

Division/Area Name: MSE/Biological Sciences	For Planning Years: 2023-2024
Name of person leading this review: Jedidiah Lobos & Zia Nisani	
Names of all participants in this review: Lena Coleman, Lauren Conroy, Joseph Esdin, Jedidiah Lobos, Zia Nisani, Patricia Palavecino, Nikki Riley	

Fall 2022 Program Review Report

Part 1. Program Overview: Briefly describe how the program contributes to the district mission

The district’s mission is to provide a quality, comprehensive education to a diverse population of learners. This includes various transfer degrees and Transfer/General Education Courses. The biology program continues to meet these goals and increase course offerings to facilitate transfer courses for the A.S. and A.S-T in Biology. Currently biology is the 2nd largest major on campus and in the 2021-2022 cycle we had 44 (AS-BIOLOGY), 26 (AS-T Biology) & 182 (AA- Liberal Arts in Math & Sciences) degrees granted. Many of our courses are program prerequisites for the Registered Nursing (RN) and other allied health programs. Finally, the program is spearheading the expansion of undergraduate research (UR) at AVC with many faculty being active in mentoring students conducting UR.

Part 2A: Analyze the program review data (retrieval instructions) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:

Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)

- (1) The number of students declaring biology as a major has steadily increased and so has the number of graduates. The last cycle, biology was the 4th largest major on campus and this cycle it is the 2nd largest.
- (2) Most of the labs in majors and non-majors’ courses are moving to the area of inquiry-based education.
- (3) Some faculty have actively engaged in scientific research and have mentored undergraduates. This has resulted in students presenting at conferences and publishing papers in peer-reviewed journals.
- (4) The number of sections offered has steadily increased since the decline due to the pandemic.

Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)

- (1) With our last analysis of PLO 1, "Demonstrate a practical working knowledge of the scientific method, and the ability to collect, evaluate, and analyze scientific data," for both AS (74.4%) & AS-T (74.6) degrees increased from Fall 2021 to Spring 2022 by 9% and 14% respectively. This increase can be attributed to the more hands-on nature of laboratories and activities. This is why PLO 5 “Demonstrate the ability to use laboratory experiments and methods safely and proficiently as an individual or as a group” also increased. There was a slight decline of about 10% in PLO 4 “Examine and Evaluate the role of evolution and natural selection at the cellular and organismal level”. Our target goal for all PLOs is 90%, however, we believe that because of the online nature of instruction (due to COVID) students did not receive proper guidance and mentoring that normally occurs in face-to-face instruction. That is why we as a department believe that Biology majors’ courses must always be taught using the in-person (face-to-face) modality especially when it comes to labs.
- (2) The program success rate dropped from 75.6% in 2020-2021 to 65.4% in the 2021-2022 cycle. Historically our success rate hovered around 65-68% and the incurred seen in 2020-2021 was mostly due to live online nature of instructions due to the pandemic. Due to the online nature of instruction

(including labs), there was a 5% increase in the number of B's and A's awarded in the program. It must be noted that our success rate was on the rise even before the pandemic and it was at 68.6%, which was a 5.7% increase from the previous cycle.

Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)

We have continued to develop more hands-on, inquiry-based labs and activities to further develop students' scientific skills. For example, in both major's introductory biology courses (Biol 110 and 120), students have been introduced to CURE (Course-Based Undergraduate Research Experience) courses. In Biol 120, the students conducted a field journaling project spanning several months in their chosen natural setting. The students were surveyed pre- and post-completion of the project. The focus was on how field journaling affected the students' interest in the natural world and understanding of course topics. They described reasons for their interest, and if/how the project better connected them to course material. Students across all career plans increased their interest in observing the natural world after completing the journal. Students reported an increased connection to course content as a result of completing their project. In Biol 110, the students sampled soil from different areas around the Antelope Valley in search of antibiotic-resistant (tetracycline) organisms. The students were introduced to cell culture techniques that usually are taught in higher-level courses. This CURE project is based on an existing one where the data is then inputted into a national database. This past year also saw the revision of our Biol 101 lab manual. The new lab manual (set for a Spring 2023 debut), has much more inquiry-based material than the previous iteration. Since Biol 101 is the feeder course of many courses in the allied health fields, it is the hope of many in our department that it would lead to a greater understanding of the material presented in General Biology (Biol 101). In the future, we are hopeful that we can continue to develop CURE courses and summer research projects for our students in all of our biological sciences courses. It has become a major priority of the department, as we believe that undergraduate research strengthens written and oral communication, critical thinking, technical skills, and information literacy.

General Human Anatomy (Biol 201), General Human Physiology (Biol 202), and General Microbiology (Biol 204) are all prerequisite science courses for the AVC RN program. Biol 201 is in need of new anatomical models as well as software updates. Biol 202 is in dire need of an equipment update. Maintaining necessary science lab equipment is essential for student success in these courses, and will continue to provide a pathway for students' academic advancement to AVC programs, or for transfer. While the field of microbiology in both clinical and research settings has always relied on biochemical testing as a way to identify microorganisms, the way testing is done is far different from what is currently taught in the microbiology classes. In order to truly present *current* methodologies in microbiology, we need to purchase equipment that matches what is becoming the standard in microbiology labs, namely molecular equipment. In order to prepare our students properly, we must modernize our labs and introduce our students to technology that is seen in labs all over the world.

In order to best serve our biology majors, the cell and molecular biology class (Biol 110) needs updating. There is a need to understand the technology that drives the field of cell and molecular biology. This same technology should also be used in updating our general microbiology class (Bio 204). As mentioned in the previous paragraph, while our current microbiology classes teach methods that have been mainstays in traditional microbiology labs, these methods do not reflect what currently is being used in research, academic, and high-end clinical laboratories across the globe. The field of microbiology has increasingly become molecular when it comes to diagnostic testing, and microbial identification has gone from a 2-day affair to as little as 25 minutes. If we want to teach our students current techniques that will equip them with the skills necessary to navigate through upper division university classes and skills that they can build upon for the job market, then new lab equipment is a necessary addition.

Although Introduction to Botany has shown some growth in the past year, there is a need to update the resources and furniture that is currently found in the classrooms. Doing so will not only provide a better learning environment, but also a much safer environment that the students can thrive in.

Overall, outdated and/or deteriorated laboratory material does not allow for the presentation of current biological themes.

Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data

N/A

Insert Labor Market Data here <https://www.labormarketinfo.edd.ca.gov/commcolleges/>

Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):

Biology 100 - SLO 1: Demonstrate an understanding of the structural organization of the human body systems; examine microscopic and macroscopic structures, compare relative locations of structures, describe composition of structures and interrelate function of structures, SLO 2: Apply anatomical terminology used and accepted in describing the human body and the location of various organs, SLO 3: Demonstrate the ability to apply dissection techniques, use laboratory equipment and materials, and practice safe lab procedures in a group setting, SLO 4: Demonstrate the ability to identify various bones in the body (axial and appendicular) and recognize special markings and points of articulations, SLO 5: Differentiate between the various types of joints, SLO 6: Construct the physiological basis of muscle mechanics and be able to identify various muscles relating structure to function, SLO 7: Assemble relationships between the macroscopic and microscopic relationship of human anatomy as it relates to the physiology of the human body, SLO 8: Define the components of cells and identify their functions: The Biology 100 course either meets or exceeds expectations for the SLOs. The course mode and format of instruction supports the flexible scheduling needs of the students while fostering an independent study opportunity or experience. The success can be enhanced by providing students with the opportunity to experience a microscope training session or review. While this cannot be a course requirement, it can be incorporated as a participation credit, for which students come to a campus lab either in the evenings or on weekends to participate in the microscope review exercise. The initial design for this course was to develop and/or improve the study skills of students who plan to or will enroll in the licensed vocational nursing program, or it serves as a prerequisite for students planning to take the Biology 201-Human Anatomy course—in transit to other allied health programs, including the RN, Respiratory and Radiation Technology programs. In recognition of the current financial market and economic challenges, there is potential for this course to become an open resource course. In this case, it would be beneficial to have licensure for textbook access including supplemental learning materials, as well as online learning resources for laboratory experiments. The face-to-face microscope training session should enhance student performance with regards to possible participation in advanced biology classes offered on campus or when transferring to the university setting. The Anatomage digital cadaver is a digital cadaver experience and it is offered as a study resource for the department's face-to-face anatomy courses. It would be a very beneficial experience to own the license to this digital technology so that it would be available to students in the online Biology 100 course. This option may also enhance the student's comfort level when offered this as a study resource for the face-to-face Biology 201 course.

Biology 101 - SLO 1: Describe the diversity among living organisms and how it applies to understanding the evolution of life on Earth, SLO 2: Explain the structure of the organelles in the cell and understand their role in the chemical reactions of life: For Biology 101 Lecture, both SLOs reported below the expected performance line (expected performance: 70%; actual performance 63.81% for SLO 1 and 60.78% for SLO 2). Although the expected performance for both SLOs was not met, the actual performance for each SLO was within 10% of the expectations. We posit that the lower-than-expected performance may be due, in part, to the fact that during the 2021-2022 academic year, students were returning to campus for the first

time since the start of the COVID-19 pandemic and therefore had to reacclimate to face-to-face instruction. SLO performance in Biology 101 Lecture was higher during the 2020-2021 academic year, when all sections of Biology 101 were offered online and students might have had access to notes and/or other resources while SLOs were being assessed. We hope that in the year since Fall 2021, students have had time to relearn how to study and take notes during face-to-face courses. We also propose that the current, oversaturated schedule of topics in Biology 101 Lab makes it impossible to synchronize coverage of topics between Biology 101 Lecture and Lab. Ideally, a lecture course should lay a conceptual foundation, while practical applications of the same concepts are reinforced in the lab. Currently, this is impossible, contributing to confusion and the experience of content overload among students. We hope that the planned introduction of the new Biology 101 Lab manual in Spring 2023, which reduces the number of topics but increases the depth of coverage, will improve SLO performance in both Biology 101 Lecture and Lab. Another feature which may provide a barrier for students is the high cost of the course textbook. Adoption of a lower cost text or a zero-cost OER should boost SLO performance.

Biology 101L - SLO: Apply the scientific method to formulate and test a hypothesis. Students will be able to conduct an experiment, collect data, analyze results, and prepare scientific reports: Biology 101 Lab has one SLO with a target of 70% meeting or exceeding this goal. Actual performance was slightly lower, at 64.5% meeting or exceeding, which is 4.5% percent below this expectation. This is an average over both Fall 2021 and Spring 2022, with Fall slightly below the 70% goal and Spring slightly above, indicating an improvement trend for the year as a whole, which gets lost in the average value. It may be explained by the fact that in the beginning of the year, students were transitioning to face-to-face learning after online learning during Covid. After a semester of acclimatization, performance was above the 70% target. While performance did improve, we would like to maintain this trend. Currently we are in the process of implementing a new lab manual with activities that specifically target each parameter in the Biology 101 Lab SLO. The current lab manual only occasionally addresses the scientific method and when it does, it is very general. With the new lab manual's emphasis on the scientific method, it is hoped that student performance will continue to improve for this SLO.

Biology 102 - SLO 1: Demonstrate the ability to use laboratory equipment and techniques safely and in a group setting, SLO 2: Define the components of cells and identify their functions, SLO 3: Differentiate between the four different types of tissues and relate function and location to each tissue category, SLO4: Construct the physiological basis for function of each major organ system of the human body, SLO 5: Assemble relationships between the macroscopic and microscopic relationship of human biology as it relates to the function of the human body, SLO 6: Understand the current thinking about primate evolution and be able to place humans phylogenetically, SLO 7: Formulate an appreciation of the function of the human body to lead a healthy lifestyle, SLO 8: Understand and use the scientific method to formulate, perform and analyze simple scientific experiments: The Biology 102 course either meets or exceeds expectations for the SLOs. The course mode and format of instruction supports the flexible scheduling needs of the students while fostering an independent study opportunity or experience. The success can be enhanced by providing students with the opportunity to experience a microscope training session or review. While this cannot be a course requirement, it can be incorporated as a participation credit, for which students come to a campus lab either in the evenings or on weekends to participate in the microscope review exercise. The face-to-face microscope training session should enhance student performance with regards to possible participation in advanced biology classes offered on campus or when transferring to the university setting.

Biology 103 - SLO 1: Apply the scientific method to formulate and test a hypothesis. Students will be able to conduct an experiment, collect data, analyze results, and prepare scientific reports, SLO 2: Demonstrate an understanding of the basic plant structure and organization, physiology, and classification. Recognize the relationships among the different groups of plants from an evolutionary perspective: Students have met SLO 1 at an acceptable/good percentage (87.10%). This SLO partially involves laboratory activities and hands-on experiences that are more manageable for students, which also implies team effort and the exchange of information. As time goes on, more lab materials and resources become available for our Botany labs making the learning process more effective. An essential and needed upgrade to make our laboratory activities more effective and safer will be the installation of a new TV screen attached to the wall and an instructor microscope permanently connected to it like those we have in the Biol 101 laboratory classrooms in Uhazy Hall. Additionally, replacing the current tables in the classroom with a more appropriate four-student table with book compartments and drawers over the cupboard, will make the lab work safer and more functional. Students must carry microscopes walking around tables, backpacks, etc., to put them away at the end of the lab work, introducing potential hazards. The cabinet where microscopes are stored is different from the appropriate one as well. SLO 2 is below the expected performance line (58.06%). This SLO involves mostly theoretical content mainly delivered during the lecture part of the course. Students struggle with new/specific scientific terminology and understanding chemical and physiological mechanisms such as photosynthesis, cellular respiration, mitosis, and meiotic division. Most students enrolling in Botany have not taken any previous science classes, making learning new concepts difficult. One essential resource that can significantly help deal with this issue is having Botany tutors available at the Learning Center. I have suggested names of excellent students who have already taken Botany to be contacted to become tutors and help students who struggle to learn the concepts mentioned above. I must communicate again with the Learning Center and help make this option a reality for students. Another aspect of the course that may positively impact students' performance is a change in the schedule of classes offered at night during the fall. I am hopeful that students' performance will improve if the blended option is approved for the following Fall 2023. Additionally, moving the class time to an earlier start time (from 6 pm to 4 pm) and breaking up the lecture portion of 3 hours as it is now into two days, 1 hour 20 min each, like the morning class, will positively impact the student's performance.

Biology 104 - SLO: Demonstrate an understanding of the principles of energy and energy flow in ecosystems, relationships among organisms in ecosystems, or natural biogeochemical cycles in ecosystems, and how humans impact these factors: For Biology 104, both SLOs exceed the expected performance (expected performance: 70%; actual performance 92.04% for SLO 1 and 91.15% for SLO 2). The SLOs are straightforward yet broad enough that they can be addressed in numerous ways. Typically, 2-3 sections of Biology 104 are offered each semester. Usually, 1-2 sections are face-to-face and 1-2 sections are distance education courses. Offering a mixture of modalities serves our students and may promote their success in this course.

Biology 110 - SLO 1: Describe the components of living cells, and demonstrate how they interact to allow the state of being alive, SLO 2: Describe the methods used to culture bacteria, protists, fruit flies, and flowering plants in the laboratory. Employ major experimental laboratory techniques, sometimes in a team context, including centrifugation and gel electrophoresis, SLO 3: Demonstrate an ability to formulate meaningful research questions in molecular-cell biology, design controlled scientific experiments to investigate those questions, and write up the results in publishable form. Demonstrate an understanding of the scientific method: For Biology 110, the cumulative result of SLO 1 is perhaps the result of students being used to learning and being assessed in an online environment. These SLOs were assessed during the first two semesters back in-person, after the students spent (potentially) a year or more online. Many students who take Biol 110 are entry-level (freshman level) students and may have a "Zoom

hangover” from high school. The study skills that many students may have taken with them into college may be underdeveloped and it remains to be seen how the SLO data looks in the next program review. SLO 2 results look far worse, but again, may be attributed to the same problem. Many students during the semesters that this SLO was assessed were not used to a face-to-face laboratory class. The disconnect made it difficult for many students to draw upon previous lab experiences to help them with understanding how laboratory work is performed. The result of SLO 3 was not that surprising and may be due to the assessment method used for this SLO. The SLO was assessed using laboratory notebooks that were collected near the end of the semester. Because most students keep up to date with this “assignment”, it would have been surprising if this SLO dipped below the expected performance rate.

Biology 120 - SLO 1: Students will be able to use the theory of evolution as a scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped organismal morphology, physiology, life history, and behavior, SLO 2: Demonstrate ability in using critical thinking through the application of the scientific method to collect data, process information and produce (potentially falsifiable) results: For Biology 120, both SLOs exceed the expected performance (expected performance: 70%; actual performance 77.2% for SLO 1 and 84.8% for SLO 2. This is most likely due to the implementation of hands-on inquiry-based activities in both lectures and labs. This is especially true for SLO 2 (scientific method) where students conduct course-based undergraduate research, thus giving them more hands-on and experience-based opportunities to learn and appreciate the scientific method. Biol 120 continues to have inquiry-based and hands-on lab activities. For example, the labs have a designated research project, field journal and online modeling of population genetics. This allows students to get hands-on experience in research, relate subject material to the field, and observe the effect of selection and drift over multiple generations. We recommend that through training, professional development, and conference attendance, we can expand research opportunities for students and increase hands-on inquiry-based class in our department. We will continue this path to maintain the momentum that we have.

Biology 201 – SLO 1: Demonstrate an understanding of the structural organization of the human body systems; examine microscopic and macroscopic structures, compare relative locations of structures, describe composition of structures, and interrelate the functions of structures. SLO 2: Demonstrate the ability to practice safe lab procedures in a group setting: The anatomy faculty will continue to monitor and discuss SLOs statistics. They will design lesson plans to ensure continued success. The anatomy faculty meets monthly. We will discuss the SLOs scores and performance. We will be discussing, in detail, any SLOs that underperformed and brainstorm on plans and techniques to address them in future semesters.

Biology 202- SLO: Define and comprehend how the human body works by constructing a cascade of molecular and cellular events that lead to normal physiological responses in metabolism and in the nervous, endocrine, muscular, cardiovascular, respiratory, renal, digestive, reproductive, and immune systems: The physiology faculty will continue to monitor and discuss SLOs statistics. They will design lesson plans to ensure continued success. The physiology faculty meets monthly. We will discuss the SLOs scores and performance. We will be discussing, in detail, any SLOs that underperformed and brainstorm on plans and techniques to address them in future semesters.

Biology 204 –SLO: Describe the characteristics of the bacteria, viruses, protozoa, fungi, and parasitic worms and their interactions with the host organism, and how they cause diseases. Understand their role in food production and spoilage, water contamination, and sewage treatment: Much like what happened in Biol 110, students in this class are expected to draw upon previous experiences and knowledge to help them navigate through

this class. While much of the information that this SLO covers is taught in Biol 204, the foundations of this is material that the student should already know. After the faculty who teach this course discussed this SLO, we have conclude that the SLO actually reflects the overall student performance during the first two semesters back in-person. We will continue to monitor how the students perform and will see if the same trend continues when the next program review cycle comes out.

Part 2D: Review and comment on progress towards past program review goals:

Goal 1) Reform instructional methodology to include Inquiry-based learning. We are continuing to develop more inquiry-based, hands-on labs in our majors classes. In previous semesters, this work has led to students doing undergraduate research (UR) work that has led to publication. We are continuing this effort and the goal is to spread this inquiry-based education to the non-majors' classes such as Biology 101. Recently, a committee of Biology 101 faculty have developed a new lab manual (that will be used in Spring 2023) and this manual emphasizes hands-on inquiry-based activities. This group has also conducted workshops for faculty to participate in order to prepare for teaching biol 101 lab in spring 2023.

Goal 2) Improvement of student learning outcomes. The grade distribution in biology classes tends to follow a normal distribution curve. This suggests that we do not have any potential grade inflation occurring. As mentioned previously, the success rates have dropped from the spike seen during the pandemic (see #2 in Opportunities & Challenges), but we hope by implementing more effective instructions, especially inquiry-based, to increase our success rate.

Goal 3) Develop an undergraduate research (UR) program. The number of faculty members that are conducting research has increased. Recently, we had one paper published with students presenting their work at a conference. In addition, we have ongoing projects that involve students doing research. Biology 120 classes continue to promote UR as part of the class curriculum. Finally, we have been awarded a 5-year multimillion dollar grant that has UR as one of its goals. This grant will allow for creation of undergraduate research coordinator which will help immensely in growing UR.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:

Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you've achieved your goal?)
	ILO	PLO	SLO	OO				
#1: Reform instructional methodology to include Inquiry-based learning.	ILO 2. Creative, Critical, and Analytical Thinking	BIOL PLOs 1 & 5	Biol 120 SLOs 1 & 2 Biol 110 SLOs 2&3	N/A	Goal 3: Focus on utilizing proven instructional strategies that will foster transferable intellectual skills.	Instituting inquiry-based learning in more courses.	Having workshops on developing hands-on lab activities and rewriting lab manuals. Sharing literature on how to develop more inquiry-based labs. Biology 101 has developed and adapted a lab manual (to be used in S2023) that is mostly inquiry-based labs. Finally, by purchasing more supplies and equipment we can develop more hands-on	By the end of Spring 2023 we will review all the biology lab manuals and account for all the lab exercises that are hands-on inquiry based.

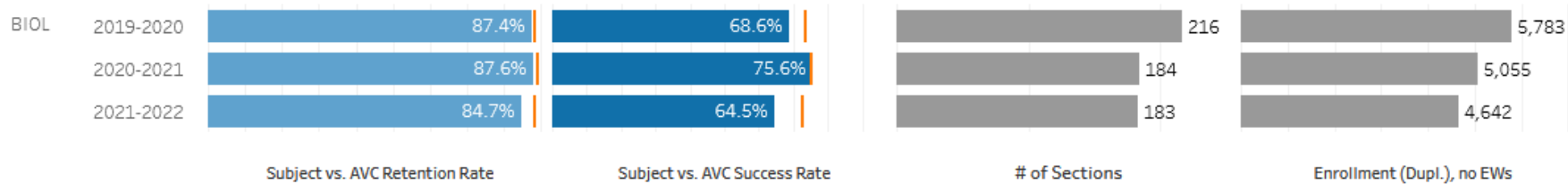
							labs for students (this last part also applies to goal 2).	
#2: Improvement of student learning outcomes.	ILO 2. Creative, Critical, and Analytical Thinking	BIOL PLOs 1-5	Biol 120 SLOs 1 & 2 Biol 110 SLOs 1-3	N/A	Goal 3: Focus on utilizing proven instructional strategies that will foster transferable intellectual skills.	Increase student success rates.	Trying to develop ways to identify students that are struggling earlier in the semester and referring them to proper services. Developing review workshops that students can attend when struggling.	We will assess student success rates by the end of the 2022-2023 academic cycle.
#3: Develop an undergraduate research (UR) program.	ILO 2. Creative, Critical, and Analytical Thinking	BIOL PLOs 1 & 5	Biol 120 SLO 2 Biol 110 SLOs 2&3	N/A	Goal 1: Commitment to strengthening institutional effectiveness measures and practices.	Increasing faculty participation in mentoring student research.	A group of faculty are reading literature and attending UR conferences in order to get ideas on how to implement a permanent UR program on campus. We are also holding discussions and developing UR projects for students to perform in majors' courses. Finally we have received a recent grant that will support expansion of UR.	Develop a structure whereby the faculty will have access to resources and workshops on developing various activities to implement Ur in their courses.

Part 4: Resource Requests that Support Program Needs (based on above analysis)
 Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).



Retention, Success, Number of Sections, & Enrollment in BIOL (Total AVC rates are shown as | *hover over to see data*)



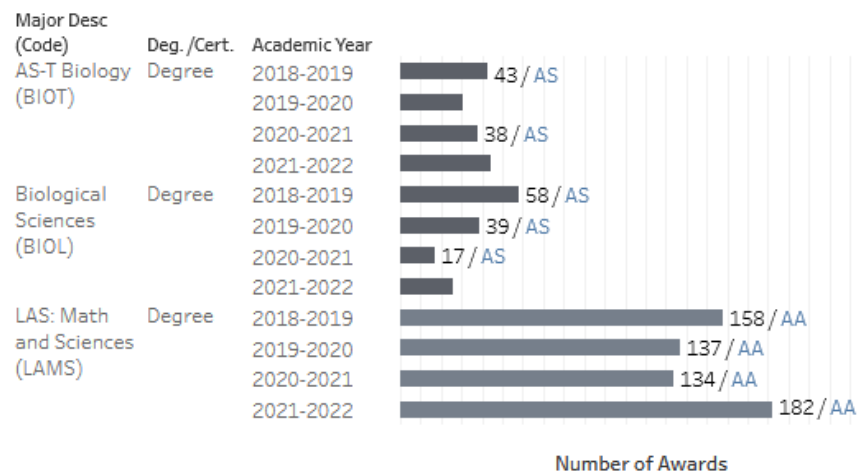
Enrollment and Number of Sections by *Modality* in BIOL

	Instr. Method	2019-2020	2020-2021	2021-2022
Number of Sections	Online	21	25	30
	Other Indep Study			1
	Traditional	195	159	152
Enrollment	Online	668	698	779
	Other Indep Study			1
	Traditional	5,340	4,369	3,885

Enrollment and Number of Sections by *Location* in BIOL

	Location	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	198	164	147
	Palmdale	18	20	36
Enrollment	Lancaster	5,564	4,610	3,769
	Palmdale	444	457	896

Number of Program Awards in [AS-T Biology \(BIOT\)](#), [Biological Sciences \(BIOL\)](#), [LAS: Math and Sciences \(LAMS\)](#)

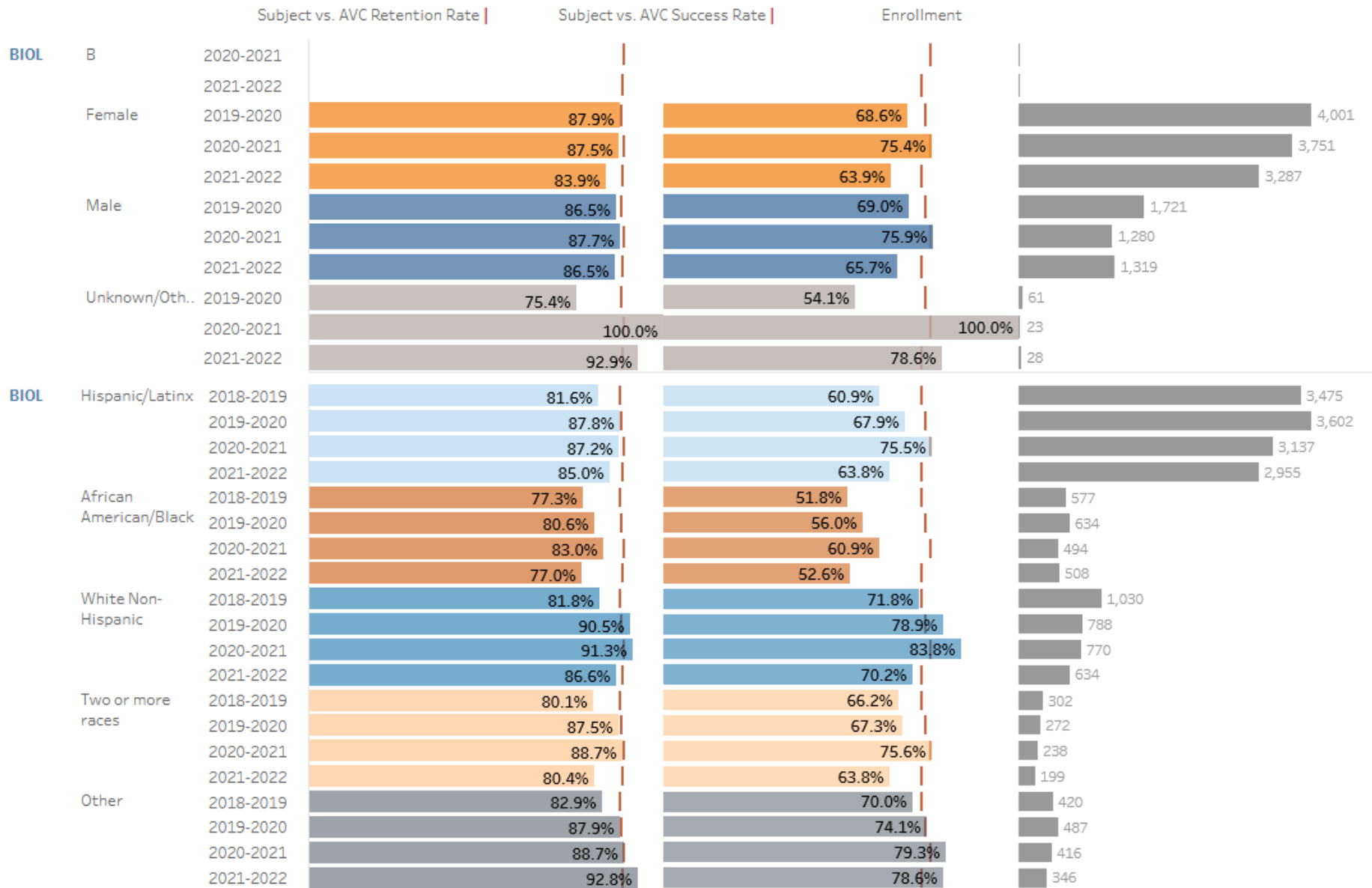


FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in BIOL

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF	8.8	8.4	6.7	4.6
FT (Regular) FTEF	13.5	12.4	12.8	13.6
FT (Overload) FTEF	3.3	3.7	4.1	4.9
TOTAL FTEF	25.7	24.5	23.6	23.2
PT/FT FTEF Ratio	0.7	0.7	0.5	0.3
FTES	359.6	344.3	340.5	297.6
FTES/FTEF Ratio	14.0	14.1	14.4	12.8
WSCH/FTEF Ratio	420.3	422.1	432.8	384.8

Click [here](#) to see AVC's Program awards dashboard

Last Update: 09/30/2022 .Data Sources: AVC's Banner, ARGOS reports



Division/Area Name: SME/Mathematics	For Planning Years: 2023-2024
Name of person leading this review: James Dorn	
Names of all participants in this review: Josh Strong, Hal Huntsman, Christos Valiotis	

Fall 2022 Program Review Report

1.1. Briefly describe how the program contributes to the district [mission](#)

The mathematics department provides a quality, comprehensive education to a diverse population of learners. Most awards at AVC have a math requirement so though we may not have an extensive number of degree pursuers, the impact of the department is widespread.

Part 2A: Analyze the [program review data \(retrieval instructions\)](#) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:

Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)

The Math Department continues to be united in providing quality instruction while holding a high standard of rigor across all courses. We continue to adapt to the changing environment with an effort to increase our online offerings by submitting all our courses for distance education approval. Additionally, legislation continues to shape the matriculation of students with the reinterpretation of AB705 and AB1705 forthcoming. We have responded to the initial mandates by incorporating corequisite support classes for our entry level STEM and non-STEM courses and have an alternate pathway to Calculus that will be ready for implementation in Fall 2023.

The Math Department faculty engage consistently with each other to share ideas and discuss approaches that can improve student success. A statistics learning community has been meeting regularly now for almost 2 years. In addition, a “math chat” group now meets almost weekly to discuss topics in various courses. Both groups attract a regular following of faculty.

Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)

The Math Department continues to experience challenges from the aftereffects of AB705, its reinterpretation, and the shift to online in response to the pandemic. The removal of all prerequisite basic skills courses, now including Intermediate Algebra, has led to the first college math class being at the transfer level. Though this has been less impactful in the non-STEM pathway, we continue to see a growing number of students identifying as STEM majors being greatly underprepared for the rigors of our entry level STEM math courses. This issue is compounded by learning loss during the pandemic, especially acute in mathematics, and we are seeing it in the department’s declining success rates.

The overall success and retention rates for Mathematics are well below the average success and retention rates for AVC. And, while the department does see gaps by ethnicity and gender, our success and retention rates for all demographic categories are consistently 10 - 12 percentage points less than AVC’s rates, which suggests that the gaps we experience are consistent with the gaps for AVC.

Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)

It is hoped that the Math Department will be able to identify a viable strategy to meet the challenges that AB705 has and AB1705 will continue to create. Through our efforts to create a new pathway to Calculus and the incorporation of co-requisite courses for our entry level transfer and STEM classes, we look forward to the time where students can accurately access their own learning needs and enroll in the course structure that provides the greatest opportunity to be successful. Perhaps the biggest hurdles to achieving this goal are that the support systems enacted are new to AVC and up to this point have been voluntary. With a continued effort to identify the appropriate subgroups of students based on multiple measures placement data and making support for the identified populations compulsory, we hope to arrive at a point where success rates for all populations in all demographic categories meet or exceed the average success rate of students at AVC.

Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data

N/A

N/A

Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (aka Action Plans):

Retention rates were 81.5% and success rates 60.7%, both down from the last review period where they were 84.7% and 65.2% respectively. We also saw a significant dip in our PLO performance, falling to 68% for PLO1 and 61% for PLO2 from 71.5% and 73.3% from the last review period. Coinciding with this, we had a decrease in SLO performance in our STEM sequence, from Math 135 through Math 160. These results support what the department has been experiencing in terms of student preparedness as students are placed into the sequence at a higher rate due to multiple measures placement.

PLO Performance:

PLO#1: Solve mathematical problems, including computational, real world, and proof, independently. 68%

PLO#2: Effectively communicate solutions to mathematical problems using both words and mathematical symbols. 61%

SLO Analysis:

SLO performance exceeded the achievement target for many 100 level classes, up to and including MATH 148 Calculus for Business and Econ. The achievement target was also exceeded for the 200 level classes as well. However, the 100 level STEM courses did not meet the achievement target. For those that did achieve the target rate, it is noted that the use of technology as well as face to face instruction has been very effective. Various modalities, having computerized notes (possibly handwritten on a device), and clear rubrics for assignments were cited as having a positive impact. For those that did not achieve the target rate, it is noted that many students are under prepared and could use more outside help or even that the classes could be offered with more units, so there is enough time to carefully cover the material. Based on this information, students would benefit from having computers (or graphing calculators) in the classroom as well as having the ability to have a recorded document (zoom recording or PDF of notes) of what went on in class. Students would also benefit from more class time, such as required corequisite support, more units for classes, and embedded tutors.

Part 2D: Review and comment on progress towards past program review goals:

Goal #1: Increase MATH 135 and MATH 115 success rates for those students who place with support recommended or strongly recommended.

A data request has been made to compare the success rates for this review period but to date, we have not seen the data. Based on the SLO results and success and retention data, it is believed that there is still more work to do, especially in promoting the availability and benefit of the corequisite support sections for the identified populations.

Goal #2: Increase the consistency of success rates between sections of courses, especially for those which have an overall success rate lower than the target 70%.

The department continues to discuss ways to align expectations between courses, especially those that lead to the Calculus sequence. There has not been a wealth of enthusiasm to start the process, but the department has identified that consistency in content and evaluation between courses taught by different instructors is worth looking at.

Goal #3: Explore an alternate STEM pathway to better prepare students who do not directly place into MATH 140.

The MATH Department has created an alternate STEM pathway to Calculus that will be implemented in Fall 2023. Instead of a STEM student not placing into MATH 140 taking MATH 135 and then MATH 140 to get to Calculus, students will now take MATH 130, College Algebra for STEM, and then MATH 135 to be eligible for MATH 150. The inclusion of MATH 130 at the beginning of the STEM pathway was included to help ensure the algebraic skills that students in those placement subgroups were deficient in.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:

Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success <small>(How would you know you've achieved your goal?)</small>
	ILO	PLO	SLO	OO				
#1	ILO 2. Creative, Critical, and Analytical Thinking				Goal 4: Advance more students to college-level coursework- Develop and implement effective placement tools	To create mandatory corequisite support courses for MATH 115 and MATH 130 based on multiple measures placement rubrics.	1. Demonstrate the success of corequisite courses for students in recommended placement categories; 2. Increase the number of sections with corequisite support attached.	Success rates for students in recommended support categories succeed at rates similar to those from the "support not needed" category.

#2	ILO 2. Creative, Critical, and Analytical Thinking				Goal 3: Focus on utilizing proven instructional strategies that will foster transferable intellectual skills	To increase the opportunities for professional development for our faculty so they can better promote the success of our students.	<ol style="list-style-type: none"> 1. Identify and bring appropriate professional development facilitators to campus; 2. Incentivize faculty to attend sessions and change their practice to improve student success; 	Success rates in courses improve by 5-10 percentage points, especially for African-American, Latinx, and mixed-race students.

Part 4: Resource Requests that Support Program Needs (based on above analysis)

Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Please Select **Subject area** (twice) and **Program Major(s)** to get your data -->

Select Subject
MATH

Select Subject again
MATH

Select Program Major(s)
LAS: Math and Sciences (LAMS)

Academic Year
2021-2022



Retention, Success, Number of Sections, & Enrollment in MATH (Total AVC rates are shown as | hover over to see data)



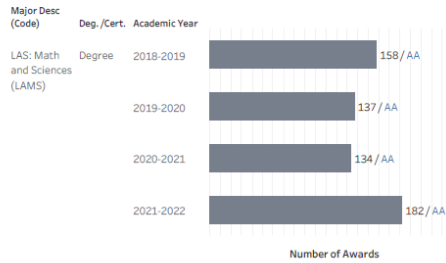
Enrollment and Number of Sections by **Modality** in MATH

Instr. Method	2021-2022
Online	21
Other Indep Study	2
Traditional	223
Enrollment	
Online	2,746
Other Indep Study	3
Traditional	3,738

Enrollment and Number of Sections by **Location** in MATH

Location	2021-2022
Lancaster	205
Lancaster [O...]	9
Palmdale	30
Palmdale [Of...]	2
Enrollment	
Lancaster	3,343
Lancaster [O...]	210
Palmdale	2,898
Palmdale [Of...]	36

Number of Program Awards in **LAS: Math and Sciences (LAMS)**

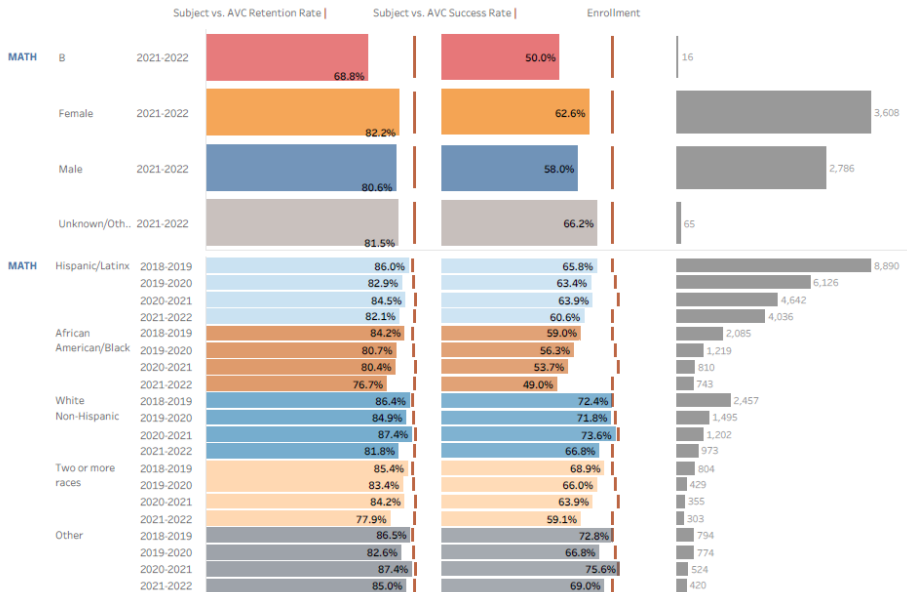


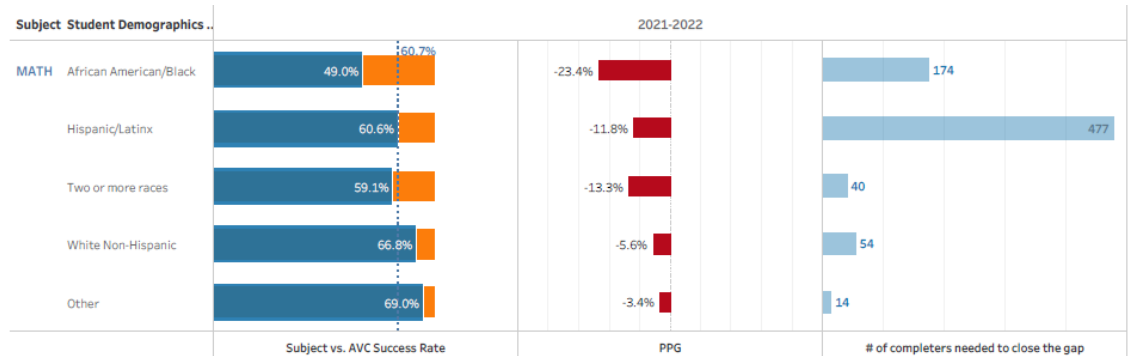
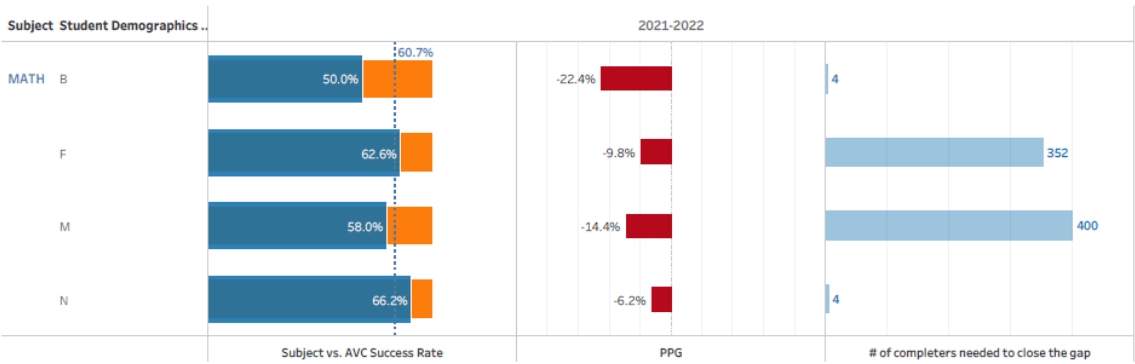
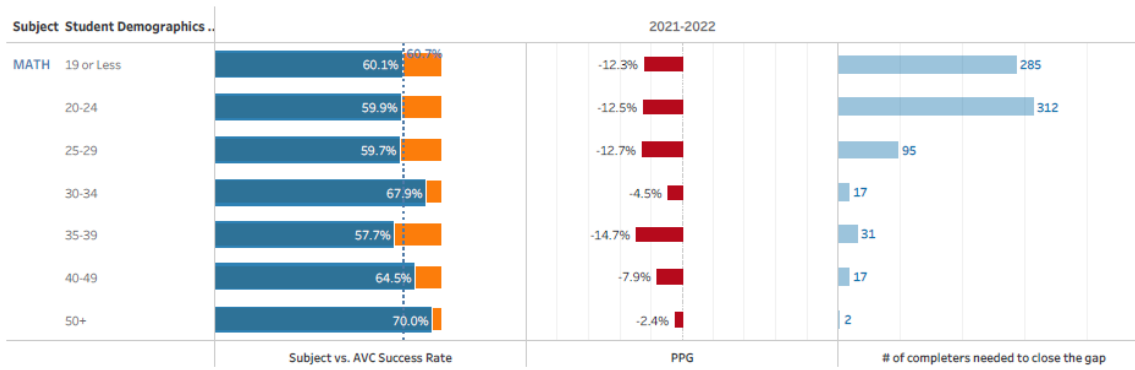
FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in MATH

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF	16.3	11.9	9.7	6.4
FT (Regular) FTEF	20.3	22.2	21.2	18.6
FT (Overload) FTEF	4.0	2.6	1.1	1.9
TOTAL FTEF	40.6	36.6	32.0	27.0
PT/FT FTEF Ratio	0.8	0.5	0.5	0.3
FTES	667.0	571.3	448.9	353.0
FTES/FTEF Ratio	16.4	15.6	14.0	13.1
WSCH/FTEF Ratio	492.7	468.3	420.8	392.3

[Click here](#) to see AVC's Program awards dashboard

Last Update: 09/30/2022. Data Sources: AVC's Banner, ARSOS reports





SLO Performance:

Course	SLO	Achievement Target	Actual Performance
MATH 110	Analyze and solve level-appropriate problems including sets, and logic.	70.00%	79.12%

Mathematics for Liberal Arts Students	Use appropriate mathematical notation, processes, and strategies to effectively communicate the solutions of level-appropriate problems in sets and logic.	70.00%	69.23%
MATH 115 Statistics	Analyze and solve level-appropriate problems including concepts of probability, the normal and binomial distributions, confidence intervals, and hypothesis testing for one and two population parameters	70.00%	75.58%
	Use appropriate mathematical notation, processes, and strategies to effectively communicate the solutions of level-appropriate problems in concepts of probability, the normal and binomial distributions, confidence intervals, and hypothesis testing for one	70.00%	67.21%
MATH 116 Intro to Statistics Using R	Analyze and solve level-appropriate problems including concepts of probability, the normal and binomial distributions, confidence intervals, and hypothesis testing for one and two population parameters.	70.00%	87.50%
	Use appropriate mathematical notation, processes, and strategies to effectively communicate the solutions of level-appropriate problems in concepts of probability, the normal and binomial distributions, confidence intervals, and hypothesis testing for one.	70.00%	87.50%
MATH 120 Math for Teachers	Analyze and solve level-appropriate problems using patterns and logic within the real number system, including rational and irrational numbers and different representations.	70.00%	82.98%
	Use appropriate mathematical notation, processes, diagrams (including number lines) and strategies to effectively communicate the solutions of level-appropriate problems within the real number system.	70.00%	74.47%
MATH 124 Finite Math	Analyze and solve level-appropriate problems including matrices, linear systems and programming, variation, normal and binomial distributions, probability, and logic.	70.00%	79.25%
	Use appropriate mathematical notations, processes, and strategies to effectively communicate the solutions of level-appropriate problems including matrices, linear systems and programming, variation, normal and binomial distributions, probability, and logic.	70.00%	73.58%
MATH 128 College Algebra for Lib Arts	Analyze and solve level-appropriate problems using patterns and logic within the real number system, including rational and irrational numbers and different representations.	70.00%	75.63%
	Use appropriate mathematical notation, processes, diagrams (including number lines) and strategies to effectively communicate the solutions of level-appropriate problems within the real number system.	70.00%	72.05%
MATH 135 Plane Trigonometry	Analyze and solve level-appropriate problems including the six trigonometric functions, graphs of functions, velocities, identities, areas of triangles, Law of Sines and Cosines, vectors, and the Dot Product.	70.00%	67.46%
	Use appropriate mathematical notation, processes, and strategies to effectively communicate the solutions of the appropriate problems with the six trigonometric functions, graphs of functions, identities, areas of triangles, Law of Sines and Cosines, vectors, and the Dot Product.	70.00%	65.07%
MATH 140 Precalculus	Analyze and solve level-appropriate problems including equations, inequalities, and systems involving polynomial, rational, exponential, logarithmic, radical, absolute value, and trigonometric expressions.	70.00%	69.31%
	Use appropriate mathematical notations, processes, and strategies to effectively communicate the solution of level-appropriate problems in equations, inequalities, and systems involving polynomial, rational, exponential, logarithmic, radical, absolute value.	70.00%	66.01%
MATH 148 Calculus for Business & Econ	Analyze and solve level-appropriate problems including Rates of Change, Differentiation, and Integration in a business context.	70.00%	87.50%
	Use appropriate mathematical notations, processes, and strategies to effectively communicate the solutions of level-appropriate problems in Rates of Change, Differentiation, and Integration in a business context.	70.00%	90.00%
MATH 150	Analyze and solve level-appropriate problems including Limits, Differentiation, and Integration.	70.00%	67.01%

Calculus & Analytic Geometry	Use appropriate mathematical notations, processes and strategies to effectively communicate the solutions of level-appropriate problems in Limits, Differentiation and Integration.	70.00%	64.16%
MATH 160 Calculus & Analytic Geometry	Analyze and solve level-appropriate problems including proper and improper integrations, infinite series and sequences, power series, parametric equations, polar coordinates, and conic sections.	70.00%	68.60%
	Use appropriate mathematical notation, processes, and strategies to effectively communicate the solutions of the appropriate problems in proper and improper integration, infinite series and sequences, power series, parametric equations, polar coordinates.	70.00%	53.72%
MATH 220 Linear Algebra	Analyze and solve level-appropriate problems in topics including vector space properties, linear transformations, diagonalizations and mathematical proofs.	70.00%	78.95%
	Use appropriate mathematical notations, processes, and strategies to effectively communicate the solutions of level-appropriate problems in vector space properties, linear transformations, diagonalizations, including mathematical proofs.	70.00%	72.63%
MATH 230 Intro Ordinary Diff Equations	Use appropriate mathematical notations, processes, and strategies to effectively communicate the solutions of level-appropriate problems including first order linear, some nonlinear ordinary differential equations, higher order linear differential equations.	70.00%	74.42%
	Analyze and solve level-appropriate problems in topics including first order linear, some nonlinear ordinary differential equations, higher order linear differential equations, and systems of linear differential equations.	70.00%	80.23%
MATH 250 Calculus & Analytic Geometry	Analyze and solve level-appropriate problems including differentiation and integration of multivariable and vector valued functions, rectangular, cylindrical, and spherical coordinates, and line integrals.	70.00%	88.51%
	Use appropriate mathematical notations, processes, and strategies to effectively communicate the solutions of level-appropriate problems including differentiation and integration of multivariable and vector valued functions, rectangular, cylindrical, and spherical coordinates, and line integrals	70.00%	79.31%

CIPs:

1. Utilizing the content of the Action Plan Report and conversations with other faculty, address all SLOs that have met and/or exceeded the expected performance, how can this success be sustained and supported?

MATH 20: This course is no longer being taught in the MATH Department.

MATH 21: This course is no longer being taught in the Math Department.

MATH 102: This course is no longer being taught in the Math Department.

MATH 110: The performance on SLO1 well exceeded the 70% achievement target with just over 79%. Instructors will continue to emphasize the problem-solving process throughout the course and continue to prepare students to analyze and solve problems effectively.

MATH 115: Add additional application problems to provide students more opportunities to refine their problem-solving skills. The performance for SLO1 is below target (67.21%), whereas the performance for SLO 2 is slightly above target (75.58%). It is obvious that SLO1 which addresses the appropriate use of mathematical notation, processes, and strategies to effectively communicate the solutions of level-appropriate problems in concepts of probability and hypothesis testing will need more attention to plan for improvement. However, even though SLO2 that reflects the ability of a learner to analyze and solve level-appropriate problems including concepts of probability and basic statistics had exceeded the expectation of 70%, it can also be improved or sustained on current level. In statistics it is more efficient to use the appropriate statistical software to solve statistical calculations. Increasing student access to various statistical software will be helpful.

MATH 116: There will be multiple rubrics created for each assigned project. Each project will have selectable rubrics to emphasize features the class seems to need to put more effort into.

MATH 120: Both SLO1 and SLO2 exceeded the performance target of 70%. Instructors will continue to model effective problem-solving strategies to continue or increase the level of success on SLO assessments.

MATH 124: The performance on both SLOs for this course exceeded the expected performance (70%). Recording and posting Zoom recordings of each class helped the students retrieve notes and review concepts they might have missed in class. Graphing calculators were utilized and key in most of the sections taught. Students could work more difficult applications and the technology element kept them engaged and interested. Students benefited from the face-to-face instruction. Canvas has been very helpful for assignments, homework, notes, and grades.

MATH 128: The performance on both SLOs for this course exceeded the expected performance (70%). Online formats allowed students to have exact copies of the notes that were presented in class. Students also benefited from the in-person lectures as well. This practice of having saved copies of notes can be maintained using smart boards in every classroom. Handwritten Notes could be saved and posted on the internet for later viewing. A smartboard could also be used as a screen for PowerPoint presentations and other media.

MATH 135: Performance on both SLO's were 3 to 5 percent below the achievement target.

MATH 140: The performance on both SLOs for this course was below the 70% achievement target, though it was close (69.31%) for SLO1.

MATH 148: The performance on both SLOs for this course was above the 70% achievement target

MATH 150: The performance on both SLOs for this course was below the 70% achievement target.

MATH 160: Posting video lectures of each section for the entire course and letting students to submit the worksheets and the lecture notes from each video help the students to learn the materials. Weekly group quizzes can keep the students practicing the materials.

MATH 220: The SLO results came out slightly above the target mark. Continue F2F modality to ensure that the integrity of the course is sustained.

MATH 230: The SLO results came out above the target mark. Continue F2F modality to ensure that the integrity of the course is sustained.

MATH 250: Having F2F, asynchronous online and synchronous online learning components all in one class improved student success and retention. Therefore, finding the best ways to implement F2F, asynchronous online and synchronous online learning components into our classes will be important in the future.

2. Utilizing the content of the Action Plan Report and conversations with other faculty, address all SLOs reporting below the expected performance line. What high-impact practices or other changes can be implemented to improve student performance?

MATH 20: This course is no longer being taught in the Math Department.

MATH 21: This course is no longer being taught in the Math Department.

MATH 102: This course is no longer being taught in the Math Department.

MATH 110: The performance on SLO2 nearly met the 70% achievement target with just over 69%. Though a majority of students were able to solve problems accurately, there is more work to be done in modeling appropriate communication in the problem-solving process. Communication in mathematics is inherently difficult in mathematics, with the focus often being on arriving at the correct answer. More emphasis needs to be placed on what communication looks like in the problem-solving experience and clearly delineate the level of expectation with respect to communication, both in words and use of mathematical symbols.

MATH 115: This course will be better taught in a computer lab. SLO1 that assesses the learner's ability to effectively communicate the solutions of the statistical applications and applications on probability was below the target line (67.21%). It is extremely important to not only solve the statistical problem but also analyze the results and communicate the findings to the audience. Many instructors note that group work helps to emphasize conceptual understanding, therefore increasing the time for students to collaborate in group activities during class time will be beneficial for growing students learning and understanding the crucial statistical concepts. Perhaps students will also benefit from more flexible due dates to complete their assignments as sometimes missing a few assignments in a row due to various life circumstances might have a snowball effect on students' overall learning of a subject. More support in the form of embedded tutors and SI leaders, as well as promoting workshops among students will also have a positive impact on student learning.

MATH 116: Proposed rubric changes will be coordinated with Dr. James Brownlow to include his desired grading suggestions.

MATH 120: Not applicable.

MATH 124: The course covers a wide variety of topics in a short amount of time. Word problem applications are difficult for most of the students. Finding tutors in the learning center that can help with Finite Math has been very difficult. Having an SI leader or embedded tutor would have a positive impact on student understanding.

MATH 128: Some students still struggled with communicating their mathematics clearly. More support classes could help. There are also issues with time and the amount of material that is required by the course outline of record. A reexamination may be in order to see if some topics could be optional.

MATH 135: Considering that the 2021-2022 school year took place during the pandemic, the performance target for both SLOs was within 3 to 5 percent of the achievement target. Many improvements have been made since, both in terms of technology, resources, and face to face instruction. Some students performed well under the circumstances, in a remote/online environment, others did not. Going forward, offering more modalities including face-to-face, remote, and fully online courses, will give students choices, so that they can learn in a style suitable to their needs.

MATH 140: The performance on SLO1 and SLO 2 was 69.31% and 66.01%, respectively. We can improve these results by creating more opportunities for students to review algebra skills from the past. This could take a variety of forms -- workshops outside of class, an embedded tutor in the class, handouts for students that address specific algebra skills, and/or a corequisite support course. In addition, many instructors feel that more in-person learning leads to more and better learning, so anything we can do to support our students coming to campus and working in-person with their instructors and other support personnel will be beneficial. Some instructors are using videos to good effect, as well, which may help for those students that cannot come to campus on a regular basis.

MATH 148: The performance on SLO1 was 87.5% and for SLO2 was 90%, both being above the 70% achievement target

MATH 150: The performance on SLO1 was 67.01% and for SLO2 was 64.16%, both being below the 70% achievement target. Seek ways to encourage students to go to tutoring, attend SI, and access other assistance. Not only are students having problems with calculus, but they are making algebra mistakes and there is not enough time to re-teach algebra. The prerequisite level of skill required in algebra to be successful is missing in a good portion of the students. We will work on developing some directed learning activities that can be completed in our MathLab and incorporated in MATH140 to help with the missing fundamental skills. Faculty will also consider the appropriateness and viability of incorporating co-requisite support classes for at least a few sections of MATH150.

MATH 160: There is so much to cover, and a lot of students are not prepared for this class. The students need more outside of class help. We could give more quizzes during the semester. We can focus more on abstract questions so that theorems and definitions seem more applicable.

MATH 220: No reporting below the expected performance has been made.

MATH 230: No reporting below the expected performance has been made.

MATH 250: Having F2F, asynchronous online and synchronous online learning components all in one class improved student success and retention. Therefore, finding the best ways to implement F2F, asynchronous online and synchronous online learning components into our classes will be important in the future.

3. Indicate any additional resources needed to implement the changes.

MATH 20: This course is no longer being taught in the Math Department.

MATH 21: This course is no longer being taught in the Math Department.

MATH 102: This course is no longer being taught in the Math Department.

MATH 110: No additional resources are required at this time.

MATH 115: More computer labs and graphing calculators. Explore options to purchase the access codes and/or StatCrunch codes for students' use through different entities on campus, including Books H.E.L.P., FYE/SYE program, and other sources. Many students are underprepared for the course due to various reasons including being away from school for a long time, lack of algebra-based concepts needed in statistics, etc. and need more support. Increasing the number of MATH 115 courses taught with corequisite courses will give better support for those students to succeed in the course. Bringing more tutoring support to students right in the classroom and increasing the number of sections with embedded and SI tutors will be beneficial to all students. Create an FLC group to share the experiences teaching with corequisites. More training is needed for faculty to learn about creating accessible Canvas courses for their online classes or placing accessible material in their Canvas shell for the in-person classes.

MATH 116: No additional resources are known at this time.

MATH 120: No additional resources are required at this time.

MATH 124: Students have benefited from the graphing calculators provided by Books H.E.L.P. Online homework access codes would be very helpful for financially struggling students, perhaps provided through Books H.E.L.P. or other sources. Bringing more tutoring support to students with embedded tutors and SI leaders will be beneficial to all students as well.

MATH 128: Smart boards for the classrooms would greatly improve the quality of lectures. Support classes that could be focused on the communication of mathematics.

MATH 135: We need a feeder course, one that prepares students in basic algebra, so that the students are adequately prepared for the rigors of this course. We currently have no pathway for the students who are missing key courses in math and want to become a STEM major.

MATH 140: More SI and embedded tutors. Some instructors also would like more classrooms with white boards on all the walls and classroom furniture that better enables group work during class. It might also be helpful to bring in training from outside the college on how to best facilitate and manage group work in the classroom.

MATH 148: None at this time

MATH 150: None at this time.

MATH 160: No additional resources are required at this time.

MATH 220: A genuine, attested peer review process is needed to ensure that the student evaluation process is meaningful and fair. An evaluation process can be designed to *artificially* boost the performance level via an open book exam, an online exam, a discussion exam, etc. and via easy non-critique-providing grading. After such a review process, a certain level of standardization is warranted to avoid extreme differences in the value of grades among different sections. This includes sharing of not only the exam questions but also the *actual grading* of the exams. Such a standardization can bring all the sections to agree to what the subject is about, what we are really testing our students, and what the minimum level should be to pass the course.

MATH 230: This course can use an additional time-resource or special reviewing sessions within the schedule to force the students review algebra, trig and calculus. The course subject is essentially an extension of Calculus II and *heavily* relies on the students' skills from algebra, trig and calculus. Absent these skills, such students will have no chance for passing the course- unless the instructor intentionally avoids most algebraic manipulations except simple kinds, most or all trig functions and natural log functions, and all differentiation and integration involving special techniques such as chain rule, implicit rule, integration by parts, trig-sub techniques, power series, etc. A genuine, attested peer review process is needed to ensure that the student evaluation process is meaningful and fair. An evaluation process can be designed to *artificially* boost the performance level via an open book exam, an online exam, a discussion exam, etc. and via easy non-critique-providing grading. After such a review process, a certain level of standardization is warranted to avoid extreme differences in the value of grades among different sections. This includes sharing of not only the exam questions but also the *actual grading* of the exams. Such a standardization can bring all the sections to agree to what the subject is about, what we are really testing our students, and what the minimum level should be to pass the course.

MATH 250: Canvas training and a peer review process.



Fall 2022 Program Review Report

Division/Area Name: Mathematics, Science & Engineering / ASTRONOMY	For Planning Years: 2023-2024
Name of person leading this review: Mark McGovern	
Names of all participants in this review: Mark McGovern	
Part 1. Program Overview: <i>Briefly describe how the program contributes to the district mission</i>	
Astronomy provides courses that satisfy general education requirements. Completion of these courses allows students to fulfill degree requirements or enroll in upper division courses and programs at accredited four-year institutions through our articulation agreements.	
Part 2A: Analyze the program review data (retrieval instructions) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:	
Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)	
<p>The astronomy discipline offers two classes, introductory astronomy and astronomy lab. The discipline offers an exciting option for students looking to satisfy their general education needs in science. For majors that are undecided, the discipline offers a wide range of exposure to all areas of STEM that can spark the interest of a student leaning towards a STEM related field. The astronomy curriculum is unique in that its courses focus on the future of humanity and role that science plays in establishing a successful one. It widens the cultural and global perspective of the student in a way that no other course can and thus strongly supports the ILOs of the college. Additionally, the VSL (Virtual Science Lab aka planetarium) is constantly utilized for outreach opportunities. On an almost weekly basis, K-12 groups are exposed to type of education and experience that can be typically found in a college setting. This promotes not only STEM related fields but also excites student to desire to continue their education at AVC and beyond.</p> <p>For courses within the discipline, we have been able to maintain high success (> 80%) and retention (>90%) rates which stay consistently above the overall college average. In recent years, we have been able to broaden our online course offerings.</p>	
Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)	
<p>The discipline will continue its outreach efforts by getting the word out to a greater number of K-12 institutions in the area for the purposes of promoting STEM careers and the college in general. As a combined result of the pandemic and the catastrophic consequences of AB 705, the discipline has seen a dramatic decline in the mathematical abilities of incoming students. This will likely require working more closely with Basic Skills and the Learning Center to meet those challenges. Lastly, the discipline is greatly in need of additional faculty support. With the addition of a single adjunct faculty member the discipline would be able to widen its course offerings.</p>	
Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)	
<p>The discipline would like to expand its use of the VSL for more K-12 groups and to start allowing for public shows. Additionally, it is desired to offer more than just the one lecture course. Perusing the course offerings from nearby community colleges shows that multiple introductory style courses have been approved for general education requirements. This would allow a greater diversity of courses to be offered and satisfy the desire expressed by some students to continue learning material in astronomy after the completion of ASTR 101.</p>	
Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data	
Astronomy is a non-CTE discipline and as such has no advisory committee.	
The only labor market data related to astronomy falls under the category of Atmospheric/Space Sciences Teachers, Postsecondary. It is estimated that there are approximately 400 job openings annual in Los Angeles county.	

Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):

For ASTR 101, 47.1% of students met or exceeded the target for SLO #1 while 70.1% of students met or exceeded the target for SLO #2. Outcomes analysis identified two major areas that required action. First, some of the SLO data identified topics that students typically struggle with across all course offerings. To address these, some instruction was moved to the Virtual Science Lab to help students better visualize and understand some complicated three-dimensional behavior. Additional simulations were introduced in both lecture and on homework. In these simulations, the student can manipulate different variables that affect the orbit of binary star systems to understand how they move and how astronomers detect their motion. Secondly, the SLO assessment test the discipline used was outdated and did not properly reflect changes that have been recently introduced to the course. The assessment tool has been rewritten to better assess how some of the recent changes to the course has impacted student learning.

For ASTR 101L, 82.7% of students met or exceeded the target for SLO #1 while 76.9% of students met or exceeded the target for SLO #2. Outcomes analysis identified that students were struggling with some of the mathematical concepts of the lab. In particular, graphing data and calculator work regarding exponents were major areas of difficulty. Some of the lab activities were rewritten to have a brief review of some of the mathematical material completed at the start of the lab. The discipline hopes to see an increase in the SLO data related to mathematical concept in future SLO assessments.

Part 2D: Review and comment on progress towards past program review goals:

One program review goal from last year’s report was training with the Virtual Science Lab (VSL). To accomplish this goal a student worker was hired and both instructor and the student worker went through a series of training modules that were provided by the manufacturer. The outcome of this training was the ability to create custom shows tailored to the needs of our students.

There has been significant work put towards the creation a lab manual. Currently, activities come in form of individual handouts. Over time these activities are being incorporated into a single document that has the ability to refer to sections outside of the individual handouts. This will provide for a more cohesive experience across all lab activities. There is no time frame, as of yet, to when this will be finished.

Lastly, we are looking to increase the number of course offerings in the discipline to better address the varying availability of students to take classes. However, the discipline has not been able to do this in the past academic year.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:

Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you’ve achieved your goal?)
	ILO	PLO	SLO	OO				
#1 VSL Software	ILO 2. Creative, Critical, and Analytical Thinking		ASTR 101 SLO #1		Goal 2: Increase efficient and effective use of resources: Technology; Facilities; Human Resources; Business Services	Increase the library of VSL content available for instruction.	The discipline should procure new software for the Virtual Science Lab and renew licenses for current software. Additionally, custom software can be developed by both faculty and students.	We should see an increase the number of students achieving the targets for our SLOs in ASTR 101.
#2 Lab Equipment	ILO 2. Creative, Critical, and		ASTR 101L		Goal 2: Increase efficient and effective use of resources: Technology; Facilities;	Modernize current equipment and incorporate new	New equipment will need to be acquired and introduced into current lab activities. Additionally,	We should see an increase the number of students achieving the targets for our SLOs in ASTR 101L.

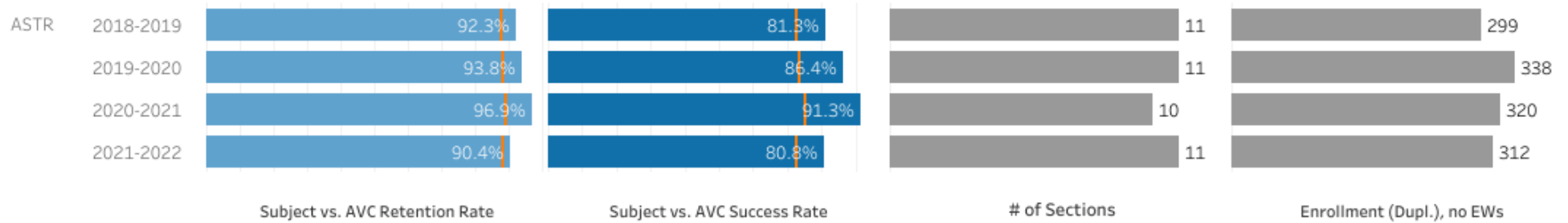
	Analytical Thinking		SLO #1		Human Resources; Business Services	equipment in lab activities.	identify suitable replacement equipment and purchase them.	
#3 Lab Manual	ILO 1. Communication		ASTR 101 L SLOs #1, 2		Goal 1: Commitment to strengthening institutional effectiveness measures and practices	Creation of a lab manual	Continue the work on the creation of a lab manual document and provide it to the bookstore for reproduction and use.	The goal is completed once the manual is fully put together and faculty has deemed it suitable for reproduction and distribution.
#4 Enrollment	ILO 1. Communication				Goal 2: Increase efficient and effective use of resources: Technology; Facilities; Human Resources; Business Services	Increase course offerings	Contact human resources to put out a call for a part time instructor.	We see the successful hire of a part time instructor.

Part 4: Resource Requests that Support Program Needs (based on above analysis)

Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Retention, Success, Number of Sections, & Enrollment in ASTR (Total AVC rates are shown as | *hover over to see data*)



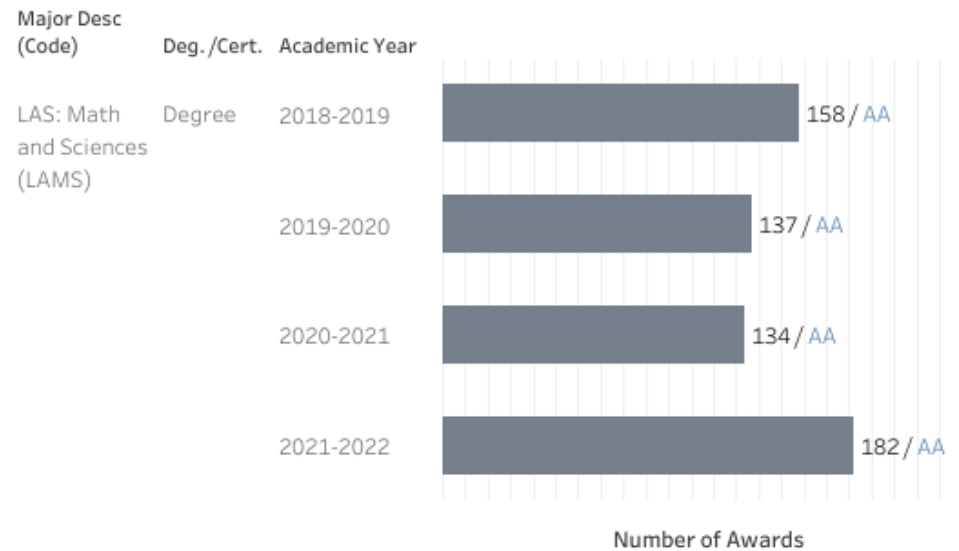
Enrollment and Number of Sections by **Modality** in ASTR

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Online	1	2	2	2
	Traditional	10	9	8	9
Enrollment	Online	39	94	86	77
	Traditional	260	250	234	236

Enrollment and Number of Sections by **Location** in ASTR

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	11	11	10	11
Enrollment	Lancaster	299	344	320	313

Number of Program Awards in **LAS: Math and Sciences (LAMS)**



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in **ASTR**

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF				0.2
FT (Regular) FTEF	0.8	0.4	0.4	0.4
FT (Overload) FTEF	0.2	0.4	0.4	0.2
TOTAL FTEF	1.0	0.8	0.8	0.8
PT/FT FTEF Ratio	0.0	0.0	0.0	0.5
FTES	14.8	14.4	14.7	11.8
FTES/FTEF Ratio	15.3	18.8	18.4	15.4
WSCH/FTEF Ratio	458.7	565.0	552.8	462.1

Click [here](#) to see AVC's Program awards dashboard

Last Update: 09/30/2022 .Data Sources: AVC's Banner, ARGOS reports



Fall 2022 Program Review Report

Division/Area Name: MSE/Chemistry	For Planning Years: 2023-2024
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Name of person leading this review: Dr. Jessica Harper

Names of all participants in this review: Dr. Alex Schroer , Dr. Gurcharan Rahi
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Part 1. Program Overview: Briefly describe how the program contributes to the district mission

The chemistry program contributes to the district mission by supporting a diverse student population and their learning needs. For some, the chemistry courses are prerequisites for the nursing program, and many nurses stay in the community to work. Chemistry is also a prerequisite for various biology courses, Engineering, kinesiology courses. Students in chemistry classes complete the AS-T Chemistry, LAS-Math and Sciences, or Physical Sciences degrees.

Part 2A: Analyze the program review data (retrieval instructions) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:

Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)

- While FTES for AVC overall has decreased dramatically from 4929 FTES in Fall 2018 to 3524 in Fall 2021, only 71% of the original amount, chemistry department still has 93% of the FTES that we had in 2018.
- Our research grade instrumentation provides outstanding training for students who are majoring in laboratory science fields or medicine.
- Degree completion increased slightly despite overall decrease in FTES.

Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)

- Because we do not have enough chemistry instructors, not enough courses can be offered to meet the demand.
- Losing intersession and having an unsuccessful summer schedule (6-week course too short, 12 week too long) has limited the options for students to make up courses from which they withdrew or failed, and has blocked high school students from taking science classes in summer due to conflict with their high school schedule.
- Certain topics in chemistry curriculum require knowledge from other courses (such as wave behavior in physics, graphing in math...) that students might not have taken.

Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)

We want to help students gain experience in the field through internships, lab experience, connections with local employers and national labs. We want to train students for success in chemistry and the other fields that utilize their chemistry knowledge.

Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data

Advisory Committee/ Not Applicable

Insert Labor Market Data here <https://www.labormarketinfo.edd.ca.gov/commcolleges/>

For LA County:

Annual Job Openings by Occupation
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SOC Code	Occupation Title (Linked to "Occupation Profile")	2018 Employment	Annual Job Openings (1)
251052	Chemistry Teachers, Postsecondary	440	450
192031	Chemists	2,150	2,230
	Total	2,590	2,680

Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):

List your past outcomes analysis (Action Plans) and progress towards those goals.

Course	SLO Achievement Target	Actual SLO Performance
CHEM 101	70%	72.1%
CHEM 102	70%	71.2%
CHEM 110	70%	68.8%
CHEM 120	70%	66.0%
CHEM 210	70%	87.21%
CHEM 220	70%	73.9%

- a. **CHEM 101** This course serves two primary groups: science majors who have not had chemistry in high school and non-STEM students, primarily pre-nursing students. The lab component of this course is an integral part to student success. The SLO related to lab is consistently higher than that in the lecture course, indicating that this is an essential method of learning for many students. The goal is to try to have a higher performance percentage, which can be achieved by reinforcing some of the math concepts in the beginning of the school year and having face to face instruction, rather than online.
- b. **CHEM 102** In this course, students learn to acquire and interpret experimental data using safe laboratory techniques and equipment. This course is intended for students who intend to earn an allied health degree or related field. STEM-majors are also encouraged to take this course as preparation for more Organic Chemistry classes. The SLO's are met, and the goal is to keep improving.

- c. **Chem 110** This course is designed for students taking courses in the sciences, mathematics, and related STEM areas. Theories are tested and evaluated in the laboratory. To succeed in CHEM 110, students are required to successfully complete CHEM 101 or one year of High School Chemistry. Algebra is used extensively to solve problems involving quantities. After the pandemic, math skills went drastically down, which could explain why the performance is slightly lower in Chem 110. Embedded tutors and more group activities should alleviate this in the future. Math concepts should be reinforced in the beginning of the semester. Funding is needed to maintain the labs, instruments, and computer software.
- d. **Chem 120** Examines chemical theory in the context of familiar phenomena. Theories are tested and evaluated in the laboratory. One hour of lecture time is reserved for small group activities and analysis. This course is designed for science, mathematics, and related majors. As discussed above, like Chem 110, SLO's are below 70%. Students struggle with math concepts and improvement is necessary. Similar steps as discussed for Chem 110 will be taken. This course does use software, materials and equipment for hands-on labs that are supported by the college. The continued funding would be needed to maintain the lab, instruments, and software.
- e. **Chem 210** A major topic will be the preparations, reactions, and reaction mechanisms of organic compounds. The laboratory generally evaluates material that is being studied in lecture. Students learn to use and interpret the data from various equipment available in the laboratory. The course is intended for those planning to pursue a four-year degree in science or a related field. Continued funding is needed to maintain the lab, buy glassware, maintain the instruments and software. SI and tutors are crucial for this class.
- f. **Chem 220** This course is a continuation of the study of organic compounds. A major topic will be the preparations, reactions, and reaction mechanisms of organic compounds. A short introduction will be given covering biochemical topics. The laboratory generally follows material that is being studied in lecture. The course is intended for those planning to pursue a four-year degree in science or a related field. Continued funding is needed to maintain the lab, buy glassware, maintain the instruments and software. SI and tutors are crucial for this class.

While Chem 101,102, 210 and 220 met or exceeded the SLO goals, it appears that Chem 110 and 120 need improvement. We are attributing the lower number to the fact that students were online the previous years, due to the pandemic, and didn't get the needed hands-on training. Many of these students are new college students who completed their high school education online. We anticipate marked improvement in subsequent years due to help from the Learning Center (chemistry tutoring and math support) and Supplemental Instruction.

CHEM 210 and 220 had slight decreases from previous years but still met the SLO requirement. In face to face modality these courses are more demanding, requiring hands-on lab skills and documentation. Students are still developing these skills that that they would have had if their earlier chemistry classes had not been online. The support of a supplemental instructor will provide great help.

Part 2D: Review and comment on progress towards past program review goals:

List your past program review goal

- 1- Hire additional faculty
- 2- Increase the number of AS-T chemistry awards
- 3- Undergraduate Research

Recruitment has been extended through the use of NeoGov and the positions are being advertised for longer periods of time and through a wider distribution. We are simultaneously trying to expand the pool of adjunct instructors through personal contacts and networking in the chemistry field.

Faculty worked with counseling staff to have a coherent pathway for students transferring to UC or CSU systems. Because of the high number of units, and different requirements for the two systems, there has previously been much confusion and conflicting information provided to students. This has been resolved, which should make it easier for students to follow the sequence to obtain the degree.

In support of undergraduate research, a new gas chromatography system was purchased. This will enhance hands-on training for students, giving them up-to-date experience. The chemistry department is closely working with the undergraduate research activity coordinator and is planning to attend conferences with students.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:								
Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you've achieved your goal?)
	ILO	PLO	SLO	OO				
#1	ILO 4. Career and Specialized Knowledge				Choose an item.	Hire additional full-time faculty and increase the adjunct pool	Advertise sooner; Expand search	We will have a new chemistry teacher; there will be enough adjunct teachers to cover all classes
#2	ILO 4. Career and Specialized Knowledge				Goal 4: Advance more students to college-level coursework- Develop and implement effective placement tools	Increase the number of AS-T chemistry awards by 15%	Advertising that the degree is available; encourage students to follow the new pathways; educate counselors on the plan; increase success and retention in chemistry classes	Observe a 15% increase in AS-T awards
#3	ILO 2. Creative, Critical, and Analytical Thinking				Goal 3: Focus on utilizing proven instructional strategies that will foster transferable intellectual skills	Increase undergraduate participation by 15%.	Work with established undergraduate research efforts on campus; participate in conferences; recruit students; continue training on instruments	Successful recruitment of students and launch of an ongoing research project.

Part 4: Resource Requests that Support Program Needs (based on above analysis)

Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

(Goal 2) Continued support for supplemental instruction, tutoring and math learning resources are critical for all the chemistry classes.

(Goal 2 and 3) Additional budget for lab instrumentation is essential to ensure enough supplies for all students. In some labs, lack of supplies requires students to

work in groups that are too large for optimal hands-on experience. HPLC and GC/MS and NMR require specific solvents, gases and glassware that need to be included in budget. Preparatory column. These are necessary to support lab related SLOs and ensure support undergraduate research.

(Goal 3) More training on undergraduate research design and instrumentation to achieve our goal of expanding research opportunities for students.

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Please Select **Subject** area (*twice*) and **Program Major(s)** to get your data -->

Select Subject
CHEM

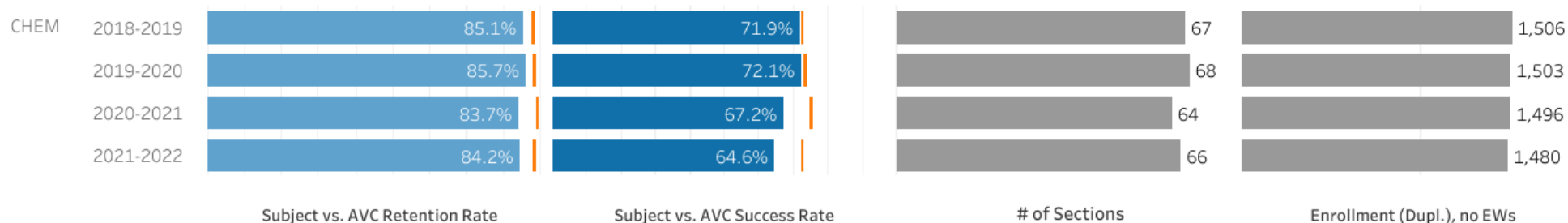
Select Subject *again*
CHEM

Select Program Major(s)
AS-T Chemistry (CHMT)

Academic Year
Multiple values



Retention, Success, Number of Sections, & Enrollment in CHEM (Total AVC rates are shown as | *hover over to see data*)



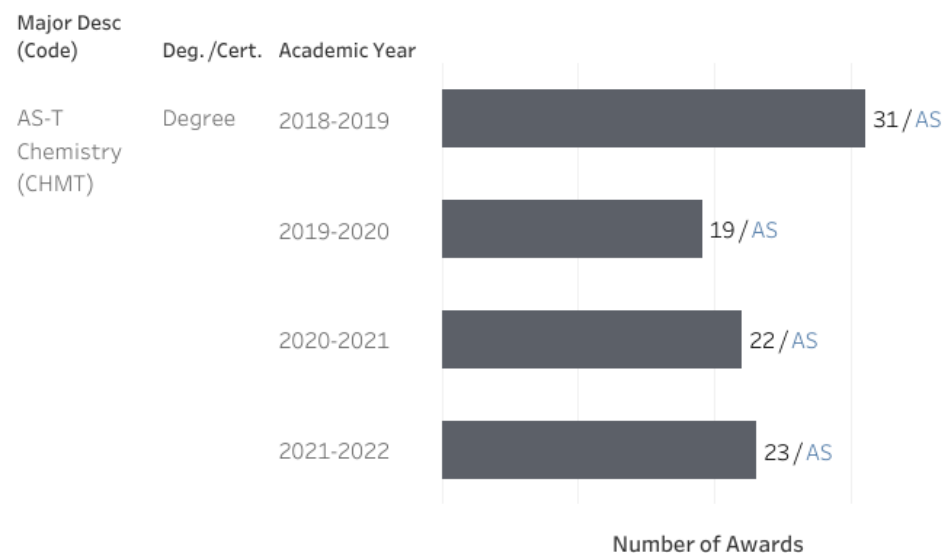
Enrollment and Number of Sections by *Modality* in CHEM

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Traditional	67	68	64	66
	Enrollment	1,506	1,556	1,498	1,482

Enrollment and Number of Sections by *Location* in CHEM

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	64	65	61	62
	Palmdale	3	3	3	4
Enrollment	Lancaster	1,446	1,484	1,433	1,394
	Palmdale	60	72	65	88

Number of Program Awards in AS-T Chemistry (CHMT)



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in CHEM

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF	4.5	4.7	4.7	5.3
FT (Regular) FTEF	5.1	4.5	5.7	4.5
FT (Overload) FTEF	1.9	2.6	1.7	1.5
TOTAL FTEF	11.6	11.8	12.1	11.3
PT/FT FTEF Ratio	0.9	1.1	0.8	1.2
FTES	162.7	164.9	163.8	152.8
FTES/FTEF Ratio	14.0	14.0	13.5	13.5
WSCH/FTEF Ratio	420.7	419.2	406.1	404.5

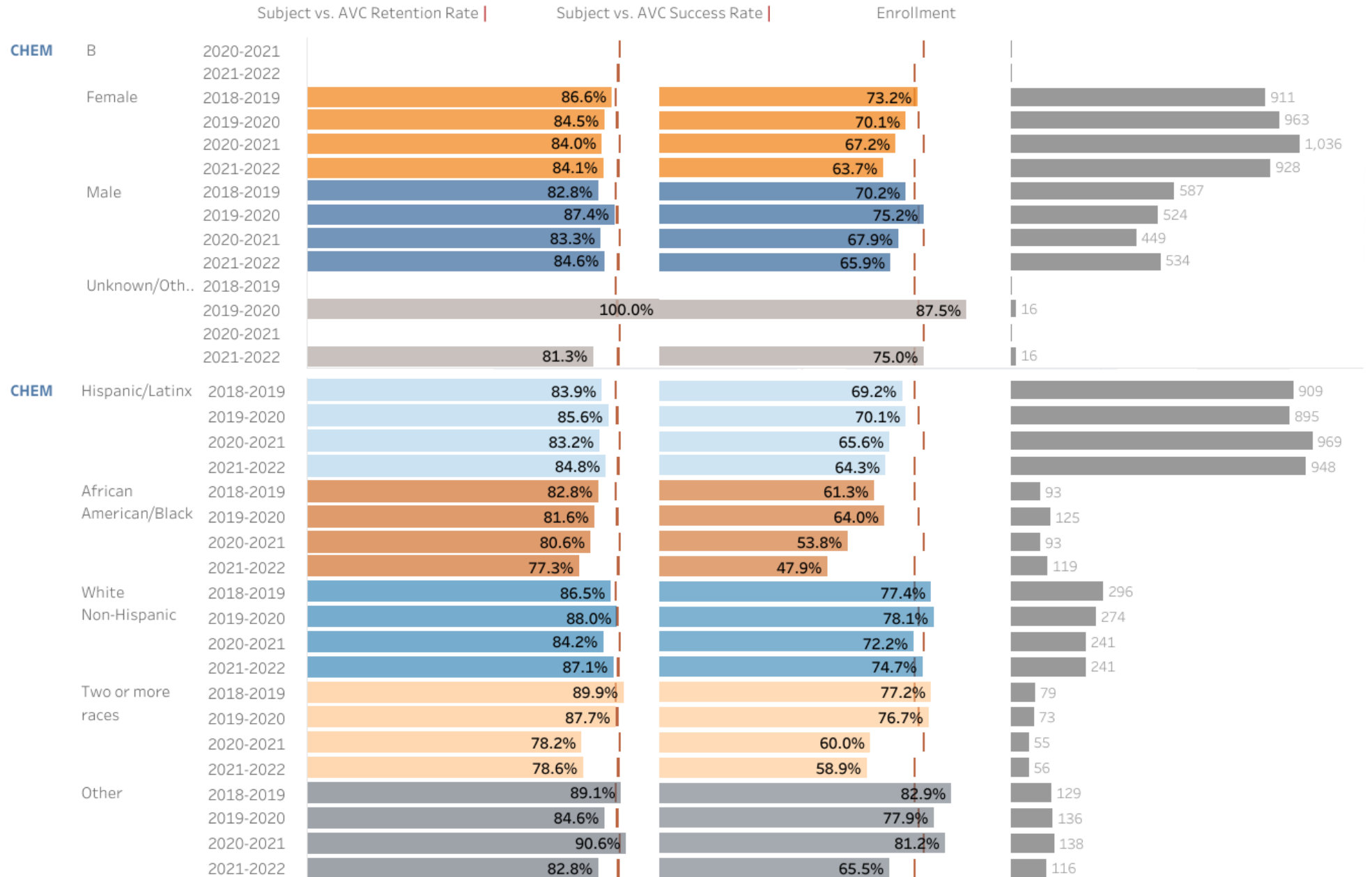
Click [here](#) to see AVC's Program awards dashboard

Last Update: 09/30/2022 .Data Sources: AVC's Banner, ARGOS reports

Subject-Level Retention Rate (RR), Success Rate (SR), and Enrollment by Sex & Race/Ethnicity as Compared to **AVC's Rates** (|)

If subject bars are below the vertical lines |, it indicates that equity gaps exist in SR or RR for those subgroups as compared to overall SS or RR. Some questions to ask when looking at the data:

- What are the potential reasons for equity gaps? - What can my program implement to mitigate these gaps? - What resources/training are available/needed to support efforts?



COMPUTER SCIENCE REPORT NOT COMPLETED



2023-2024 Program Review Report

Division/Area Name: Math, Science, and Engineering Division - Engineering	For Planning Years: 2023-2024
Name of person leading this review: Jonathan Compton (Faculty)	
Names of all participants in this review: Tongzhou Wang (Faculty), Christos Valiotis (Dean)	

Fall 2022 Program Review Report

Part 1. Program Overview: *Briefly describe how the program contributes to the district mission*

The AVC engineering program continues to play a pivotal role in attracting, retaining and graduating/transferring students in engineering majors that are so highly sought after by the local aerospace and manufacturing industry. The AVC engineering student population is very diverse, closely resembling the overall area demographics. In keeping up with a diverse population of learners, the Engineering department provides courses for not only Engineering students, but for the Career Technical Education division's AFAB/AFMT students as well. Overall, the Engineering department has been successful in retention and success of its students. Moreover, the Engineering department does maintain a firm balance in equity based on gender, race/ethnicity, and age.

Part 2A: Analyze the [program review data \(retrieval instructions\)](#) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:

Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)

In the 2021-2022 academic year, **ENGR's success rate was 76.7%**, while **AVC's annual success rate was 72.4%**. Moreover, the **retention rate of ENGR was 88.2%** versus **AVC's annual retention rate of 88%**.

As a department, ENGR had a very successful year in terms of success rates and retention rates. Engineering is one of the more demanding disciplines on campus and thus would be expected to have lower than average retention and success rates. However, this was not the case. ENGR

Gender Gap

The department of ENGR had **116 female students (26.0%) and 331 male students (74.0%)** enrolled during the 2021-2022 school year. The **retention rate of female students was 91.4%**, whereas the **retention rate of male students was 87.0%** (AVC's of 88.0%). The **success rate for females was 75.9%**, whereas the **success rate for males in the AVC was 76.7%** (AVC's of 72.4%).

The **ENGR department did not observe any gender gaps** based on retention or success. Overall, ENGR has been successful in maintaining a welcoming environment for female and male students alike.

Ethnicity/Race Gap

The department of ENGR served the following students in the 2021 - 2022 school year: **286 Hispanic/Latinx** (63.5%), **12 African American/Black** (2.7%), **89 White/Non Hispanic** (20%), **21 Two or more races** (4.7%), and **42 Other** (9.3%).

The **ENGR Retention Rates** for the given Ethnicity/Race groups are as follows: **86.7% for Hispanic/Latinx** (AVC's of 88.5%), **83.3% for African American/Black** (AVC's of 83.0%), **94.4% for White/Non Hispanic** (AVC's of 89.0%), **85.7% for Two or more races** (AVC's of 85.8%), and **88.1% for Other** (AVC's of 90.8%).

The **ENGR Success Rates** for the given Ethnicity/Race groups are as follows: **73.1% for Hispanic/Latinx** (AVC's of 72.9%), **58.3% for African American/Black** (AVC's of 60.5%), **88.8% for White/Non Hispanic** (AVC's of 89.0%), **71.4% for Two or more races** (AVC's of 76.8%), and **83.3% for Other** (AVC's of 79.9%).

The **ENGR department did not observe any significant ethnic/racial gaps** based on retention or success. Overall, ENGR has been successful in maintaining a welcoming environment for all ethnicities/races alike.

Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)

Challenges

The ENGR department had a total of 306 students (unduplicated) enrolled, and another ~200 students that have selected an ENGR degree for their educational plan but were not enrolled in an ENGR course during the 2021-2022 school year. With that said, we only had 21 degrees awarded during this time. **This brings us to the biggest challenge in ENGR, getting students through their prerequisites and eventually through their ENGR courses to obtain a degree.** Transfer universities vary in their articulation/requirements which causes a lot of issues for students and counselors. This does also lead to lower completions of degrees.

Another area that is a **challenge for ENGR has been a low percentage of African American students enrolling in the ENGR program.** During the 2021-2022 school year only 12 African American/Black students were enrolled. This low enrollment has been consistent historically.

Opportunities

We have an opportunity to help prepare students from the first ENGR course (ENGR 110) with a carefully developed curriculum. We can also work with counselors to ensure our degree offerings provide enough flexibility for degree completions. We can also work with our Articulations Officer to increase the percentage of courses that have formal articulations with universities. **All of this will hopefully drive degree completions to higher levels.**

We have another opportunity with the African American population in the Antelope Valley. While they represent about 15% (~54,000 people) of the overall population ([2021 consensus](#)), **the number of African American students (5.1%, 23 out of 450) in ENGR suggests that there can be significant improvement on this matter.** One possible direction is to work more collaboratively with local high schools to draw more students into engineering.

Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)

The ENGR program at AVC wants to be known for two main topics: **Inclusivity** and **Preparation**.

Inclusivity

The ENGR department is aware of the diversity of the surrounding area and welcomes it. We foster openness within our classrooms and within our role as professors of knowledge. Students of all backgrounds should walk through our doors and feel safe to learn and interact with faculty and peers. Through work with

Student Life (Books H.E.L.P.), the STEM grant, and ITS, we have helped close the financial barriers of learning by providing textbooks, materials for labs, and computer access to all students that show need. There should be absolutely no reason for a student to not have the same resources to learn as any other.

Preparation

The ENGR department strives to ensure we meet the standards of university level instruction and hands-on technical interactions. When a student leaves ENGR for transfer they should be at or above the expected level of a transfer student. Through constant interaction with counselors, university faculty, and industry partners, we have tailored the students' experience to provide a rigorous experience throughout all of our courses. Starting with our Introduction to Engineering course, which focuses on preparation for future coursework, guidance on engineering majors, and university transfer. Each subsequent course further builds the engineering students culminating in a level at or exceeding competing transfer level students. The ENGR department also has the benefit of working with the CSU Long Beach Antelope Valley Engineering Program, CSULB AVEP, to provide students with the ability to stay within the area to complete a Baccalaureate Degree in either Mechanical or Electrical Engineering and local job opportunities.

Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data

Insert Advisory Committee Recommendations here

Insert Labor Market Data here <https://www.labormarketinfo.edd.ca.gov/commcolleges/>

Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):

Course	SLO Achievement Target	Actual SLO Performance
ENGR 110	70%	88.71%
ENGR 125	70%	94.64%
ENGR 130	70%	96.77%
ENGR 140	70%	78.05%
ENGR 185	70%	82.14%
ENGR 210	70%	81.82%
ENGR 230	70%	93.33% / 83.33%

SLO

- a. **ENGR 110** - This course will continue to engage students through challenging projects and informative lectures preparing them for future coursework and transferring to university. This course does use materials for hands-on projects that are supported by the college. The continued funding would be needed to maintain the projects.
- b. **ENGR 125** - This course continues to utilize MATLAB Online and zyBooks to maintain accessibility for students no matter their location. Relevant problems keep them engaged and show the applicability of the MATLAB software for their other coursework and real world situations. This course does use specific software that is supported by the college. The continued funding would be needed to maintain the ability to teach the course.
- c. **ENGR 130** - This course continues to bridge the gap between theoretical knowledge and practical knowledge for students. Our hands-on labs build students' abilities to solve complex engineering problems. This course does use materials for hands-on labs that are supported by the college. The continued funding would be needed to maintain the lab.
- d. **ENGR 140** - This course continues to build students' knowledge of CAD through fun and engaging activities. Our project that spans the entire course culminates with all of the students' hard work being put together in one moveable assembly. This course does use specific software that is supported by the college. The continued funding would be needed to maintain the ability to teach the course.
- e. **ENGR 185** - This course continues to build students' knowledge of electronic components, equipment, and software. Our hands-on labs get students engaged and deepen their understanding of the fundamentals of digital electronics. This course does use software, materials and equipment for hands-on labs that are supported by the college. The continued funding would be needed to maintain the lab.
- f. **ENGR 210** - This class continues to build on students' prior knowledge of general physics. Students get to take their theoretical knowledge and apply it to a hands-on project to ensure deeper learning is achieved.
- g. **ENGR 230** - This course continues to build on students' prior knowledge of general physics. Our hands-on labs get students engaged and deepen their knowledge of electronics and analog circuits. This course does use software, materials and equipment for hands-on labs that are supported by the college. The continued funding would be needed to maintain the lab.

Overall, all SLOs have been met or exceeded achievement targets during the academic year, as shown in the table above.

PLO #	Computer Engineering	Electrical Engineering	Mechanical Engineering
PLO 1	85.6%	84.2%	88.0%
PLO 2	95.05%	93.6%	85.3%
PLO 3	N/A	83.1%	74.9%

PLO

Overall, all PLOs have been met or exceeded achievement targets during the academic year, as shown in the table above.

Part 2D: Review and comment on progress towards past program review goals:

Goal 1

We have maintained a similar number of degree completions as we had last year, which was an increase of 17 before creating the current ENGR degree pathways. We still have a lot more students to get through to a ENGR degree based on our current number of students that declare an engineering pathway on their educational plan. This is an ongoing goal of our department.

Goal 2

This goal is still pending since our lab is still a shared space for lectures and requires more specialized space for experiments. We have been told that construction is set to begin on a new lab space, as well as lab grade furniture for specialized experiments will be coming as well. This goal will also be ongoing until our students have dedicated spaces for their specialized labs.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:								
Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you've achieved your goal?)
	ILO	PLO	SLO	OO				
#1	Choose ILO	Effectively employ techniques, skills, and computational tools necessary for engineering.			Goal 3: Focus on utilizing proven instructional strategies that will foster transferable intellectual skills	Increase engineering degree completions	We will continue to work with counseling and our students to make them aware of the degree pathways as well as continue increasing our articulation with universities to ensure all of our courses count.	Compare our number of completions to previous years.
#2	Choose ILO	Design and perform tests / experiments , analyze and interpret data, and prepare technical reports as a member of a group.			Goal 2: Increase efficient and effective use of resources: Technology; Facilities; Human Resources; Business Services	Increase the success of our courses that contain hands on lab sections	We need to develop the new space acquired to suit a mechanical engineering lab as well as transform our current space into an electrical engineering lab. These will support the following lab courses (ENGR 130, ENGR 185, and ENGR 230) as well as potentially PHYS and CSULB AVEP. This will include renovating the rooms to handle the electrical and mechanical devices needed to run these labs as well as proper lab benches for both to ensure safety and comfort for students.	This would be based on the ability for us to have students perform tasks in labs as if they are doing so within an internship/job based setting. Having proper facilities will allow faculty to have students learn and grow with specific equipment/materials. We expect there to be a connection between proper hands-on learning and overall success within the course itself.
#3	ILO 4. Career and Specialized Knowledge				Goal 5: Align instructional programs to the skills identified by the labor market	Improve student engagement within the	Organize monthly engineering professional seminars and invite local industry leaders to conduct leadership development seminars.	The main indicators will be the program completion rate as well as the overall number of students declaring an

						engineering and science community		engineering pathway on their educational plan
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Part 4: Resource Requests that Support Program Needs (based on above analysis)

Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Please Select **Subject** area (twice) and **Program Major(s)** to get your data -->

Select Subject
ENGR

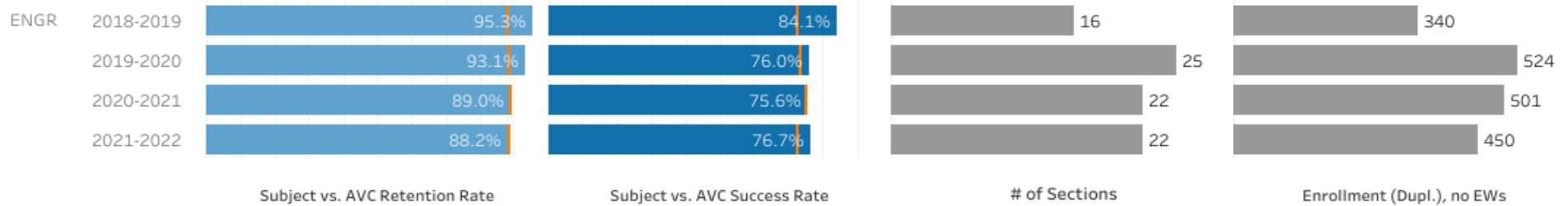
Select Subject **again**
ENGR

Select Program Major(s)
Multiple values

Academic Year
Multiple values



Retention, Success, Number of Sections, & Enrollment in ENGR (Total AVC rates are shown as | hover over to see data)



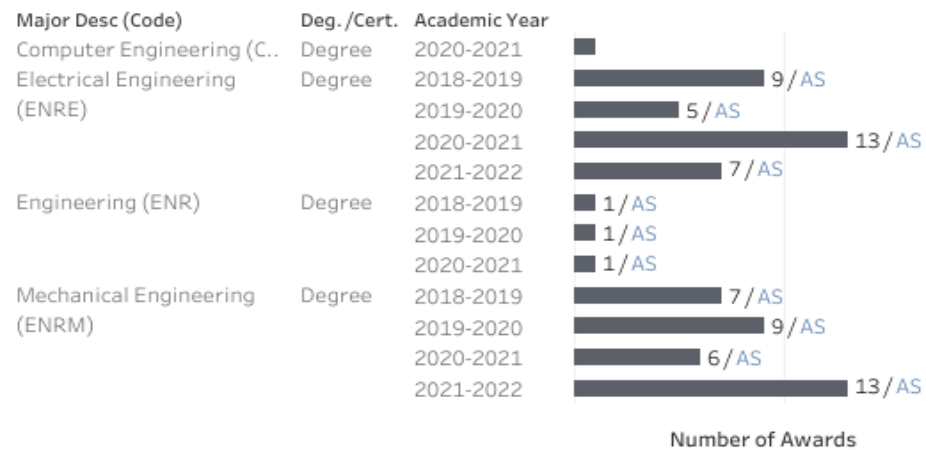
Enrollment and Number of Sections by **Modality** in ENGR

Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections				
Online		5	7	10
Other Indep Study		1	1	1
Traditional	16	19	14	11
Enrollment				
Online		109	176	242
Other Indep Study		1	1	1
Traditional	340	428	324	208

Enrollment and Number of Sections by **Location** in ENGR

Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections				
Lancaster	16	25	21	14
Palmdale			1	8
Enrollment				
Lancaster	340	538	475	256
Palmdale			26	195

Number of Program Awards in [Computer Engineering \(COEN\)](#), [Electrical Engineering \(ENRE\)](#), [Engineering \(ENR\)](#) and [1 more](#)



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in ENGR

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF	0.5	1.1	1.1	1.1
FT (Regular) FTEF	1.1	1.2	1.0	1.2
FT (Overload) FTEF		0.7	0.9	0.7
TOTAL FTEF	1.7	2.9	3.0	2.9
PT/FT FTEF Ratio	0.5	0.9	1.1	0.9
FTES	20.2	33.3	32.4	26.7
FTES/FTEF Ratio	12.1	11.5	10.8	9.1
WSCH/FTEF Ratio	362.9	344.9	323.9	272.8

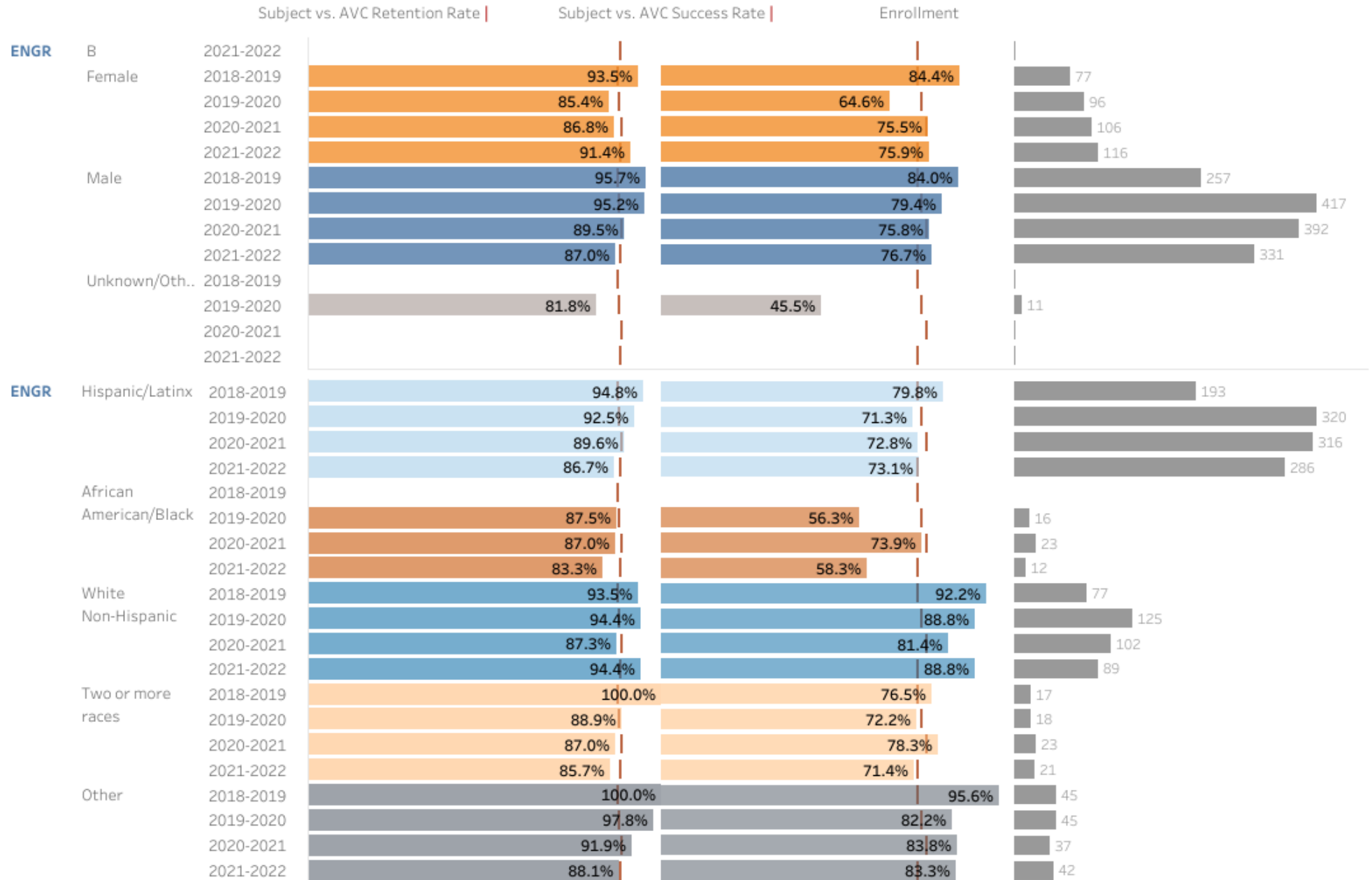
Click [here](#) to see AVC's Program awards dashboard

Last Update: 09/30/2022 .Data Sources: AVC's Banner, ARGOS reports

Subject-Level Retention Rate (RR), Success Rate (SR), and Enrollment by Sex & Race/Ethnicity as Compared to AVC's Rates (|)

If subject bars are below the vertical lines |, it indicates that equity gaps exist in SR or RR for those subgroups as compared to overall SS or RR. Some questions to ask when looking at the data:

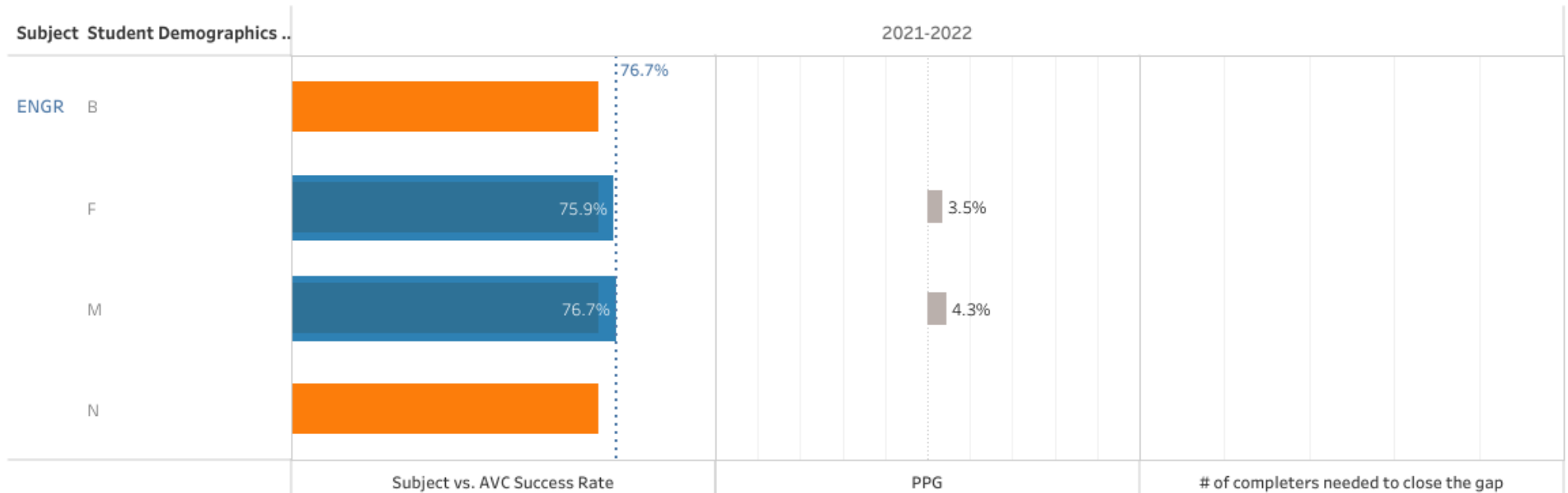
- What are the potential reasons for equity gaps? - What can my program implement to mitigate these gaps? - What resources/training are available/needed to support efforts?





2021-2022 Disproportionate Impact (DI) as Percentage Point Gap (PPG)

Blue Bars show Success Rate (SR) within the sub-Groups vs. AVC Annual SR (orange bar) vs. ENGR Annual SR (dotted line)



In 2021-2022, ENGR's Success Rate was 76.7% vs. AVC's Annual rate of 72.4%

Overall Disproportionate Impact as percentage point gap was : 4.3%

In ENGR, 450 was the enrollment count (duplicated headcount) (only shows if $n > 10$)

If there is a Disproportionate impact (PPG is negative), multiply the absolute value of PPG by the number of students and divide it by 100 to determine how many more successful completers would eliminate the gap.

(For example, $(450 * |4.3\%|)=19$. it means that 19 more successful course completers would help close the gap for this subject area)

(Hover over each bar in the chart to see details about each sub-group)

Some possible questions to ask when looking at the DI data:

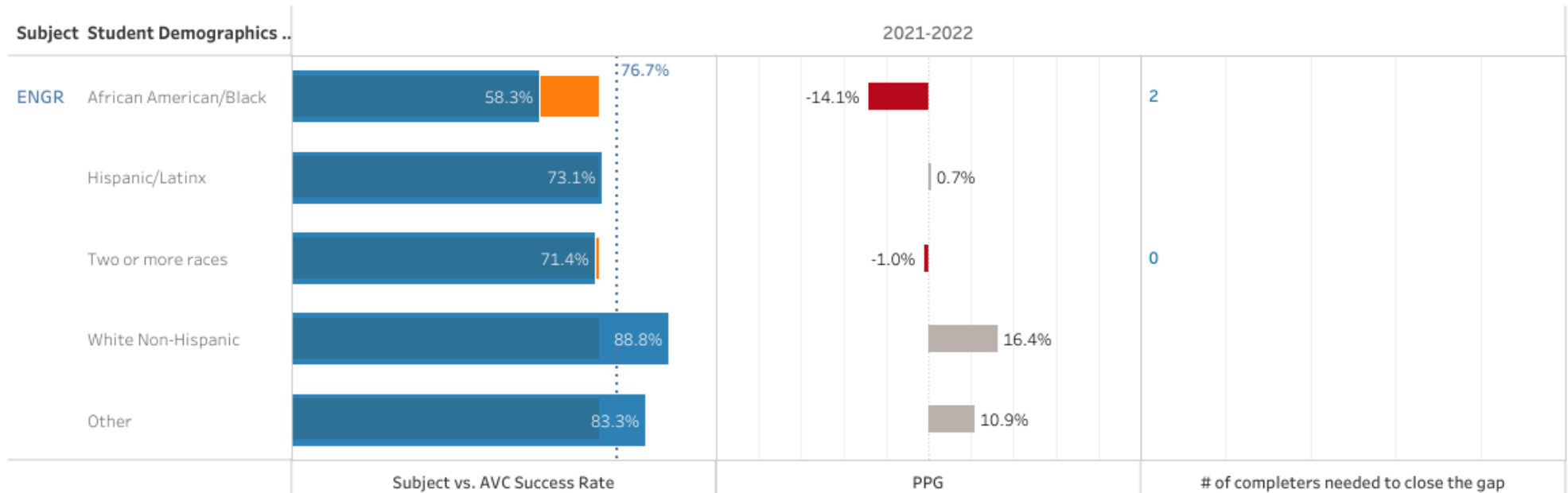
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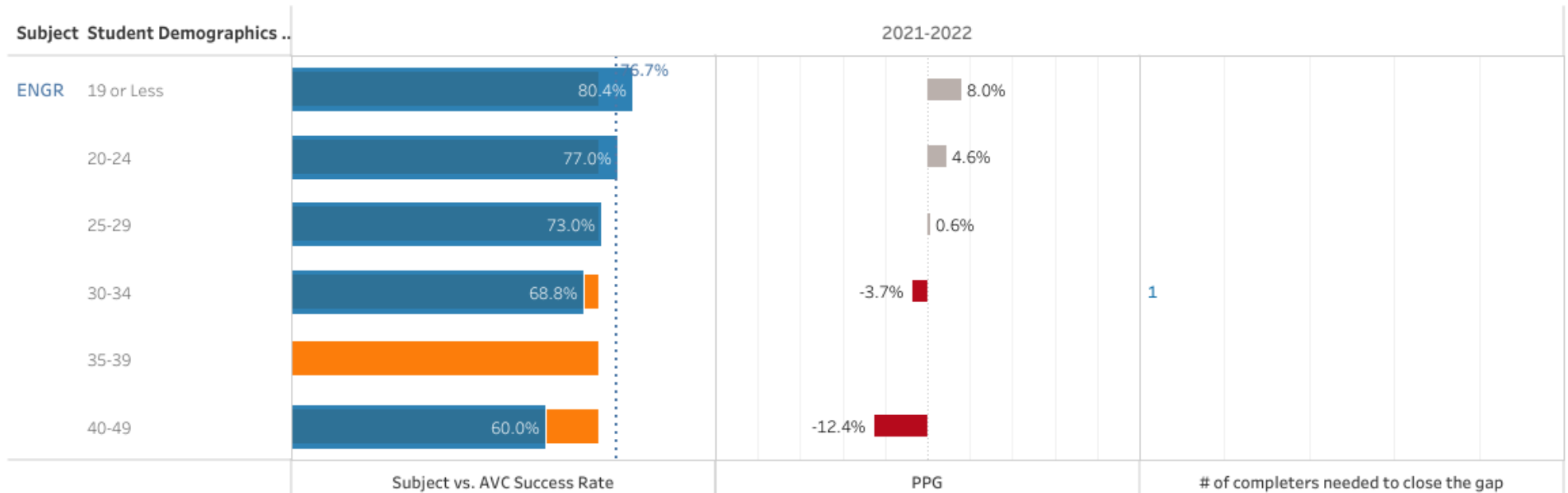
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- What resources are available to support these efforts?





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Some possible questions to ask when looking at the DI data:

- What are the potential reasons for equity gaps?
- What can my program implement to mitigate these gaps?
- What resources are available to support these efforts?



Division/Area Name: Geosciences (GEOL/GEOG/ERSC)	For Planning Years: 2023-2024
Name of person leading this review: Dr. Aurora Burd	
Names of all participants in this review: Dr. Mike Pesses	

Fall 2022 Program Review Report

Part 1. Program Overview: *Briefly describe how the program contributes to the district [mission](#)*

The Geosciences Department contributes to the institution’s “quality, comprehensive education” by offering rigorous courses that lead to associates degrees, transfer, and career technical education.

Part 2A: Analyze the [program review data \(retrieval instructions\)](#) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:

Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)

Generally, our retention and success rates have been at or above the AVC averages for the past four years. The data have managed to be relatively consistent despite the unprecedented challenges we have faced. Also, students who do complete our programs, even though there are not many, consistently do well when they transfer to a four-year university.

For GEOL in particular, we have increased our asynchronous online course offerings from no students in 2019-2020 to 236 in 2021-2022. Success rates have also increased through that time period, so the inference is that our asynchronous online course offerings should be considered successful.

Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)

We continue to have a small number of majors despite the tremendous job opportunities for students after college.

Despite full enrollment in most sections, classes were cut in ERSC 101 and GEOL 101 for Spring 2021 when one full-time faculty member sought a reduced workload for a single semester and the hiring process to find adjunct instructors didn’t proceed smoothly. Fully enrolled sections were again cut in GEOL for Fall 2022 due to resignation of a full-time faculty member, the failure of the temporary full-time hire process, and lack of adjunct instructors in the pool. The same may occur during Spring 2023 when one of the two remaining full-time geoscience instructors is on leave. The lack of continuity of regular full-time instructors and inability to effectively hire temporary full-time faculty and adjuncts is likely shrinking the pipeline of students who could pursue a geology major. This is also disruptive for non-major students who are trusting the college to provide the general education courses they need to graduate on time and who have built work & family schedules around the courses for which they have enrolled. The geoscience program has enough courses to support a third regular full-time faculty member. Adding a full-time faculty member should greatly reduce the number of fully enrolled courses canceled for lack of an instructor.

The Program Review data attached at the end of this document is misleading as all distance ed modality classes appear to have been listed as having a location of Palmdale Center. As in previous years, Palmdale Center continues to attempt to offer geoscience classes, but not only are they regularly canceled due to low enrollment, some labs are lacking in required supplies (e.g. maps, rock samples). It is demoralizing to faculty to repeatedly lose a class due to the “good deed” of trying to offer it in Palmdale, and disruptive to students, who can’t get the classes they were told would be available at the Palmdale Center.

As mentioned in previous program reviews, both climate change and COVID-19 have shown a need for students studying the spatial awareness and technical skills that geosciences degrees give students. These subjects have been worked into the relevant courses we teach at AVC and will hopefully grab student interest in majoring in the field.

The AVC administrator who liaises with the California State Prison – Los Angeles County has repeatedly requested to offer ERSC 101 inside the prison (after ERSC 101 was offered during Summer 2019 with great success), but faculty have had to repeatedly decline due to already having full workloads as well as logistics problems related to removing the lab supplies from the Palmdale Center and placing them temporarily at the prison.

AVC surveys show that students continue to be interested in online courses and we are attempting to increase our online offerings.

For GEOL, we have increased our asynchronous online course offerings from no students in 2019-2020 to 236 in 2021-2022. Success rates have also increased through that time period, so the inference is that our asynchronous online course offerings should be considered successful. The biggest issue appears to be having enough faculty to offer enough sections to keep up with demand for online geology lectures. GEOL 101 has recently been submitted for POCR review. GEOL 102 is currently being developed as an online course along with a planned switch to a zero-cost open access textbook, which will hopefully increase enrollment in this course.

ERSC 101, as a combined lecture & lab course, has not traditionally been DE-approved. The reason for this is that lab courses in GEOL and ERSC appear to need to be face-to-face for the course to be UC/CSU transferable (and the C-IDs for these courses all specify use of “real,” not “virtual” rocks) now that AVC is no longer in an emergency remote format due to COVID-19. However, in an attempt to meet students in the modality they most prefer, ERSC 101 has been submitted for DE approval to allow the course to run in a Blended format (lectures online, labs face-to-face). ERSC 101 is also part of the required coursework for students intending a career in K-6 education - AVC is currently ramping up a K-12 teacher preparation program that will likely increase demand for ERSC 101. It is hoped that offering blended ERSC 101 will increase enrollment and also relieve pressure to find a classroom space suitable for the hands-on nature of this course.

The GIS certificate continues to have frustratingly little student interest, though it is clear that a big part of this is that students have limitations in the extra classes they can take. Traditionally, GIS has been an excellent way to supplement an existing major. For example, several Anthropology majors are currently taking the Introduction to GIS class to help with their Anthropology-based career goals. Many STEM majors have shown interest in the technology and methods but cannot take the classes because of an already full ed plan. A further challenge is our small department is stretched across multiple degree programs and the challenges that stem from each. The AA-T in Geography degree is neglected when work is being done on the GIS program.

Palmdale needs a full set of required supplies. Without this, classes in Palmdale will not be as successful (assuming they can even get enough enrollment to run).

Materials were removed from the main campus and Palmdale Center to support the labs at the prison, but this is not feasible during the semester or during summers where labs are offered on the main campus (the timeline of getting materials sent to prison, then released on parole is quite long and unpredictable). To teach geoscience courses regularly at the prison, the prison needs its own dedicated set of supplies.

Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)

The geoscience programs aim to prepare students for transfer into geography and geology programs across the state via the AA-T Geography and AS-T Geology. Work needs to be done to ensure that students are getting the most out of the AA-T in Geography program. One important facet of both geography and geology programs is a healthy field component to get students out into the world to study the phenomena being discussed in the classroom. For a variety of reasons, the field components and classes in the Geography, Geology, and Earth Science programs have been neglected and need to be brought back to give students a better educational experience.

The ERSC 101 course is a required course for students pursuing careers as K-6 educators (although the course is also taken by students with other career goals/majors). We hope students who succeed in this course will bring the richness of geoscience to their future classrooms, with an understanding of how to seek up-to-date data, analysis, and interpretation of current issues such as California's geologic hazards (e.g., earthquake forecasting and preparation) and global climate change (including California's drought status and use of water resources, etc.). We also hope students who succeed in this course will share the joy of science with the next generation, so that over time, we have fewer students at the college level who claim disinterest, fear, or skepticism of the geosciences. This is a diversity and equity issue, as current research suggests that children begin to fall out of the STEM pipeline during their K-6 education, and that those who do fall out of the pipeline are disproportionately low socioeconomic status, female, and minorities.

The Geographic Information Systems (GIS) certificate is designed to prepare students for entry-level work as GIS Technicians. It teaches the fundamentals of the technology and the theory necessary for spatial analysis and cartography. As mentioned above, enrollment has been low, and this program should be paused to let faculty focus on the more popular AA-T in Geography program. The Introduction to GIS course, GEOG 205, is an elective of the AA-T, and GIS can easily be implemented into the other non-GIS courses through assignments and instruction. By focusing on one program and developing a cohesive and streamlined path to graduation and transfer, our hope is to increase student enrollment in the future.

Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data

As discussed in the last program review, the GIS industry is shifting away from ArcGIS Desktop to ArcGIS Pro, a complete redesign of the industry-standard ESRI software package. Working with ITS staff, we have managed to get a new licensing system that gives our students free access to the software and ArcGIS Pro is now available in UH 253 as well as the Uhazy Hall STEM lab. Our students are now working with the technology that will set them up for employment after graduation.

There are five TOP codes that most apply to the geosciences: 190100 (Physical Sciences, General), 191400 (Geology), 193000 (Earth Science), 220600 (Geography), and 220610 (Geographic Information Systems).

According to <https://www.labormarketinfo.edd.ca.gov/commcolleges/> below are Annual Job Openings by Occupation for all California Counties, Los Angeles County, and Kern County alone, for the five TOP codes specified above.

Geography: California

Includes: All California Counties

Annual Job Openings by Occupation

SOC Code	Occupation Title (Linked to "Occupation Profile")	2018 Employment	Annual Job Openings (1)
251051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	1,500	1,380
192042	Geoscientists, Except Hydrologists and Geographers	5,000	6,020
192043	Hydrologists	1,000	1,200
119199	Managers, All Other	160,400	147,200
252031	Secondary School Teachers, Except Special and Vocational Education	124,000	95,370
	Total	291,900	251,170

(1) Total Job Openings are the sum of new jobs from growth plus net replacements. Annual job openings are total job openings divided by the number of years in the projection period.

(2) This occupation has been suppressed due to confidentiality.

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Geography: Los Angeles County

Includes: Los Angeles County

Annual Job Openings by Occupation

SOC Code	Occupation Title (Linked to "Occupation Profile")	2018 Employment	Annual Job Openings (1)
251051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	420	400
251064	Geography Teachers, Postsecondary	130	120
192042	Geoscientists, Except Hydrologists and Geographers	600	740
119199	Managers, All Other	37,390	33,220
252031	Secondary School Teachers, Except Special and Vocational Education	32,870	25,860
	Total	71,410	60,340

(1) Total Job Openings are the sum of new jobs from growth plus net replacements. Annual job openings are total job openings divided by the number of years in the projection period.

(2) This occupation has been suppressed due to confidentiality.

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Geography: Kern County

Includes: Kern County

Annual Job Openings by Occupation

SOC Code	Occupation Title (Linked to "Occupation Profile")	2018 Employment	Annual Job Openings (1)
192042	Geoscientists, Except Hydrologists and Geographers	210	260
119199	Managers, All Other	1,030	910
252031	Secondary School Teachers, Except Special and Vocational Education	2,300	1,860
	Total	3,540	3,030

(1) Total Job Openings are the sum of new jobs from growth plus net replacements. Annual job openings are total job openings divided by the number of years in the projection period.

(2) This occupation has been suppressed due to confidentiality.

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Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):

GEOL 101: It appears the students were overwhelmingly successful at meeting the achievement target for the single SLO for GEOL 101 (88% met or exceeded the SLO, the target was 70%). The course was redesigned for the online synchronous environment throughout 2020-2021, and some of the changes were incorporated into the current post-COVID-shutdown face-to-face and online asynchronous versions of the course. Students seem to really appreciate some of the changes incorporated into both versions of the class - for instance, faculty recorded fully closed-captioned "review videos" for each topic so that students can review lectures on their own time as needed even if they are in the face-to-face class. This allows students to focus more on participating in the face-to-face class, but without the worry that if they are handling samples or asking questions, that they will miss writing down some crucial piece of information. It also allows students who may need to miss an occasional class to keep up with the course - this is likely a major contributor to the improved SLO performance since all students can access all material even with an occasional absence. GEOL 101 has also converted (since roughly 2019) to a completely free OER text - students have no barrier to entry and do access this text (unlike the old text, which many students simply didn't purchase).

GEOL 101L: It appears the students were overwhelmingly successful at meeting the achievement target for the single SLO for GEOL 101L (87.8% met or exceeded the SLO, the target was 70%). The return to face-to-face lab instruction has been beneficial for the students - even if it is more difficult for students to complete the labs face-to-face versus online (because the online versions featured videos of faculty's hands doing the labs, and students didn't have as much opportunity to use their own curiosity and critical thinking to make it through the labs in an inquiry-based fashion), they are likely learning more and retaining more by truly doing the labs themselves. It is also easier to keep track of struggling students in the face-to-face environment and try to help them get back on track toward successful course completion. Given concerns about transferability of online labs, and specific C-ID language regarding the necessity to use "real, not virtual, rocks & minerals," it is important that GEOL 101L be kept face-to-face if possible. GEOL 101L has also converted (since roughly 2019) to a completely free OER text - students have no barrier to entry and actually do access this text (unlike the old text, which many students simply didn't purchase).

GEOL 102 and 102L did not run during 2021-2022 so no SLO data was collected, analyzed, or interpreted.

ERSC 101: Please note that the authors of this report did not teach ERSC 101 during 2021-2022, and the only faculty member who did teach the course has separated from AVC and thus could not contribute to the report. However, it appears the students were overwhelmingly successful at meeting the achievement target for the single SLO for ERSC 101 (95.8% met or exceeded the SLO, the target was 70%). The course was redesigned for the online synchronous

environment throughout 2020-2021, and some of the changes were incorporated into the current post-COVID-shutdown face-to-face version of the course for 2021-2022. Many state/federal websites that are clearinghouses of Earth Science data received beneficial updates during the pandemic, which made their data easier to access for instructors and students alike. In addition, continued investment in lab materials is important, since some materials have become used/degraded over time (e.g., the glue used for the glacier simulation lab dried up during the shutdowns) and we will not be able to offer these activities to students during lab unless we continue to procure the lab materials.

GEOG 101: As with the other Geosciences courses, our students have been successful in meeting achievement targets (88.5%, compared to the target of 70%). Again, changes to material delivery and new online resources that came out of the scramble to deal with the remote teaching of the pandemic have obviously continued to help students in the face-to-face environment. Review sessions, online videos, and incorporating zero cost textbooks into Canvas have given the students interested in succeeding the tools necessary to do so.

GEOG 101L: This course has had its challenges, with students only achieving 62% rather than the 70% goal in the Fall 2021 semester. One struggle has been an absence of steady instructors for the course. Our adjunct pool is woefully low and needs to be replenished so we can get dedicated faculty for this course.

GEOG 105: Our Cultural Geography course has averaged about 85%, which has been great. The remote teaching of the pandemic demanded new assessment methods (some tests didn't transfer well to Canvas). Older mapping assignments, for example, have been revamped to get students using Excel to gather and analyze data before a map is made. This makes the assignment a little more interesting and teaches students some valuable job skills. Like GEOG 101, students are responding well to the post-pandemic course.

GIS courses: The various 200 level courses have all had tremendous success when reviewing the data, but the class numbers have been rather low, thus making any real analysis moot.

Part 2D: Review and comment on progress towards past program review goals:

Last year's program review included a goal of further development of our online offerings, with a side goal of faculty continuing to seek professional development related to distance education.

A new asynchronous GEOG 101 online course has been developed to comply with state standards for online coursework and to supplement our face-to-face offerings.

For GEOL 101, we have increased our asynchronous online course offerings from no students in 2019-2020 to 236 in 2021-2022. GEOL 101 has also recently been submitted for POCR review.

GEOL 102 is currently being developed as an online course along with a planned switch to a zero-cost open access textbook.

ERSC 101 has been submitted for DE approval to allow the course to run in a Blended format (lectures online, labs face-to-face). Most labs need to remain face-to-face to be UC/CSU transferable, so there are no plans currently to convert ERSC 101 to a fully asynchronous online format. Likewise, there are also no plans to convert GEOL 101L and GEOL 102L to online formats given their C-IDs' emphasis on "real, not virtual" rocks.

Faculty have completed coursework with the Online Network of Educators (@ONE) through the California Community Colleges as well as the in-house training in distance education offered by AVC's DETC.

We have done some outreach work, but not as much as we would have liked. Faculty attended a variety of virtual AVC tours, college information Zoom meetings for potential students, and face-to-face “major fair” events. We still need to complete some of the outreach material to be able to share with high school students and first year AVC students who might want to change their majors.

As mentioned in previous program reviews, fall 2018 saw an expansion of geoscience courses into the new Palmdale Center. While most lab materials have been duplicated at the Palmdale location, some labs are still missing supplies, including required materials like maps and rock samples. These materials need to be obtained so that Palmdale students can have an experience equivalent to Lancaster students. Due to the pandemic and class cancellations at the Palmdale Center, there has been no progress on this issue. We hope to acquire additional supplies this year.

Our goals of updating GIS software and improving student access have been met.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:								
Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you've achieved your goal?)
	ILO	PLO	SLO	OO				
#1 - Counseling Outreach	1-4				4	Work with counseling to attract more students to our classes and programs. Ensure that GIS students have a clear pathway to graduation as well.	Meet with counseling and STEM grant staff to design brochures or other materials to inform students.	
#2 - Palmdale Supplies Acquisition	1-4				3	Acquire duplicate materials for Palmdale Center so that all ERSC, GEOG, and GEOL labs can be run at that location without needing to remove materials from the Lancaster Campus.	Work with lab tech to place a purchase order, then organize the supplies, arrange for IMC to laminate maps, transport to the Palmdale Center, and store them in the available lab space.	
#3 - Focus on building a streamlined and technology focused AA-T in Geography program	1-4				4,5	The AA-T in Geography classes, especially the labs, need to incorporate more geospatial technology, like GIS and GPS to attract more students and to better prepare them for a CSU/UC education. Further, course offerings should be made	Assignments and instruction need to be focused on more geospatial technologies (while still following the COR). Work with the chair to ensure course scheduling allows students to quickly complete the degree.	Increased student enrollment

						consistent to give students a clear path to completion.		
#4 - Bring back GEOG 299	1-4				3	Begin offering GEOG 299 - Geographic Field Studies again.	This course has not been offered for years due to liability concerns from the Academic Affairs office as well as COVID challenges. We will work with the chair to get this course back on the schedule so that students have more opportunities to study geography out in the field.	The course is placed on the schedule and runs.
#5 - Ensure that all fully enrolled GEOG/GEOL/ERSC courses run	1-4				3	As noted above, multiple fully enrolled sections have recently been canceled due to lack of an instructor.	Hire full-time and adjunct faculty to cover currently available courses.	No courses canceled due to lack of instructor.

Part 4: Resource Requests that Support Program Needs (based on above analysis)

For 2022-2023 requested:
 USGS 7.5-minute and 15-minute topo maps, approximately 48 maps at \$8 each plus \$5 S&H (and tax); 2010 geologic map from CA Geologic Survey, 2 at \$25 plus \$8 S&H (and tax); Repeat; Approximately \$450; One-time; Dr. Aurora Burd

For 2023-2024 requested:
 Re-use the 2022-2023 request AND also add

1. Full-time faculty in geosciences due to resignation of full-time faculty member at end of 2021-2022 and difficulty in successful hiring of adjuncts. New; Approximately \$59,000 to \$82,000; recurring annually; Dr. Aurora Burd

Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Please Select **Subject** area (**twice**) and **Program Major(s)** to get your data -->

Select Subject
ERSC

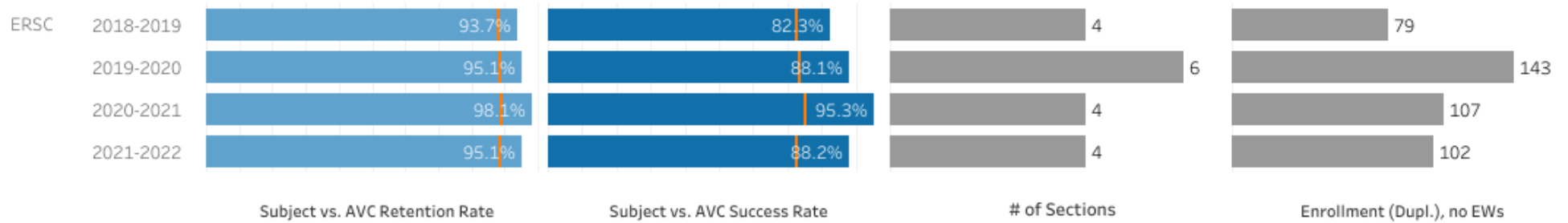
Select Subject **again**
ERSC

Select Program Major(s)
None

Academic Year
Multiple values



Retention, Success, Number of Sections, & Enrollment in **ERSC** (Total AVC rates are shown as | *hover over to see data*)



Enrollment and Number of Sections by **Modality** in **ERSC**

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Traditional	4	6	4	4
	Enrollment	79	145	107	102

Enrollment and Number of Sections by **Location** in **ERSC**

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	4	5	4	4
	Lancaster [O..		1		
Enrollment	Lancaster	79	123	107	102
	Lancaster [O..		22		

Number of Program Awards in **None**

FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in **ERSC**

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF				0.4
FT (Regular) FTEF	0.6	0.2	0.6	0.4
FT (Overload) FTEF	0.2	0.6	0.2	
TOTAL FTEF	0.8	0.8	0.8	0.8
PT/FT FTEF Ratio	0.0	0.0	0.0	1.0
FTES	7.7	10.8	11.4	9.7
FTES/FTEF Ratio	9.6	13.5	14.2	12.2
WSCH/FTEF Ratio	287.6	404.3	427.1	365.3

Click [here](#)
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Last Update: 09/30/2022 .Data Sources: AVC's
Banner, ARGOS reports

Please Select **Subject** area (twice) and **Program Major(s)** to get your data -->

Select Subject
GEOG

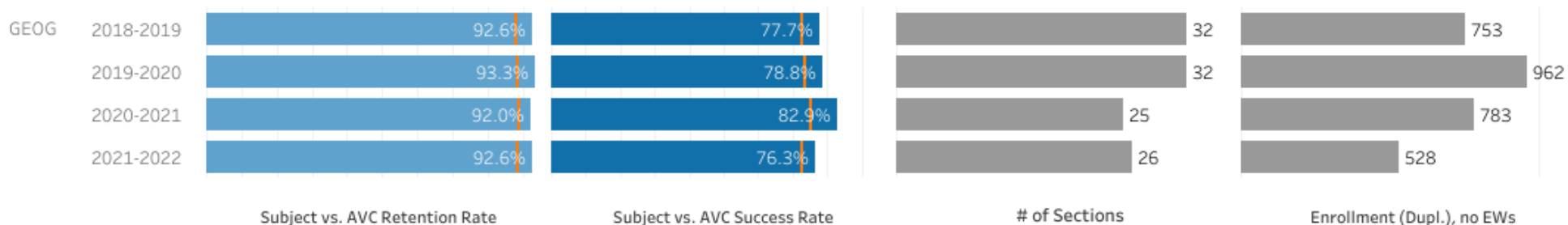
Select Subject again
GEOG

Select Program Major(s)
Multiple values

Academic Year
Multiple values



Retention, Success, Number of Sections, & Enrollment in GEOG (Total AVC rates are shown as | hover over to see data)



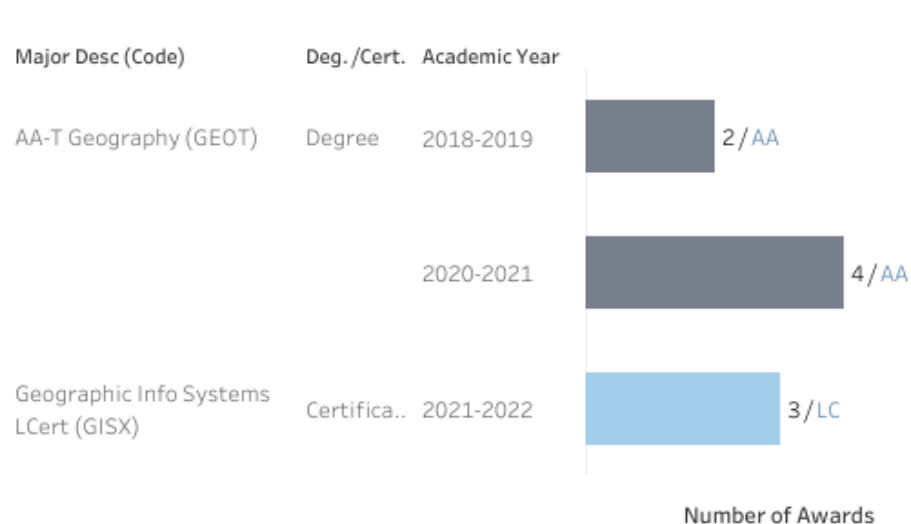
Enrollment and Number of Sections by **Modality** in GEOG

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Online	5	5	2	4
	Other Indep Study		1	2	2
	Traditional	27	26	21	20
Enrollment	Online	138	146	59	104
	Other Indep Study		1	9	8
	Traditional	615	825	715	416

Enrollment and Number of Sections by **Location** in GEOG

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	26	26	21	19
	Palmdale	6	6	4	7
Enrollment	Lancaster	631	814	664	364
	Palmdale	122	158	119	164

Number of Program Awards in **AA-T Geography (GEOT) & Geographic Info Systems LCert (GISX)**



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in **GEOG**

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF	0.9	0.7	0.7	0.8
FT (Regular) FTEF	1.0	0.8	0.6	1.0
FT (Overload) FTEF	0.2	0.6	0.6	
TOTAL FTEF	2.1	2.1	1.9	1.8
PT/FT FTEF Ratio	0.9	1.0	1.2	0.8
FTES	26.4	34.8	31.3	24.3
FTES/FTEF Ratio	12.6	16.6	16.5	13.7
WSCH/FTEF Ratio	377.6	497.1	493.9	412.0

Click [here](#) to see AVC's Program awards dashboard

Please Select **Subject** area (*twice*) and **Program Major(s)** to get your data -->

Select Subject
GEOL

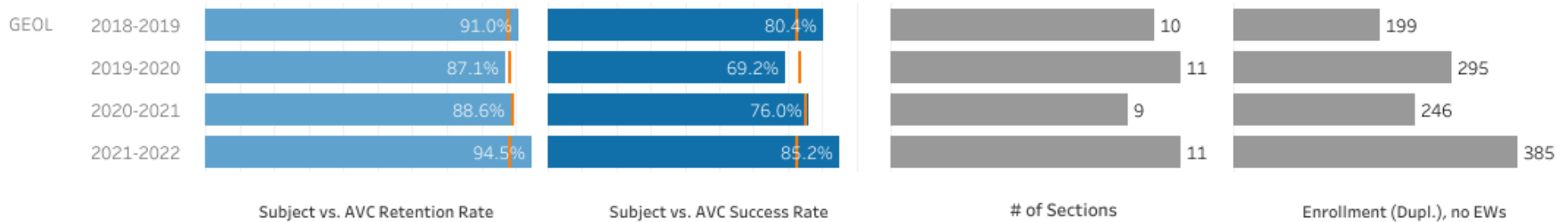
Select Subject *again*
GEOL

Select Program Major(s)
AS-T Geology (GET)

Academic Year
Multiple values



Retention, Success, Number of Sections, & Enrollment in **GEOL** (Total AVC rates are shown as | *hover over to see data*)



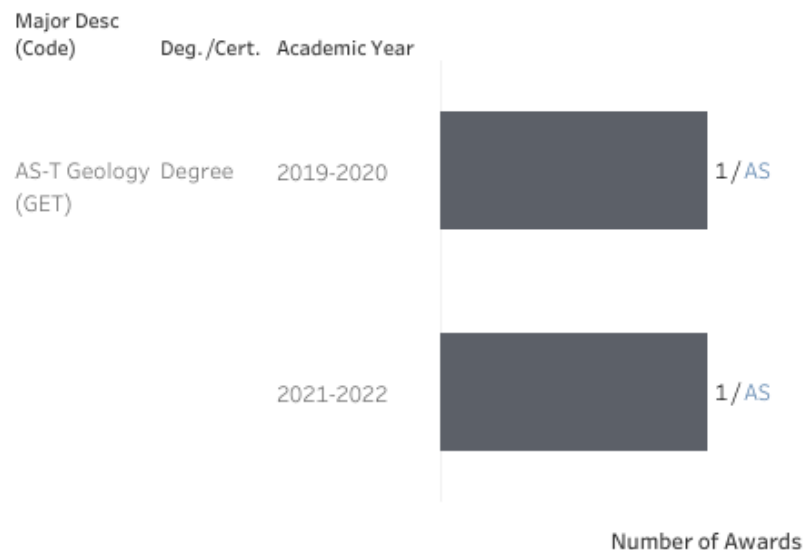
Enrollment and Number of Sections by **Modality** in **GEOL**

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Online			3	5
	Traditional	10	11	6	6
Enrollment	Online			80	236
	Traditional	199	301	166	151

Enrollment and Number of Sections by **Location** in **GEOL**

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	10	9	4	6
	Palmdale		2	5	5
Enrollment	Lancaster	199	245	104	151
	Palmdale		56	142	236

Number of Program Awards in **AS-T Geology (GET)**



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in **GEOL**

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
FT (Regular) FTEF	0.7	0.9	0.6	0.7
FT (Overload) FTEF		0.4	0.3	
TOTAL FTEF	0.7	1.3	0.9	0.7
PT/FT FTEF Ratio	0.0	0.0	0.0	0.0
FTES	8.6	16.4	15.7	14.5
FTES/FTEF Ratio	11.8	12.6	17.4	19.8
WSCH/FTEF Ratio	353.1	378.9	521.7	595.3

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Last Update: 09/30/2022 .Data Sources: AVC's Banner, ARGOS reports



Fall 2022 Program Review Report

Division/Area Name: Mathematics, Science, & Engineering / Physical Science	For Planning Years: 2023-2024
Name of person leading this review: Mark McGovern	
Names of all participants in this review: Mark McGovern, Ken Underwood	
Part 1. Program Overview: <i>Briefly describe how the program contributes to the district mission</i>	
<p>Physical Science courses provide the students of AVC with quality science education within a positive and inclusive learning environment which is dedicated to developing student understanding and appreciation of the relevancy of the physical sciences. PSCI 101 is a general education course that combines physics and chemistry content and is mainly geared towards students who intent to become K-12 teachers. The curriculum includes a hands-on active-learning laboratory component designed to improve students’ conceptual understanding and problem-solving ability. The PSCI 302 course has been designed to meet the needs of the AVC 4-year airframe manufacturing technology program. It is a required class that introduces students to a non-calculus quantitative understanding of the atmosphere through the study of atmospheric thermodynamics and dynamics.</p>	
Part 2A: Analyze the program review data (retrieval instructions) focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:	
Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)	
<p>Retention rates have increased over the four-year period of 2018-19 to 2021-22 from 91.6% to 96.1%. Success rates have increased over the four-year period of 2018-19 to 2021-22 from 79.2% to 89.5%. During this time, the program has remained well above the college average retention and success rates. Sections taught at the Lancaster main campus generally are filled to capacity. The presence of a full-time physical science lab technician has been essential for the continued success of the area. Additionally, we are starting to increase our presence at the Palmdale campus.</p> <p>Students successfully completing PSCI 302 are moving toward their goal of a bachelor’s degree in AVC’s 4-year airframe manufacturing technology program. The discipline is proud to support this program.</p> <p>Textbook materials were redundant and difficult for student engagement and were replaced by the AVC faculty writing their own labs and lecture materials.</p>	
Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)	
<p>We longer have a devoted full time instructor for physical science as our previous one moved to a different state. We desire to provide students with the most up-to-date equipment and technology and improve the quality of laboratory exercises to maintain the high levels of student success that we are currently seeing.</p>	
Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)	
<p>We have a fully equipped lab in the Palmdale campus, but enrollment has been consistently low or not available.</p>	
Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data	
<p>The physical science discipline does not have an Advisory Committee. The satisfaction of students surveyed in our classes during the past academic year revealed that the majority felt somewhat or very satisfied with the content of the courses.</p>	
<p>The labor market data related to the physical science curriculum of PSCI 101 falls under the category of Secondary School Teachers, Except Special and Vocational Education. It is estimated that there are approximately 25,860 job openings annually in Los Angeles county. The labor market data related to the physical science curriculum of PSCI 302 falls under two categories: Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary and Geoscientists, Except Hydrologists and Geographers. It is estimated that there are approximately 400 and 740 annual job openings, respectively, in Los Angeles county.</p>	
Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):	

Regarding PSCI 101, SLO targets were met at an exceedingly high rate (> 90%). This is an excellent rate for students to have met and achieved the comprehension of many variables introduced in the lower-level physical science course. The fact that 2 to 3 different full-time and adjunct faculty teach multiple sections per semester shows that the materials are being delivered and understood on a unified and consistent pattern. The lab and lecture materials are providing good information that is taught effectively and applied by the students. The hands-on labs and learning experiences with the current equipment seems to be working and helping the students to comprehend these basic physics processes. There seems to be no need for any drastic change as the data shows excellent achievement of the SLO. Faculty are thus striving to maintain the high performance of students by ensuring that instruction and materials remain high quality.

Regarding PSCI 302, recent assessment data was not available to analyze. Instruction had been unprecedented in the last couple years because of the COVID-19 pandemic so implementing actions from the previous year's plans has proved to be very challenging. One of the objectives of this course is to enhance the student's quantitative ability to apply their knowledge of physics to understand the processes used to analyze atmospheric conditions related to various weather systems. This requires a review of the relevant physical processes to derive the equations of motion, thermodynamic equation, and the continuity equation. Faculty have begun the work of rewriting the SLOs so that there is more time to review the basics of physics dynamics and thermodynamics by limiting the course to those topics. This means that any discussion of physical meteorology is restricted to the atmospheric phenomena that is analyzed in each case including the introduction of the relevant principles of physical meteorology to those cases.

Part 2D: Review and comment on progress towards past program review goals:

Progress has been made in areas such as the acquisition of new equipment and new lab experiences for students. A full time physical science lab tech has been hired for the Palmdale campus and an additional lab tech has been hired in Lancaster to assist adjunct faculty during the night sections.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:

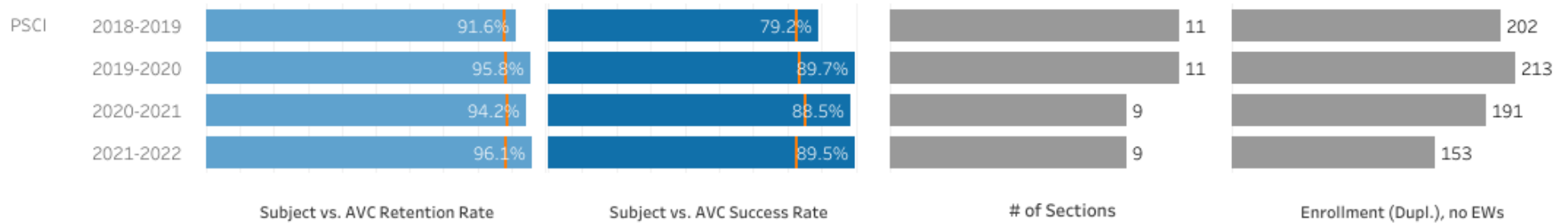
Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you've achieved your goal?)
	ILO	PLO	SLO	OO				
#1 Laboratory quality	ILO 2. Creative, Critical, and Analytical Thinking				Goal 2: Increase efficient and effective use of resources: Technology; Facilities; Human Resources; Business Services	Improve the quality of the activities used to teach physical science	Extra time spent to improve lab materials. Consultation with other faculty.	We should see a great number of students hitting SLOs targets in our assessments.
#2 Full time Instructor	ILO 1. Communication				Goal 2: Increase efficient and effective use of resources: Technology; Facilities; Human Resources; Business Services	Maintain the high quality of education with the inclusion of a faculty member fully devoted to the discipline.	Hire a full-time faculty member	We see the successful hire of a full-time faculty member in physical science.
#3	Choose ILO				Choose an item.			

Part 4: Resource Requests that Support Program Needs (based on above analysis)

Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Retention, Success, Number of Sections, & Enrollment in PSCI (Total AVC rates are shown as | hover over to see data)



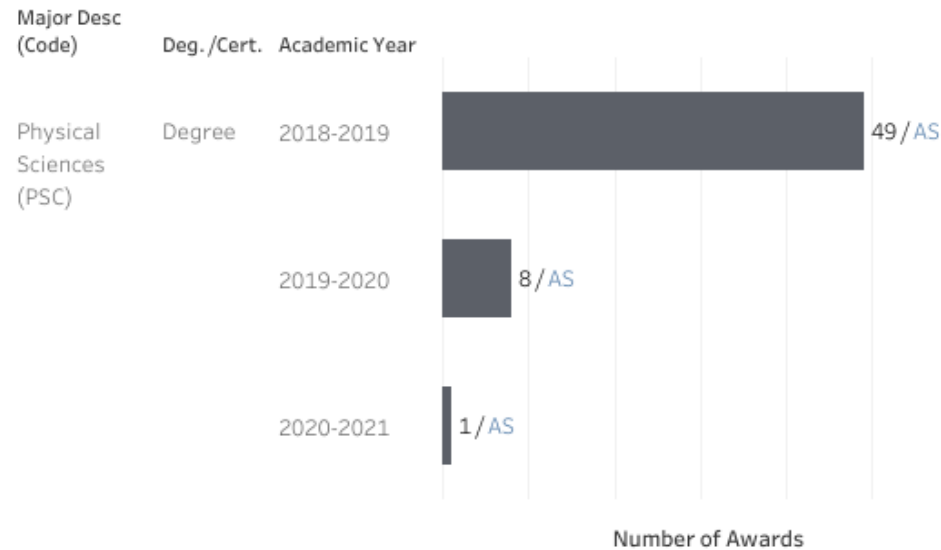
Enrollment and Number of Sections by *Modality* in PSCI

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Other Indep Study	1	1		
	Traditional	10	10	9	9
Enrollment	Other Indep Study	4	1		
	Traditional	198	216	191	153

Enrollment and Number of Sections by *Location* in PSCI

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	9	9	7	8
	Palmdale	2	2	2	1
Enrollment	Lancaster	176	175	160	137
	Palmdale	26	42	31	16

Number of Program Awards in Physical Science (PHSI) & Physical Sciences (PSC)



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in PSCI

	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF	1.0	1.0	1.0	0.2
FT (Regular) FTEF	0.8	0.8	0.8	0.8
FT (Overload) FTEF				0.4
TOTAL FTEF	1.8	1.8	1.8	1.4
PT/FT FTEF Ratio	1.3	1.3	1.3	0.3
FTES	18.5	21.0	20.1	13.9
FTES/FTEF Ratio	10.3	11.7	11.2	9.9
WSCH/FTEF Ratio	308.8	350.5	335.0	297.6

Click [here](#) to see AVC's Program awards dashboard

Last Update: 09/30/2022 .Data Sources: AVC's Banner, ARGOS reports



Fall 2022 Program Review Report

Division/Area Name: MSE/Physics	For Planning Years: 2023-2024
Name of person leading this review: Dr. Jason Bowen	
Names of all participants in this review: Dr. Chrysanthos Kyriakides, Dr. Mark McGovern, Dr. Jason Bowen	
Part 1. Program Overview: Briefly describe how the program contributes to the district <u>mission</u>	
<p>The physics program at Antelope Valley College (AVC) provides a quality education in physics to a diverse population of students through a highly engaging lecture environment, stimulating laboratory activities with new and modern equipment, faculty participation in the STEM Club, faculty participation in undergraduate research projects, and program participation in the joint AVC/California State University Long Beach AV Engineering Program.</p>	
Part 2A: Analyze the <u>program review data (retrieval instructions)</u> focusing on equity and any internal/external environmental scan information (e.g., surveys, interviews, focus groups, advisory groups, licensure exam scores, & job placement) to identify the program Strengths, Opportunities, & Aspirations:	
Strengths and Accomplishments: (Guiding Question: What does your program/area do well, including capabilities and greatest accomplishments?)	
<p>Success rates among all demographics are larger than the overall school average. Success rates by gender are at parity where for male and female students the success rates are 76.8% and 77.1%, respectively. Retention and success rates increased over the prior cycle for African American students and White Non-Hispanic students. The overall success rate in physics is 77.1%, larger than the school average 72.4%.</p>	
Opportunities and Challenges: (Guiding Question: What does your program/area need to do better to support/improve student success?)	
<p>In the current cycle retention rates have dropped from 86.6% in the 2020-2021 academic year to 83.7% in the 2021-2022 academic year (the current cycle). The overall success rate also dropped year over from 80.6% in the prior cycle to 77.1% in the current cycle. However, when retention and success rates are analyzed by race/ethnicity, increases in retention and success rates are observed in the African American/Black student population. In the 2021-2022 academic year the retention rate for African American/Black students was 75.0%, higher than the 71.9% observed in the 2020-2021 academic year. The success rate for African American students also increased from 59.4% to 75.0% year-over-year. Though success and retention rates among the African American student population remains the lowest among all demographics, it is encouraging to see the rates trend in the desired direction. An increase in retention and success rates is also observed in the White Non-Hispanic student population where the rates increased from 86.3% and 81.5% to 93.1% and 82.2%, respectively. Declines in retention and success rates continue to be observed among all other racial demographics. The persistent challenge in the current environment is restoring retention and success rates to pre-pandemic levels. An opportunity exists to identify the reasons for the improvements observed in the African American and White Non-Hispanic student populations apply appropriate remedies to improve overall student performance. Additional ongoing challenges due to the COVID-19 pandemic and socio-economic factors may continue to depress retention and success rates or stall recovery to pre-pandemic levels.</p>	
Aspirations: (Guiding Questions: What does your program/area want to be known for? What is a desired future?)	
<p>Achieve parity in performance across all demographics and achieve pre-pandemic retention, success rates and enrollments. Increase rate of transfer to four-year universities and the joint CSULB/AVC Engineering Program. Support the STEM Club and associated extracurricular activities. Promote student confidence, success, and belief that full academic potential and career goals can be realized. Encourage students to make the world a better place for all of us.</p>	
Part 2B: (Required for CTE) External Data: Advisory Committee Recommendations & Labor Market Data	
Insert Advisory Committee Recommendations here	
Insert Labor Market Data here https://www.labormarketinfo.edd.ca.gov/commcolleges/	
Part 2C: Review and comment on progress toward past SLO/PLO/OO Analysis (fka Action Plans):	

The SLO assessments for PHYS 101, 102, 110, 120, and 211 in the prior cycle reported success rates 84.6% and 76.9%, 60% and 60%, 65.4% and 69.2%, 84.8% and 76.1%, and 77.8% and 66.7%, respectively, for SLOs 1 and 2. The proposed action in the prior program review cycle called for standardizing virtual laboratory activities and coordinating across sections for online courses and monitoring trends in the face-to-face meetings during the following cycle for evidence of improved methods and making adjustments in instruction. The introduction of clickers appears to have enhanced engagement and learning. This is evident PHYS 101 where the expected performance was exceeded, and where in PHYS 102 we have yet to adopt additional active learning techniques. Marginal failures in performance standards is observed in PHYS 110 however efforts are ongoing. In addition, the introduction of additional physics demonstrations appears to have fostered enthusiasm and focus on the material taught improving analytical problem-solving ability, in addition to high quality visual descriptions of the geometry presented in class. Visual aids are emphasized in PHYS 120 and 211, where in PHYS 120 expected performance was exceeded. Performance targets were met in PHYS 211 in one category and a marginal failure to meet performance standards was observed in the second SLO category, however we expected continued use of active learning methods to yield improvements, given that an increased emphasis on visual learning tools seems to enhance student ability to solve problems through active learning and engagement. The emphasis on greater utilization of visual learning aids appears to improve learning outcomes. It was noted in past cycles that a return to in-person learning has had a dramatic affect on student ability to process abstract concepts. Visual learning tools will continue to be used to promote active learning and in-person learning encouraged as online learning environments appear to have a detrimental effect on student ability to grasp complex ideas.

Part 2D: Review and comment on progress towards past program review goals:

Goals defined in the prior program review cycle include increasing student success and retention rates to pre-pandemic levels and increasing the number of AS-T degrees awarded to pre-pandemic levels. In the 2020-2021 academic year the retention and success rates were, respectively, 86.6% and 80.6%. A persistent decline in these rates continues to be observed. In the 2021-2022 academic year the retention and success rates were 83.7% and 77.1%, respectively. Retention and success rates have not been restored to pre-pandemic levels in the current program review cycle however we note that the 2021-2022 academic year is the first full academic year following the pandemic in which all physics course instruction was offered face-to-face. It remains difficult accessing and accounting for the lingering effects of the fully online environment implemented during the 2020-2021 academic year and the pandemic's continuing economic impact on student performance. The data contained in the next program review cycle will provide illuminating insights into expected long-term trends and trajectories of student performance, success, and retention. However, it is encouraging that, despite the fact the absolute number of AS-T Physics degrees awarded declined from 28 to 25, the rate of AS-T Physics degrees awarded increased from 4.75% to 5.15%, given that overall enrollment dropped from 589 to 484 year-over-year.

Part 3: Based on Part 2 above, please list program/area goals for 2023-2024:

Program /Area Goal #	Goal Supports which:				EMP Goal Primarily Supported:	Description of Goal	Steps to be taken to achieve goal?	Measure of Success (How would you know you've achieved your goal?)
	ILO	PLO	SLO	OO				
#1	ILO 3. Community /Global Consciousness				Goal 1: Commitment to strengthening institutional effectiveness measures and practices	Increase student retention rates to pre-pandemic levels	Increase communication channels to promote in-person interventions by: (1) state clearly the first day of class the anticipated challenges some students will face due to societal obstacles exacerbated by the COVID-19 pandemic, (2) encourage students that the challenges can be overcome, (3) direct students to the relevant	Review Program Review data

							webpages hosted by the college detailing the programs/resources/hotlines on offer to combat obstacles students face including food insecurity, homelessness, etc. (4) encourage students to visit the instructor during office hours if students are thinking of dropping the course.	
#2	ILO 3. Community /Global Consciousness				Goal 1: Commitment to strengthening institutional effectiveness measures and practices	Increase student success rates to pre-pandemic levels	(1) Identify poor performing students using test scores, homework scores, and laboratory scores, (2) Contact students and arrange a meeting, (3) Identify the specific challenges preventing satisfactory academic performance, (4) Determine a plan including increasing the number solved problems presented in class, meeting with a tutor in the learning center, seeing the instructor regularly during office hours to review the material, etc.	Review Program Review data
#3	ILO 4. Career and Specialized Knowledge				Goal 3: Focus on utilizing proven instructional strategies that will foster transferable intellectual skills	Increase the number of AS-T degrees to pre-pandemic levels	Increase retention and success rates.	Review Program Review data

Part 4: Resource Requests that Support Program Needs (based on above analysis)
 Fill out your resource request via Survey Monkey: https://www.surveymonkey.com/r/AVC_ProgramReviewFall2022

Part 5: Insert your Program Review Data here, as well as any other supporting data. (See Part 2A above).

Please Select **Subject** area (**twice**) and **Program Major(s)** to get your data -->

Select Subject
PHYS

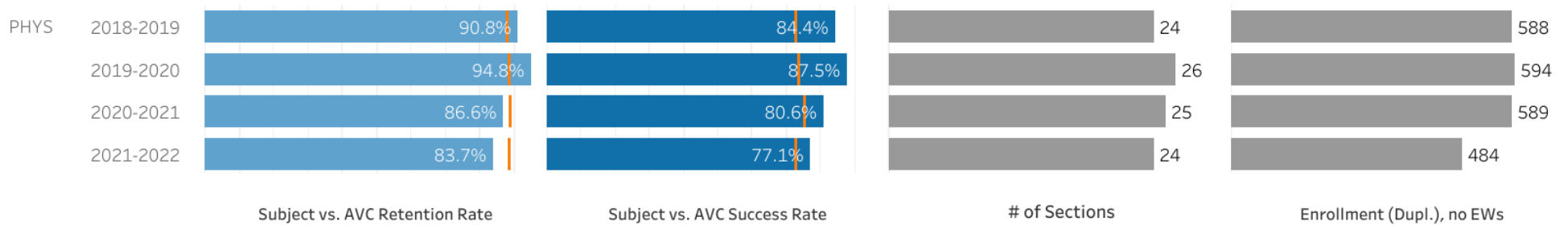
Select Subject **again**
PHYS

Select Program Major(s)
AS-T Physics (PHYT)

Academic Year
Multiple values



Retention, Success, Number of Sections, & Enrollment in **PHYS** (Total **AVC** rates are shown as | *hover over to see data*)



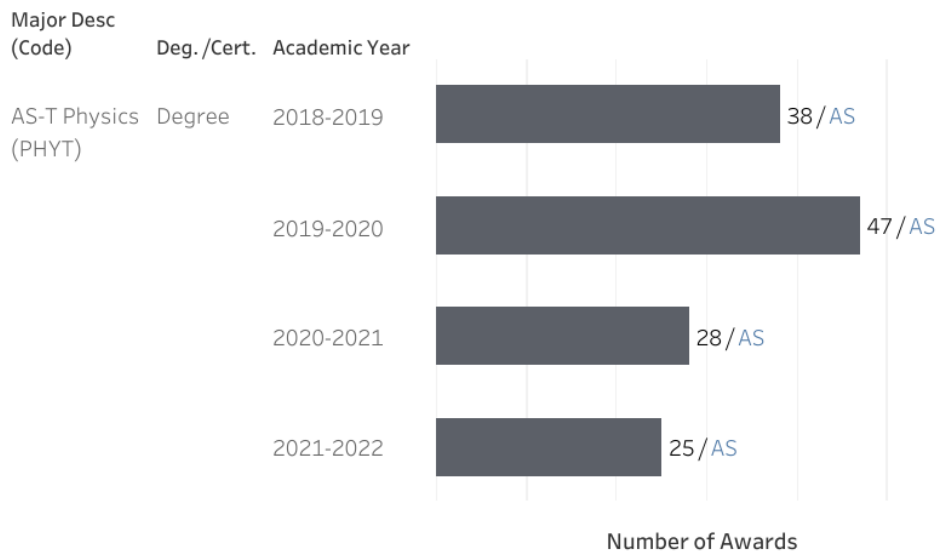
Enrollment and Number of Sections by **Modality** in **PHYS**

	Instr. Method	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Other Indep Study				1
	Traditional	24	26	25	23
Enrollment	Other Indep Study				2
	Traditional	588	607	589	483

Enrollment and Number of Sections by **Location** in **PHYS**

	Location	2018-2019	2019-2020	2020-2021	2021-2022
Number of Sections	Lancaster	24	26	25	24
Enrollment	Lancaster	588	607	589	485

Number of Program Awards in **AS-T Physics (PHYT)**



FTEF by Contract Type, Part-time/Full-time Ratio, FTES, FTES/FTEF in **PHYS**

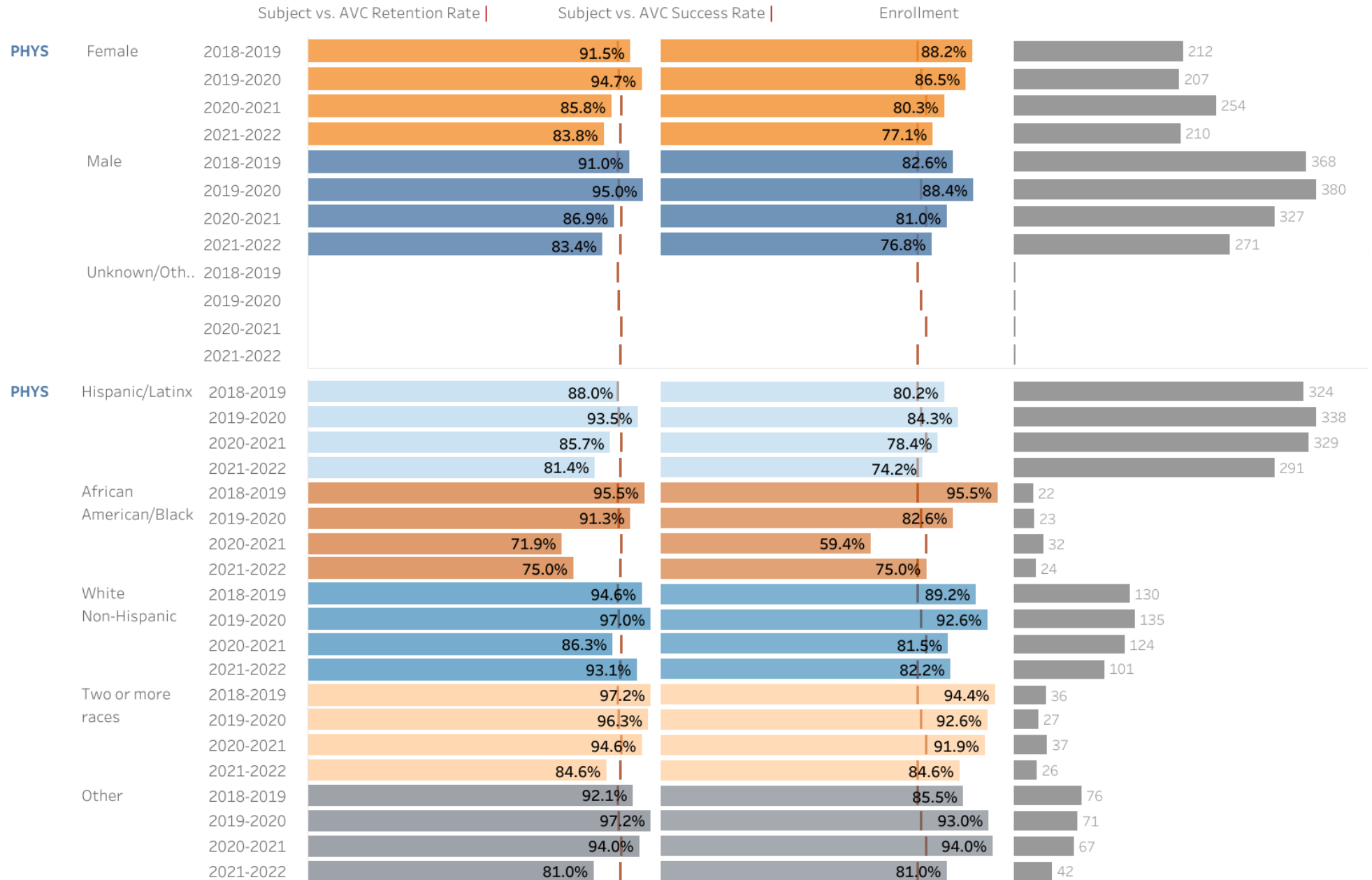
	Fall 2018	Fall 2019	Fall 2020	Fall 2021
PT (Adjunct) FTEF		0.4	0.6	0.4
FT (Regular) FTEF	2.5	2.7	2.7	2.1
FT (Overload) FTEF	1.0	1.2	1.0	1.4
TOTAL FTEF	3.5	4.3	4.3	3.9
PT/FT FTEF Ratio	0.0	0.1	0.2	0.2
FTES	49.8	53.0	55.1	43.1
FTES/FTEF Ratio	14.4	12.2	12.8	11.1
WSCH/FTEF Ratio	430.6	367.2	384.1	334.5

Click [here](#) to see AVC's Program awards dashboard

Subject-Level Retention Rate (RR), Success Rate (SR), and Enrollment by Sex & Race/Ethnicity as Compared to AVC's Rates (|)

If subject bars are below the vertical lines |, it indicates that equity gaps exist in SR or RR for those subgroups as compared to overall SS or RR. Some questions to ask when looking at the data:

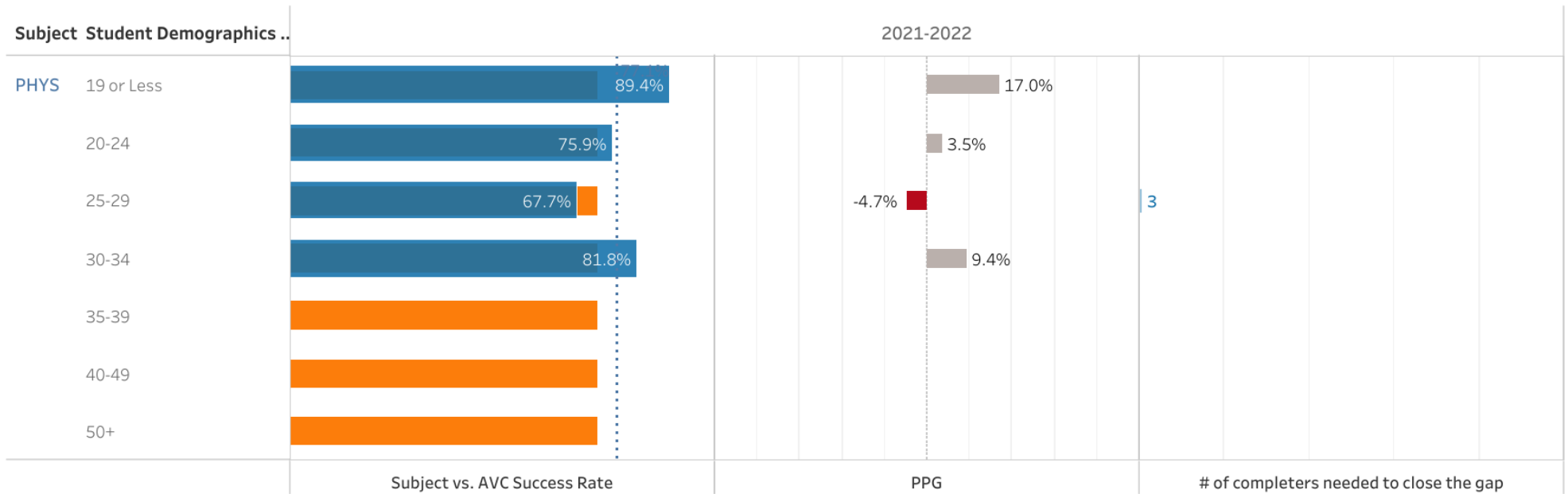
- What are the potential reasons for equity gaps? - What can my program implement to mitigate these gaps? - What resources/training are available/needed to support efforts?





2021-2022 Disproportionate Impact (DI) as Percentage Point Gap (PPG)

Blue Bars show Success Rate (SR) within the sub-Groups vs. **AVC Annual SR (orange bar)** vs. **PHYS Annual SR (dotted line)**



In 2021-2022, **PHYS's Success Rate was 77.1%** vs. **AVC's Annual rate of 72.4%**

Overall Disproportionate Impact as percentage point gap was : 4.7%

In PHYS, 484 was the enrollment count (duplicated headcount) (only shows if $n > 10$)

If there is a Disproportionate impact (**PPG is negative**), multiply the absolute value of PPG by the number of students and divide it by 100 to determine how many more successful completers would eliminate the gap.

(For example, $(484 * |4.7\%|)=23$. it means that 23 more successful course completers would help close the gap for this subject area)

(Hover over each bar in the chart to see details about each sub-group)

Some possible questions to ask when looking at the DI data:

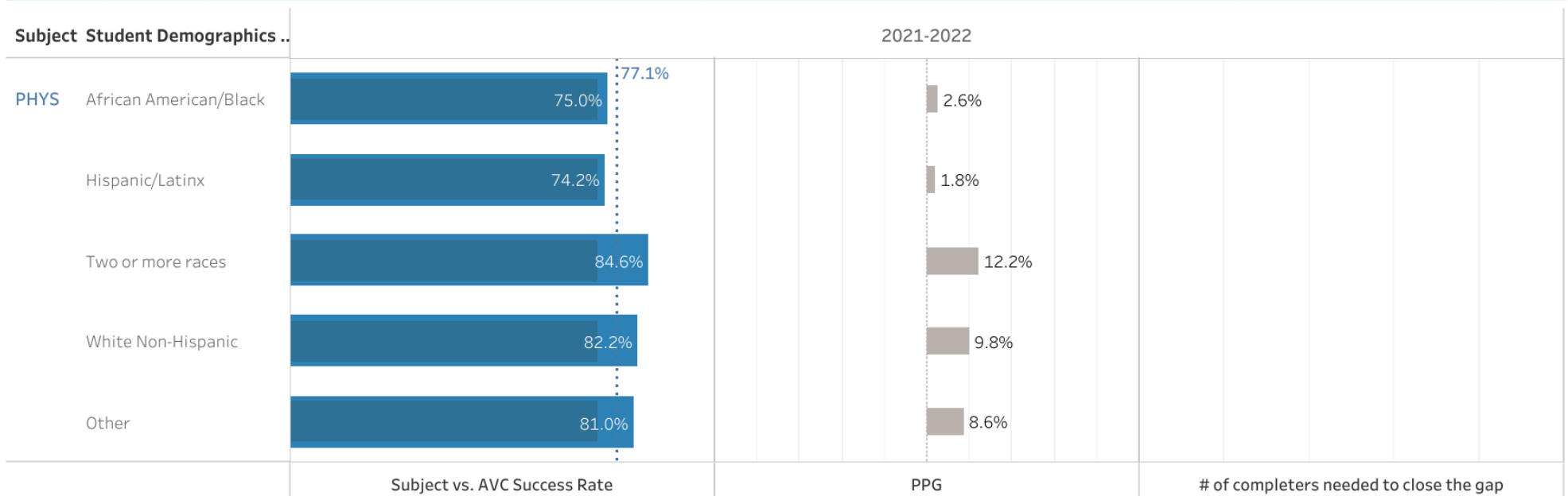
- What are the potential reasons for equity gaps?
- What can my program implement to mitigate these gaps?
- What resources are available to support these efforts?





2021-2022 Disproportionate Impact (DI) as Percentage Point Gap (PPG)

Blue Bars show Success Rate (SR) within the sub-Groups vs. **AVC Annual SR (orange bar)** vs. **PHYS Annual SR (dotted line)**



In 2021-2022, **PHYS's Success Rate was 77.1%** vs. **AVC's Annual rate of 72.4%**

Overall Disproportionate Impact as percentage point gap was : 4.7%

In PHYS, 484 was the enrollment count (duplicated headcount) (only shows if $n > 10$)

If there is a Disproportionate impact (**PPG is negative**), multiply the absolute value of PPG by the number of students and divide it by 100 to determine how many more successful completers would eliminate the gap.

(For example, $(484 * |4.7\%|)=23$. it means that 23 more successful course completers would help close the gap for this subject area)

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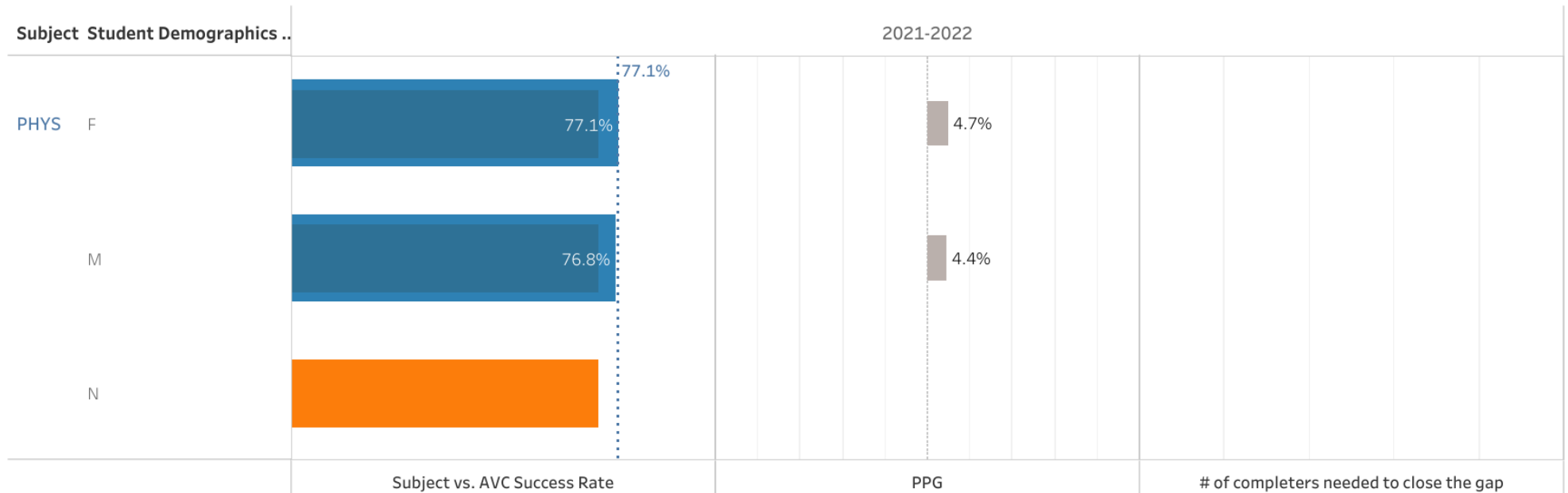
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