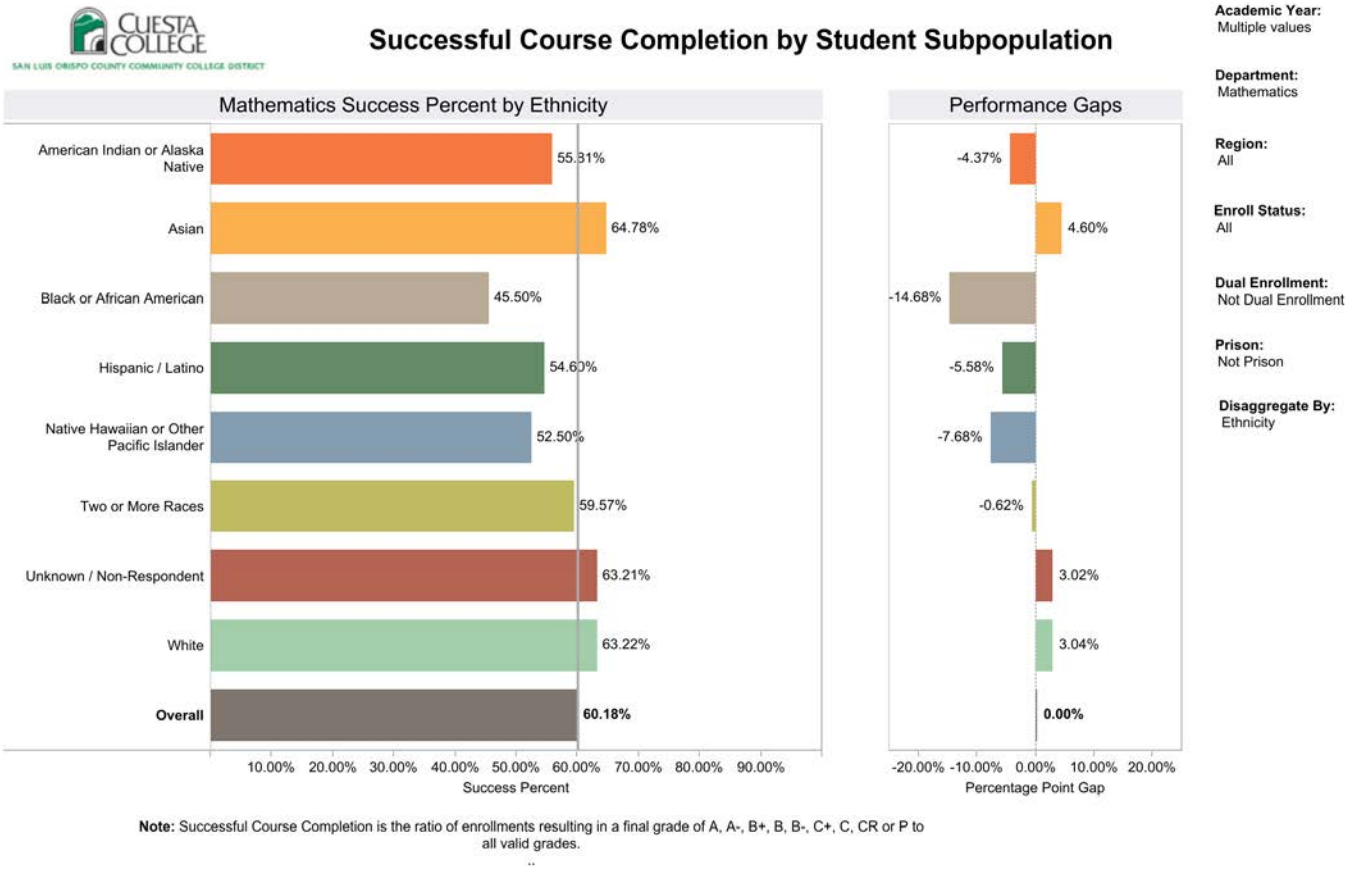
Note: Only Fall semesters were analyzed since the 2019-2020 data was inflated due to the EWs Spring 20.

Data from Fall 2019 on our support course, Math 147S, showed that approximately 10% of our Fall 2019 Math 247 students enrolled in the support course. The Math 247 success rates were similar in the Math 147S students (65.6% n=90) vs the students only enrolled in Math 247 (66.3%, n=792).

[Disaggregated Student Success]

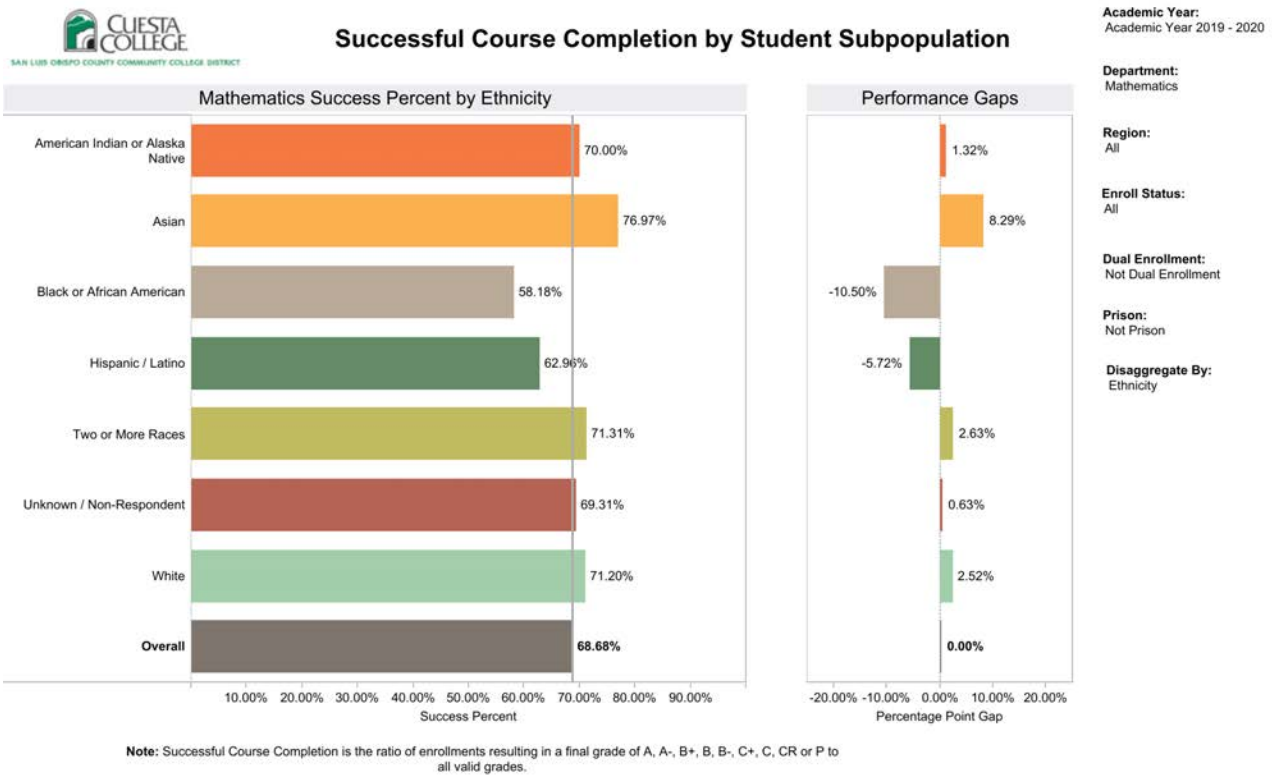
Before Full AB705 Implementation

2014-2015, 2015-2016, 2017-2018, 2018 – 2019



After Full AB705 Implementation

2019-2020



Although this data is skewed due to the EW's Spring 2020, we are optimistic that all of the extensive work we have done to implement AB705 and our recent focus on equity minded teaching have made a positive impact on marginalized groups. We know we have a lot more work ahead of us.

The Mathematics Division has been actively involved in beginning to address equity gaps. Several instructors attended an Equity Minded Teaching Institute in June 2018, The Equity Summit October 2018, The Equity Academy in April 2019, breakout sessions at math conferences focused on equity and social justice, presentations brought on campus like Ali Michael, and the numerous professional development offerings on campus during the 2020-2021 school year related to equity. Many math faculty read and discussed the book Grading for Equity, by Joe Feldman and several have implemented changes to their grading structures and shared their results. In addition, we have spent time looking at disaggregated success rates in statistics courses and plan to look at other courses in the near future to help spur dialogue. We have been sharing some of the learned best practices at our meetings and retreats and many faculty have been implementing various strategies in our classrooms and online.

OTHER RELEVANT PROGRAM DATA (OPTIONAL)

Provide and comment on any other data that is relevant to your program such as state or national certification/licensure exam results, employment data, etc. If necessary, describe origin and/or data collection methods used.

PROGRAM OUTCOMES ASSESSMENT CHECKLIST AND NARRATIVE

CHECKLIST:

☒ SLO assessment cycle calendar is up to date.
☒ All courses scheduled for assessment have been assessed in eLumen.
☐ Program Sustainability Plan progress report completed (if applicable).

NARRATIVE:

Briefly describe program changes, if any, which have been implemented in the previous year as a direct result of the Program or Student Services Learning Outcomes Assessment. *If no program changes have been made as results of Program or Student Services Learning Outcomes Assessment, indicate: NONE.*

Considering there is a very small number of students who seek to earn a Math degree, our time is more focused on the various areas of our math program supporting all of the other programs on campus. In recent years, we have tied our conversations looking at the course SLOs assessment results with the other pieces of success data in light of AB705 in order to best serve our students. Our most recent example of this was related to the analysis of Math 232, College Algebra, SLOs. The poor results on the SLOs timed with the implementation of AB705. We have a much larger number of highly underprepared students in the course, including some who have skipped Algebra II. We will look at the placement messaging and we will be developing a support course similar to what we did for statistics. We will be researching what other school's have done, including requiring the co-requisite course.

In 2020, we continued to follow our assessment cycle even during the pandemic so we could continue with our analysis discussions at our pre-semester retreats. For example, in Math 147S, Statistics Support, the SLOs results were strong due to the focus on pre-algebra skills. When looking at the parent course, 247, Intro to Statistics, it was evident students struggle more with the SLOs involving more critical thinking and hence the 147S course is being revised to reflect more critical thinking activities and will be hard linked to the parent 247 course so that it can be seen as a cohesive statistics course experience for the students. For Math 007, Prealgebra, it

was determined that the incorporation of more visualizations help with the connection to the abstract for basic skills students and samples were shared. For Math 220, Math for Elementary School Teachers, there is currently some development of materials to better support the teaching of the Common Core approach. For Math 265A, Calculus I, instructors discussed the differences between fall and spring cohorts and shared ideas for improvement in the conceptual learning that included greater use of embedded tutors, more robust "just in time" review (especially for trigonometry), and more awareness of the topics students find difficult.

PROGRAM PLANNING / FORECASTING FOR THE NEXT ACADEMIC YEAR

Briefly describe any program plans for the upcoming academic year. These may include but are not limited to the following: *(Note: you do not need to respond to each of the items below)*. *If there are no forecasted plans for the program, for the upcoming year, indicate: NONE.*

A. New or modified plans for achieving program-learning outcomes
B. Anticipated changes in curriculum, scheduling or delivery modality
C. Levels, delivery or types of services
D. Facilities changes
E. Staffing projections
F. Other

Recent Additions to the Program

Mathematics is now offered at California Men's Colony

- Spring 2019: Math 230, Math for Humanities
- Fall 2019 and Spring 2020: Math 247, Introduction to Statistics and Math 230, Math for Humanities
- Fall 2020: Two sections of Math 230 and one section of Math 247

Distance Education offerings Have Been Expanded

- Continued with previous DE courses: Math 123, Math 127, Math 232 and Math 247
- Math 247, Intro to Statistics, has expanded to multiple online offerings Spring 2020
- Math 230, Math for Humanities, offered DE Fall 2019 and Spring 2020
- Math 255, Business Calculus, offered DE Fall 2019 and Spring 2020
- Math 242, Precalculus, offered DE Spring 2020
- Post Pandemic: Add Hybrid Math 128, DE Math 265A, DE Math 231 as well as increase the number of DE sections of current offerings

Dual Enrollment

- Atascadero High School 2018-2019, 2019-2020: Math 242 and Math 265A
- Nipomo High School 2019-2020: Math 247

New Course

- Math 220, Mathematics for Elementary Schools Teachers first offered Spring 2019 and due to demand is now being offered every semester. We will begin offering at NCC Spring 2022

AB705 Related Changes and Improvements

- Increased offerings of Math 247, Introduction to Statistics and Math 230, Math for Humanities and decreased pre-transfer offerings
- Implemented Comevo guided placement messaging for Fall 2019 incoming students which was integrated into the online orientation. There are plans to revisit and make improvements Spring 2021
- Offered Math 147S, Statistics Support, for students with weaker math backgrounds and plan to hard link one way Fall 2021
- Built 147S Canvas Shell with resources that all instructors may access to support 247 students.
- Plans to develop a support course for Math 232
- Canvas Course shell for Math 232, College Algebra with learning modules of "just in time skills" that students can self enroll in from any section of the course has been developed.
- More "just in time" review homework practice is being embedded in all courses.
- Instructors are spending more time during the first two weeks to ensure students are in a course that is a good fit both for students' educational goals and in level. Some students are advised to move up in level. If instructors are concerned about a student's extremely weak pre-requisite skills, they communicate options for the needed skill building: online resources posted on the Success Center web page, extra time planned for the Math Lab and office hours, and/or transferring to a preparatory course --- especially for the STEM courses
- Increased focus on equity minded teaching professional development and discussions.
- **Collaborations With the Success Center**
    - The Division Chair regularly meets with the director of the Success Center to maintain strong communication and collaborations between the tutors and the math faculty as well as develop solutions for courses with struggling students.
    - Instructional Aids are observers in many math Canvas courses.
    - Statistics faculty regularly collaborate with the staff in the Stat Lab to help them best support students. This includes sharing materials, inviting Alysha to be an

observer in Canvas, and coordinating systems of early alert for statistics students.
  - Use of embedded tutors has increased and more dialog has been shared about effective practices with embedded tutors.
  - There has been increased focus on Math 242 support and there are plans to further support Math 232 students with specific outreach.
  - Math faculty and Success Center staff have increased promotions about the Success Center. In classrooms, flyers with the Center's offerings are posted. Online email promotions have been shared and the sample video of how to use the Success Center tutoring is shared in math classes.
  - The Math Division shares calendars and testing dates to help guide peak staffing needs in the Math Lab.
  - The Math Division shares resources to post on the Success Center webpage such as MyOpenMath, Khan Academy, MathisPower4you, etc.

Budget Notes

The division will continue to evaluate the implementation of the Student Centered Funding Formula (SCFF) and what the division can do to support the fiscal stability of Cuesta College. Currently, the division is focused on the following:

- Implementation and support for AB705, which is the best way for the division to increase the number of students that successfully complete transfer level math and English courses in their first year.
- Encouraging students to apply for financial aid
- Encouraging students to apply for earned degrees and certificates, which our transfer level students may neglect to do.
- Support implementation of Guided Pathways which should increase success rates as well as earned degrees and certificates.
- Continue to work with at risk populations in order to increase their success rates

Staffing Notes

With AB705 and the college's messaging for students to take Math and English Fall semester, there is a challenge to balance staffing between Fall and Spring semester with a potentially significant difference in offerings.

PROGRAM SUSTAINABILITY PLAN PROGRESS REPORT

This section only needs to be completed if a program has an existing Program Sustainability Plan. Indicate whether objectives established in your Program Sustainability Plan have been addressed or not, and if improvement targets have been met.

Area of Decline or Challenge	**Identified Objective (Paste from PSP)**	**Planning Steps (Check all that apply)**	**Has the Improvement Target Been Met?**
Enrollment		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Student Demand (Fill Rate)		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Efficiency (FTES/FTEF)		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Student Success – Course Completion		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Student Success — Course Modality		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one
Degrees and Certificates Awarded		☐ Identified ☐ Resources Allocated ☐ Implemented	Select one

If Program Sustainability Plan is still necessary, provide a brief description of how you plan to continue your PSP and update your PSP to remove any objectives that have been addressed and include any new objectives that are needed.