# CPR - Instructional

## A. Program Description

1. Describe your program’s purpose and identity/focus, noting any changes since the last review.

The Life Sciences Department at Santa Monica College uses various programs and courses to serve the needs of a diverse population of students. Our course pathways and programs include:

- **Majors Biology Series –** These courses are part of the traditional academic lower division requirements in biology. Our three-semester long program (Biology 21, 22, 23) fulfils the requirements for transfer into Biology and Environmental Sciences majors. Additionally, these classes fulfil lower division requirements for students pursuing careers in medicine, dentistry, and pharmacy.

- **Allied Health Series –** These courses (Anatomy 1, 2, Physiology 3, and Microbiology 1) fulfil the prerequisites for various clinical areas such as nursing, respiratory therapy, physical therapy, physician assistant, and pharmacy.

- **General Education Courses -** Our department offers a wide range of UC and CSU transferable classes (Biology 2, 3, 9, 10, 15, Botany 1, 3, Zoology 5) with and without lab that fulfill general education goals (IGETC Area 5B and 5C; CSU Gen Ed Area B2 and B3) and apply towards degrees and transfer to four-year institutions. Many of these courses also fulfil the SMC Global Citizenship requirements for an AA degree. Finally, beyond degree requirements, we use these courses to help students become more scientifically literate and foster greater interest for Science, as this may be the only college-level Science class they will take. This includes development of critical thinking, data interpretation and real-world application. Our program allows for students to become more informed citizens.

- **Nutrition Program –** The Life Sciences Department nutrition program offers a broad range of nutrition classes (Nutrition 1, 3, 4, 7, 8) designed to address the needs of both students majoring in nutrition, as well as those interested in the topic. We offer an AS-T in Nutrition and Dietetics and are now in process of exploring development of additional certificate programs in various nutrition related career areas.

- **Biotechnology Program –** This new career education program will launch in 2024 and is part of a stackable certificate program leading to an eventual AS degree. This program was developed based on a shortage of highly skilled technicians for a rapidly growing industry. We further are using this platform to help increase diversity in the area and the STEM fields in general.

- **Aquaculture Program –** This new career education program will launch in 2024 and is part of a stackable certificate program leading to an eventual AS degree. As part of a future blue economy, this program was developed in response to growing aquaculture industries at the local, state, and national level. Particular attention is being paid to use this platform to increase diversity in the area and the STEM fields in general. Additionally, this program emphasizes sustainability and environmental responsibility as a cornerstone of our educational approach.

- **SCUBA Program –** A SCUBA diving program has been developed to address the needs of our aquaculture studies. However, our department is now considering expanding this program into a career education program certificate that serves not only students involved in aquaculture and marine biology, but also those interested in industrial diving and the tourism industry.

- **Independent and Field Studies classes/opportunities –** Students have the opportunity to participate in various independent study and research programs, and/or to engage in field studies.

2. What are the critical ways your program advances the college’s mission, vision, and goals?

Our courses and programs closely align with the school’s vision, mission, and goals. By practicing the scientific method, students learn to pursue their intellectual curiosities by incorporating knowledge, intellectual inquiry, evidence-based planning, evaluation and interpretation, academic integrity, ethical behavior, global awareness, and sustainability. We encourage personal and intellectual exploration, and support students to achieve their educational goals. Students learn to contribute to their local and global community, including their natural environment. With these assets, students can communicate, reach conclusions, and solve problems more effectively. Our curriculum allows for students to better understand and assume responsibility for how their actions contribute to global problems and solutions. Our courses advocate for the nuanced approach to engagement in local and global problems with an appreciation for simultaneous consideration for environmental sustainability, social justice, and economic prosperity. Those that complete entire programs within the department we hope will become not only skilled scientists/workers, but also agents of change.  They will we hope support environmental sustainability, maintain the highest professional ethical standards, and become harbingers of change in support of diversity, equity, inclusion, and accessibility in the workforce.

## B. People Involved – Your Students

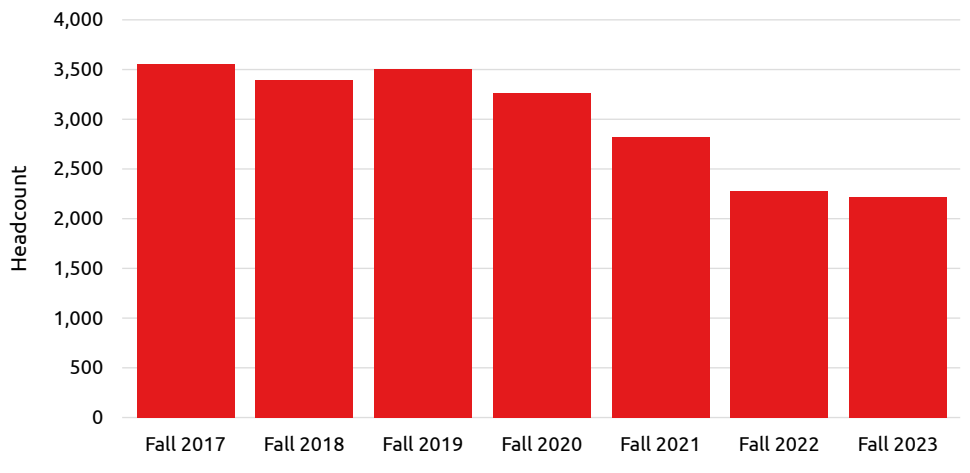
**Population and Demographics:**

3. What are the key characteristics that define your program’s student population? Compare your program's population to the overall college population, and discuss the extent to which your program’s student makeup (including subgroups who are over or under-represented) currently aligns with your program’s intended target populations.

The population of students served by the Life Sciences Department is in general well aligned with that of the campus’ demographics in relation to race and ethnicity, and gender, although compared to the college’s overall numbers, we serve a slightly higher percentage of Latine/x and female students, and a slightly lower population of white students. A more nuanced analysis of the different areas of specialty within the department does however show that this distribution is not uniform. Our Allied Health series of courses begin with Anatomy where Latine/x students represent an even higher percentage of the students, and this trend has grown over the last six years. In start of our major’s biology series, and over the last six years, we see a growing percentage of Latine/x students, and whereas the numbers are not quite in par with the rest of the department, we have more recently achieved approximate equity with the college demographics. Asian students represent a significantly higher percentage of the students in our biology major’s series, although this trend is slowly moving toward parity with that of the college and the rest of the department. The major area of concern within the biology major’s is the continued low enrollment of black students, represented by less than half of the overall population pattern within the department and the college.

## Student Headcount

Life Science




Measures: Headcount

| | Fall 2017 | Fall 2018 | Fall 2019 | Fall 2020 | Fall 2021 | Fall 2022 | Fall 2023 |
|---|---|---|---|---|---|---|---|
| **Measures** | 3,557 | 3,391 | 3,503 | 3,263 | 2,820 | 2,279 | 2,222 |

## Outreach and Planning:

4. What opportunities do your analyses reveal about your current and future student outreach and planning efforts?

We are committed to both previously effective methods, as well as new approaches for student outreach. These will include but are not limited to:

- Work closely with existing programs at SMC that serve underrepresented populations (e.g., Adelante, Black Collegians, Guardian Scholars, Student Success Teams, and EOPS)
- Participate in campus VIP days
- Organize Open House events
- Connect with academic counselors both informally and through structured workshops
- Expand and improve departmental webpages
- Use coordinated marketing efforts (e.g., mailers, digital campaigns, online presence)
- Work with our industry partners in the workforce development areas to build effective outreach programs
- Work on a departmental culture, communication, and teaching approach that centers on equity-based and inclusive language, understanding, and delivery
- Consider new approaches for creating student cohorts that establish outreach through the students themselves
- Increase in the number of full-time faculty that participate in one or more of the DEIA training programs available

# C. People Involved – Your Staff

## Population and Demographics:

5a. Discuss your program’s staff (PT/FT faculty, non-faculty, and classified).

The racial and ethnic demographics of our department’s full-time faculty is somewhat similar to that of the full-time faculty across the entire campus, except for African-Americans (Life Sci: 5.9%, College: 11.4%) and Asian-Americans (Life Sci: 20.8%, College: 12.2%). White full-time faculty represent 55.9% of our department (College: 58%) and Hispanics represent 17.4% (College: 16.7%).

Our part-time faculty also somewhat reflect the diversity of part-time faculty across the college, except for Hispanics (Life Sci: 7.8%, College: 14.3%) and Multi-Racial reporting (Life Sci: 10.3%, College: 1.7%). White part-time faculty represent 61.3% of our department (College: 56.7%), Asian part-time faculty represent 10.6% in the Life Sciences (College: 11.3%), and African-American PT faculty represent 8.8% (College: 9.8%).

These staffing statistics demonstrate that we have fewer African-American and Hispanic faculty than our program’s student population, and more White and Asian faculty than our students.

5b. How reflective of your program's student population is your staff?

See 5a

### Staffing Changes:

6. Discuss your program's staffing changes since the last review. How have these changes impacted your program's ability to achieve its desired student outcomes?

Since the last program review, we have hired six new full-time faculty. In this same time-period, six full-time faculty have either retired or taken full-time positions in other colleges. One other faculty member is now on banked leave with the intent to retire at the end of the 2023-24 academic year. Additionally, many long-term part-time faculty have also either retired or taken full-time positions elsewhere. Our new faculty have been a great source of ideas, academic innovation, and energy; however, in other areas, we now lack the experience, expertise, and potential mentorship from the long-term faculty we lost.

In addition to our faculty, we have added one full-time and one part-time laboratory technician to our staff. Lab techs are critical for acquisition, monitoring, and maintenance of our laboratory equipment and supplies, husbandry of our live specimens, and they help with set up of a wide range of complex weekly laboratory exercises. The new technicians have been an important part of our ability to expand offering of new courses and programs.

### Staffing Challenges:

7a. Looking ahead to the next review period, discuss any staffing challenges you anticipate. How is your program planning to address these challenges?

The Life Sciences Department expects several staffing challenges in the upcoming review period. Having lost seven full-time faculty over the last cycle, informal discussions suggest that we may lose an additional nine full-time faculty to retirement in the upcoming review period (about half our current full-time faculty). This loss coincides with a time when the department hopes to expand program offerings, and address student retention and success issues. Additionally, we are already struggling to staff some of our most critical courses (e.g., Biology 21 – the first of our major's biology classes) with any full-time faculty. Furthermore, we recognize that this transition period is occurring during a budgetary difficult time for the college, but we hope that there will be sufficient institutional support to address what we know is going to be a challenging staffing period for us.

The capacity to hire new full-time faculty is particularly important because we believe that having enough dedicated faculty is fundamental to success of new programs, and in allowing for the long-term collaborative approaches that address student success gaps for those with intersectional, marginalized identity. We hope that the college will help us replace our faculty with a diverse group of new instructors with the highest level of expertise in their areas. We further hope that hiring of new full-time faculty will be such that it allows for transition periods of mentorship of the new hires by the outgoing professors. Finally, as we expand our programs, and we transition from offering classes in one building to offering classes in three different geographic locations and at four buildings, the college will allow us to hire the adequate support staff in form of additional laboratory technicians needed for long-term student success.

7b. What institutional support does your program need to address these challenges?

See 7a

8. What key elements of your department culture facilitate and impede your program's ability to achieve its desired student outcomes?

The Life Sciences Departmental culture is one of mutual respect where members are encouraged to openly communicate with one another, address concerns, set goals, and collaborate to achieve their goals. As a department, we promote diversity and inclusion, and encourage individuals' professional development in various areas. All these facilitate our program's ability to achieve its desired outcomes.

There are however areas where we could improve:

- Many faculty work a large portion of their assignments remotely. Others, due to personal obligations and/or nature of commuting and housing needs, spend only the time they absolutely must on campus. We believe that additional means to provide time together would further improve collegiality, increase collaboration, prevent inter-personal conflicts, and allow for additional innovative approaches to achieve departmental goals.
- There is a culture of academic inertia and rigidity. Although courses are updated to reflect new scientific advances, and teaching methods are modified to address students' everchanging needs, much more can and should be done. We hope that an honest approach to program review, encouragement of innovative ideas, and a supportive work environment for collaboration between all faculty to address concerns will facilitate large scale program updates that will help achieve desired student outcomes.
- There is departmental (and science in general) reputation for difficulty of classes in our area, and this reputation may impact nontraditional students even more so than the rest. We believe that this affects enrollment patters in STEM and hope to address it through our various outreach efforts.
- Finally, the department leadership recognizes the need for better recognition of faculty achievements and will try to improve on this aspect to foster a culture of excellence.

## Staff Support and Professional Development:

9a. Discuss how your program involves and supports its staff (classified, non-faculty, and PT/FT faculty).

Our program tries to create a supportive work environment that fosters a positive and respectful climate. We value, recognize, and appreciate everyone's contributions, and do our best to give everyone the adequate resources needed to perform their tasks effectively. Opinions and suggestions are welcomed, appreciated, and considered at every level.  We also in whatever capacity possible support and encourage personal and career growth for individuals and recognize the need for adequate life/work balance.

Professional development is encouraged in form of participation in conferences, workshops, faculty development programs, and collaboration with industry and government partners. Undergraduate research is also encouraged, including but not limited to participation in the NSF Research Experience for Undergraduates (REU) program, the Advanced Technological Education (ATE) program, and the Louis Stokes Alliance for Minority Participation (LSAMP) Program. Staff can also pursue advanced degrees or certificates that can advance their careers. Finally, allowance is given for innovative ideas that faculty may have for professional development that do not fall under traditional categories.

9b. What roles do your program's staff play on campus and in the off-campus community?

Classified and non-faculty staff are fundamental to the running of our department. They are highly skilled and knowledgeable professionals with expertise in a range of areas. In addition to administrative responsibilities, they keep track of the budget, ordering, maintenance, repair, and calibration of equipment, set up laboratory displays and experiments, make sure safety and chemical hygiene regulations are followed, take care of our live and preserved specimens, ensure compliance with ethical and legal standards, and assist our faculty as needed.

Faculty, in additional to their teaching roles, also actively engage in departmental activities including participation in department meetings, evaluation of peers, review of ongoing programs/courses, and creation of new programs. Many of our faculty are active in the Academic Senate, either directly or in committees, as well as the Faculty Association, and various college-wide programs and initiatives, and in advisory roles for student clubs. As part of the off-campus community, our faculty are involved in several local environmental or professional boards and/or are members for various City of Santa Monica commissions.

9c. Discuss how your staff's professional activities since the last review period have positively impacted your program.

The staff's professional activities since the last program review have positively impacted our program in several ways, including but not limited to:

- Many of our staff have participated in various programs that address student success and equity concerns (e.g., Equity Gateway Courses Professional Development program; Equity to Action Groups; NSF program for Fostering an Equity-minded Student Success Culture in STEM; UCLA-SMC faculty discussion groups). There is a clear cultural shift towards addressing the needs of students, particularly those with intersectional, marginalized identity. We recognize there is more work to be done, but we are actively moving in the right direction.
- Student's have benefited from program and course updates based on ongoing faculty efforts to maintain academic recency.  Our faculty regularly review relevant literature, participate in conferences and professional associations, collaborate with colleagues from other colleges and universities, and by participate in primary research.
- We have developed two new programs with stackable certificates (i.e., Biotechnology, and Aquaculture) to address workforce needs, and we are in the process of assessing the potential for additional programs in nutrition, ecotourism, and allied health.

9d. What additional areas of professional development and trainings are needed for your staff?

For non-academic staff, the college has been great in offering training for general administrative needs. Staff have self-trained in their areas of expertise as needed for advancing technologies and new course/program offerings. However, whereas some training for safety protocols have been available to our staff, we feel the need for additional and more comprehensive training and are now in the process of establishing these.

Our academic staff use a variety of means to keep up with the necessary professional development they need to address academic advancement, teaching improvement, and better means to break down student success gaps. Not every faculty however has the means to participate in the available opportunities across the country, and additional accessible professional development funding could address this need. Additionally, our faculty could benefit by expanding externship opportunities in relevant industries or academic programs that we are preparing our students to enter.

## If applicable:

10a. In what professional organizations does your program's staff participate?

Some of the professional organizations our faculty participate in include:

- Society for the Advancement of Chicanos and Native Americans in Science
- American Society of Cell Biology; Cell Biology Education Consortium
- American Association for the Advancement of Science

- Western Society of Naturalists
- American Academy of Underwater Instructors

10b. Discuss your staff's grant-funded research and projects.

Grant funded Activities include:

- Perkins V grant for development of Aquaculture program
- Strong Workforce Program grant for development of Aquaculture program
- Senate Appropriation Padilla/NOAA Grant for development of Aquaculture program
- Builders Initiative grant for development of Aquaculture program
- National Science Foundation _ Advance Technological Education grant for development of Biotech program
- W.M. Keck Foundation grant for development of Biotech program
- Perkins V grant for development of Biotech program
- Strong Workforce Program grant for development of Biotech program
- National Science Foundation Research Experience for Undergraduates (REU) Program grant for field research in marine sciences

10c. Discuss your program's partnerships with regional educational institutions.

- Our Aquaculture program has partnered with nonprofit AltaSea. Their vision is to prepare today's generation of students for future jobs in science, technology, engineering, business, and the ocean. In addition, we have partnered with Cal State Northridge and Mira Costa College on applying for grants.
- Our Biotech program has established partnerships with USC, The Keck Graduate Institute, Pasadena City College, CSU Channel Islands, Moorpark Community College, and the other 18 community colleges offering biotechnology programs that are part of the Los Angeles and Orange County Regional Consortia.

10d. Discuss your program's industry partnerships and relationships.

- In aquaculture, in addition to being an education partner, AltaSea is our industry partner, as they serve a unique role in connecting aquafarms, aquaculture research, and the regulators of the industry all in one place, their doc at the Port of LA. They are creating an ocean-based campus on 400,000 square feet of doc space with a state-of-the-art facility that brings together all of the elements of the aquaculture industry that are needed to accelerate the rapid adoption and expansion of the nascent industry.
- In Biotech, our industry partnerships include publicly traded biotech companies, private foundations, and academic institutions. They help us establish and maintain an up-to-date program that serves the industry needs and will provide us the means to fill our student internships. They include:  Bio-Rad; Pasadena Bio Collaborative Incubator, Amgen/UCLA; Kite Pharma; Quantgene; USC/AltaSea; Keck Graduate Institute/ Cardea Bio; Amgen Bioprocessing Center/Keck Graduate Institute; Frozen Oncogene Consulting; Digital World Biology/ Assocation for Biomedical Research Facilities; Teraski Institute.

10e. Discuss how your faculty are upskilled to address industry and/or curricular changes.

- Our faculty in many cases are highly skilled and already possess the skills needed to address program needs. In other areas, faculty can develop additional skills through attendance at relevant conferences, as well as collaborations in form of research/study with colleagues from other colleges and universities. Additionally, we plan to hire individuals to teach some of the highly specialized course in our programs. Long term success of program may however need to rely on faculty externships with companies/programs that will allow them to update their skill sets.

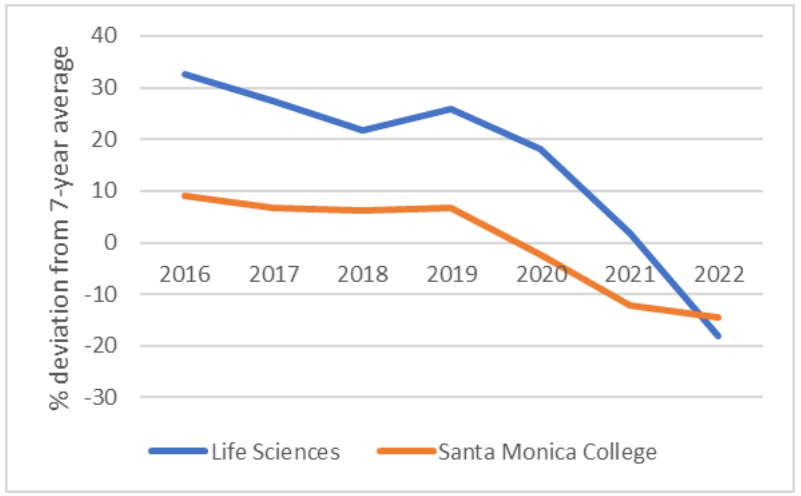
10f. Provide your program's advisory board membership and meeting dates since the last review period.

Please see supplemntal documents provided.

## D. Curriculum, Courses, and Scheduling

11. Analyze your program's enrollment trends disaggregated by modality and other course attributes. Reflect on the extent to which your current course offerings and class scheduling practices maximize student success. Include any evidence to support your points. Discuss any changes your department plans to better respond to students' needs.

An overall analysis of the enrollment trends in the Life Sciences Department over the period ranging from 2016 to 2022 suggests that relative to the seven-year average, the department had higher and more consistent enrollment than the college. That is, although enrollment was down both for the college as a whole and the department, the Life Sciences Department was less affected than the Santa Monica College altogether. This is until 2022, when the college and department enrollment was approximately at an equal rate.




A more nuanced analysis though indicates that the above enrollment patterns, particularly the sharp drop seen over the last couple of years, are not evenly distributed within the department.

- One of the major areas of concern in Life Sciences, besides the overall drop in enrollment, is for the biology major's series. The first area of concern is the general drop in students beginning the series. The second area of concern is that the average enrollment in the third course of this series is approximately %26 of the enrollment observed int the first of these courses (by Spring 2023, we only had nine students enrolled in this third course). Some of the reasons for this pattern are:

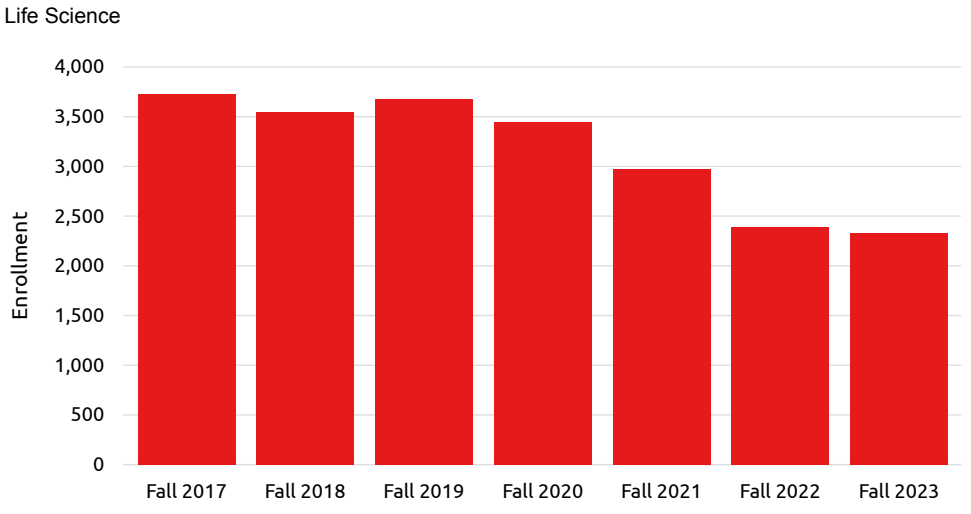
1. Lower division biology majors course series traditionally have a high drop off between the first and the last of the courses. This drop may be partially associated with workload, pace, and rigor. Also, many biology-based careers require higher education (e.g., medical school, graduate school, etc.) that primarily serve students with high grade point averages. The traditional bar of "C" for "student success" does not fully translate for those enrolled in these classes. The SMC Life Sciences Department continually considers ways to help students achieve their goals despite the difficult nature of these courses.

1. Lower enrollment may be due to many students not having the prerequisites for enrollment. We are now in the process of reassessing those prerequisites.

1. Lower enrollment may be due to the length and time commitment necessary for our program. The biology major's course series is typically covered over three regular semesters, with courses that as associated with 6, 6, and 9 weekly teaching hours per semester. Students now have options at other colleges where they can cover the series in just one year, and major transfer universities such as UCLA no longer require the entire three-semester long program for transfer. We are now in the process of reassessing our entire series of courses for biology majors and hope to introduce major revisions to the curriculum committee in the near future.

- Other major area of concern for enrollment patterns is associated with our allied health course series (i.e., Anatomy, Physiology, Microbiology). Once again, the largest concern here is the high attrition rate between the first and last of the courses, where enrollment in Microbiology is only about %23 of those enrolling into Anatomy, with the biggest drop seen between Anatomy and Physiology – the first two courses of the series. Although course rigor does play a role here, we believe the biggest issue is the students' lack of skill sets and background knowledge needed for success. We have discovered that students that complete Biology 2 (Human Biology – a non-lab general education course) or Biology 3 (General Biology with lab) before beginning the allied health course series have a significantly higher success rate. We are now considering various ways to not only help students in anatomy directly, but also help students develop skills/knowledge before enrolling Anatomy (e.g., Providing self-testing and/or accessible tutorials for catching up). Additionally, we plan to provide students that drop out in the first few weeks of anatomy, late-start Biology 2 sections to help them get back to the allied health series with better results in future.

## Course Enrollment

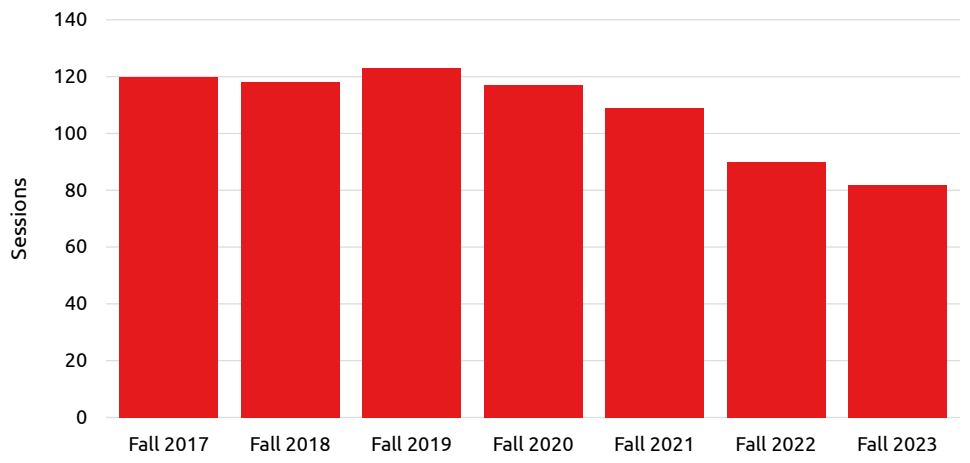



Measures: Enrollment

| | Fall 2017 | Fall 2018 | Fall 2019 | Fall 2020 | Fall 2021 | Fall 2022 | Fall 2023 |
|---|---|---|---|---|---|---|---|
| **Measures** | 3,722 | 3,550 | 3,672 | 3,446 | 2,974 | 2,389 | 2,329 |

# Section Offerings

Life Science




Measures: Sessions

| | Fall 2017 | Fall 2018 | Fall 2019 | Fall 2020 | Fall 2021 | Fall 2022 | Fall 2023 |
|---|---|---|---|---|---|---|---|
| **Measures** | 120 | 118 | 123 | 117 | 109 | 90 | 82 |

12. What institutional support do you need to create a more equity-minded and student-centered curriculum, course offerings, and class schedules?

- Professional training - Although the college has various equity-centered professional development opportunities, they are often very generalized, are time-consuming, and participants are primarily faculty that already have an equity-minded and student-centered curriculum. It would be great to have a mechanism for simple yet specific training for all faculty in form of workshops where individual classes are reviewed for culturally responsive teaching, as well as implicit bias, where specific recommendations (and implementation tools) are given for creating inclusive classrooms and student-centered pedagogy. Further, it would be appropriate for case of new courses for the curriculum committee to have a dedicated member that helps with curriculum design with focus on diversity, equity, and inclusion integrated in various aspects of the program.

- Resource allocation - Most faculty have the desire to have class offering through an equity-minded lens. However, most faculty are also overwhelmed with their teaching loads and other departmental and personal responsibilities. Funding through stipends or release time could provide a mechanism to encourage faculty to not only participate in conferences and workshops, but to actively work to redesign existing courses through an equity lens. Additional funding could also improve the success of such programs through mentorship and peer support.

- Flexibility in scheduling – We have a diverse group of students that attend Santa Monica College and participate in programs and courses in the Life Sciences Department. Although some of these students fall under the “traditional” category, many do not. A truly equity-minded lens in scheduling should allow for multiple class offerings in the mornings, evenings, weekends, as well as opportunities to complete classwork over a few weekend-intensive labs. Our department faculty and staff are willing and interested in this approach (and have had previous success with it); however, this would require college-wide support through funding for both physical and soft infrastructure, and a willingness to allow class offerings at lower than ideal enrollment numbers.

13. Document any substantial changes to your program curriculum since the last review and discuss what prompted these changes. Looking forward, what changes to the curriculum do you plan based on the emerging needs of your discipline, industry, student population, etc.

- Over the last six-year program review period, we’ve had the following substantial changes to our program curriculum:
  - We created a new class in Environmental Sciences. Additionally, based on analysis of Environmental Science degrees in colleges our students transfer to most, we redesigned and established a new AS degree in Environmental Sciences.
  - We created a program in Biotechnology. This program allows for students to gain skill sets required to enter the job market and/or continue their education towards higher certificate levels and/or degrees in biotechnology. The first cohort of this program started classes Spring semester 2024.
  - We created a program in Aquaculture. This program allows for students to gain skill sets required to enter the job market and/or continue their education towards higher certificate levels and/or degrees in aquaculture. The first cohort of this program started classes Spring semester 2024.
- Over the following six-years, we hope to consider changes, updates, and/or creation of new programs in the following areas:
  - Assess general success and student needs in our newly created programs in biotechnology and aquaculture. Adjust and modify curriculum, scheduling, and industry partner relationships as necessary to ensure long-term sustainable programs and student success.
  - Assess job markets for creation of additional workforce programs within the department (e.g., culinary arts; eco-tourism; etc.)
  - Biology Major’s series – Over the last decade, there has been a general drop in enrollment and retention in our biology major’s series (i.e., biology 21, 22, &23). With consideration for these patterns, as well as equity-based reflections on course pre-requisites and time required for program completion, we hope to update this series using an equitable and student-centered pedagogical approach. It is important to the department to make these changes while maintaining the integrity and rigor of this program that has served our previous students well following transfer to four-year programs.
  - With consideration to low success rates in our anatomy classes that are the gateway class to the allied health program, we hope to come up with new and innovative strategies to improve student success.

## E. Evaluation, Effectiveness, and Equity:

Course Success and Retention: Indicate your program's chosen level of analyses for the review (choose one):

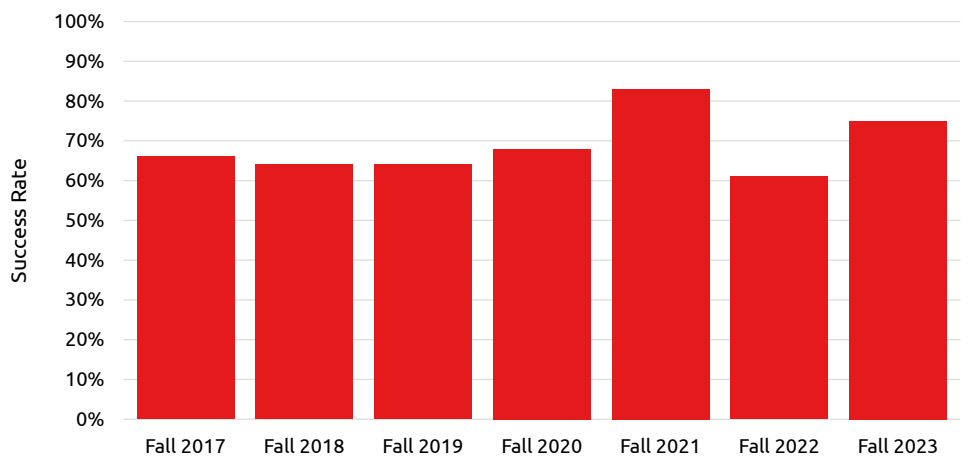
Department-level

14a. Analyze your program's course success and retention against your program's institution-set standards (minimum threshold) and improvement goals. Discuss any significant changes/trends over time. Include your program's plans to improve course success and retention.

- Over the last six years, Life Science Department level overall student success rate was not significantly different from that of the college (LifeSci: 68.7, S.D. +/- 7.7; College: 70.7, S.D. +/- 5.2). Overall, retention rates are also within the range of the college, except for the first of the major's biology courses (i.e. Biology 21) and the first of the allied health program classes (i.e., Anatomy 1). The discrepancy in success/retention in those classes may be due to issues around foundational knowledge gaps for some of the students entering the program, rigorous and demanding workloads, unfamiliarity with the nature of the classes, as well as potential technology challenges, lack of effective study skills, and/or lack of access (or time to access) supportive services. As the department tries to address these issues, we look to create a supportive learning environment with easier access to tutoring, mentoring, and the college STEM program. At the course level, when possible, we hope to use more engaged active teaching/learning strategies, and modify curriculum to be culturally relevant.

## Course Success Rates

Life Science




Measures: Success Rate and Success Count and Attempts

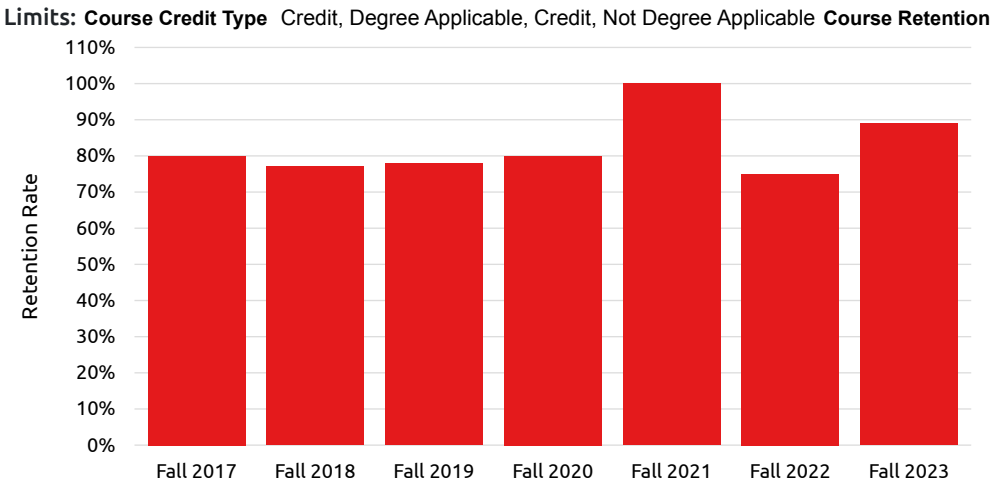
| | Fall 2017 | | | Fall 2018 | | | Fall 2019 | | | Fall 2020 | | | Fall 2021 | | | Fall 2022 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Success Rate | Success Count | Attempts | Success Rate | Success Count | Attempts | Success Rate | Success Count | Attempts | Success Rate | Success Count | Attempts | Success Rate | Success Count | Attempts | Success Rate | Success Count |
| **Measures** | 66% | 2,475 | 3,722 | 64% | 2,278 | 3,550 | 64% | 2,335 | 3,672 | 68% | 2,325 | 3,442 | 83% | 1,862 | 2,230 | 61% | 1,460 |

Credit Courses Only

## Course Retention Rates

Life Science

**Limits:** **Course Credit Type** Credit, Degree Applicable, Credit, Not Degree Applicable **Course Retention** Not Retained, Retained




**Limits:** **Course Credit Type** Credit, Degree Applicable, Credit, Not Degree Applicable **Course Retention** Not Retained, Retained

Measures: Retention Rate

| | Fall 2017 | Fall 2018 | Fall 2019 | Fall 2020 | Fall 2021 | Fall 2022 | Fall 2023 |
|---|---|---|---|---|---|---|---|
| **Measures** | 80% | 77% | 78% | 80% | 100% | 75% | 89% |

Credit Courses Only

14b. Disaggregated data: Which racial/ethnic student group completes their courses at the highest rates? Which racial ethnic groups experience the largest gaps when compared to the highest performing group? Analyze the trends across the last review period.

- Course success rates amongst different equity groups follows a similar pattern in the Life Sciences Department as the College, with Asian and White students having the highest success rates, and Black/African American and Hispanic/Latine/x students having the largest success gaps. The department has the same patterns with success rates as the college when considering gender, as well as special populations that include foster youth, students with disabilities, and veterans. The only discrepancy is in the Black/African American population where the success gap for the college is at -21% but is at -27% at the department level.

14c. Equity Gaps: What factors are contributing to the equity gaps? Consider factors that relate to people, programs, practices, and policies in the classroom, program, or college.

These success gaps may be due to number of factors such as socioeconomic disparities (lower quality K-12 education causing a foundational knowledge gap, as well as lower access to tutors, extracurricular STEM programs, and educational materials), lack of role models and mentorship from populations with the same ethnic background, lack of cultural relevance and inclusivity in curriculum, as well as cultural and stereotypical perceptions.  We hope to address some of these issues with helping students have easy access to equitable and supportive resources. With the help of the college, we also hope to continue anti-bias training, develop more culturally responsive pedagogy, and increase representation of diverse role models and mentors through better hiring processes.

14d. What else does your program need to know to better understand how to address equity gaps in your program's course success and retention rates?

Although there are no specific additional areas that we need information on, the department is open to additional training or consideration of any aspects we may have omitted. We are as a group committed to breaking down the equity gap and are open to suggestions.

## SLO Mastery Rates:

15a. Description of process: Describe your program's processes and practices for defining, assessing, and analyzing learning outcomes. Include a discussion of how your program uses the results of SLO data to inform course and program improvement efforts.

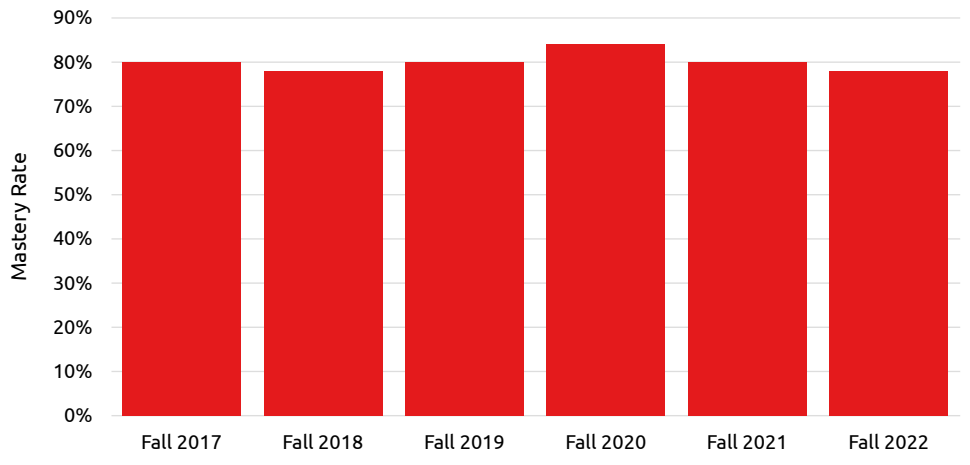
- SLOs for each course were initially developed by groups of faculty with expertise in the area. Every few years, faculty are asked to evaluate their courses (including the SLOs), and if necessary, make recommendations/modifications. Assessment of SLOs, as well as use of results to inform improvement efforts have been at the individual level and there have been no departmental level efforts to use this data for program improvement. This is an area that our department needs to work on.

15b. Most salient findings: Describe the most salient results of course or program SLO mastery rates data over the last review period, including results of disaggregated data. Include a discussion of how the results will be used to improve student learning.

- Department-wide SLO mastery rates have been about 4-7% behind the college level. SLO masteries are however particularly low for our Black/African American and Hispanic Latine/x students. In 2017 and 2018, the gap averaged around 11% relative to the department average. These numbers improved to about 6% between 2019 and 2022 but returned to 11% in 2023. We do not have an explanation for this gap. The process of this program review has brough direct attention to this problem. We have not in the past used this information to improve student learning but recognize the importance of correcting this shortcoming in future.

## Course SLO

Life Science




Measures: Mastery Rate and Successes and Attempts

| | Fall 2017 | | | Fall 2018 | | | Fall 2019 | | | Fall 2020 | | | Fall 2021 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mastery Rate | Successes | Attempts | Mastery Rate | Successes | Attempts | Mastery Rate | Successes | Attempts | Mastery Rate | Successes | Attempts | Mastery Rate | Successes | Attempts | Mastery Rate |
| **Measures** | 80% | 5,044 | 6,271 | 78% | 5,680 | 7,308 | 80% | 6,410 | 7,977 | 84% | 5,278 | 6,277 | 80% | 4,230 | 5,311 | 78% |

## Degrees and Certificates:

16a. Analyze your program's degree and certificate award trends against your department's institution-set standards (minimum threshold) and improvement goals. Document any significant changes or trends over the last review period.

- It is difficult to analyze our program's degree trends over the last program review cycle. The major degree given to those interested in the Life Sciences is an A.A. in General Sciences. However, this degree also includes every student interested in the Life Sciences degrees, but also those from the Physical Sciences, as well as the Earth Sciences. The only degree that we do specifically give out is that of Environmental Sciences, but here the numbers are unfortunately too low for any meaningful analysis. Overall, we believe that improvements to our Science Biology Major's classes, as well as our Allied Health series classes (both assessed above) are the trends we need to follow and attempt to make improvements on most closely. We hope in the next program review cycle to have data on our new certificates/degrees in aquaculture, biotechnology, and hopefully other new programs yet to be developed.

# Degrees and Certificates

Life Science

Measures: Degrees and Certificates

| Award Type Detailed | Program Title | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 | 2022-2023 |
|---|---|---|---|---|---|---|---|---|
| **A.S.-T** | **Nutrition and Dietetics** | 1 | 5 | 3 | 5 | 9 | 11 | 8 |
| | **Total** | 1 | 5 | 3 | 5 | 9 | 11 | 8 |
| **Total** | | 1 | 5 | 3 | 5 | 9 | 11 | 8 |

16b. Which student racial/ethnic groups disproportionately earn more awards in your program? Which racial/ethnic groups earn disproportionately fewer degrees and certificates?

- N/A Please see explanation in 16 a

16c. Based on your analyses, what changes is your program exploring, including addressing any equity gaps?

### If applicable:

17a. Labor Market Data: Discuss the labor market demand for your program. What is the gap between demand and supply? How does labor market data inform your overall program planning?

- Recent labor market data, as well as direct information from local industry partners suggest a strong workforce need in entry level positions in biotechnology, particularly in California. We developed our program in biotechnology to address this workforce need, and to offer a pathway for our students for high wage entry level positions. Our program is designed to allow students to continue their education and advance their careers while active in the job market.
- In case of aquaculture, labor market data and information from our industry partners suggest a smaller current need, but indications are that there is potential and likelihood for future growth and strong job market in this area. Our program in aquaculture was designed to offer quick access to entry level positions, with the option for continued education for job advancement.
- The Life Sciences Department also provides the programs required for any student interested in the biological, nutrition, environmental, and medical fields. Given the expected growth in biotechnology industry, bioremediation and jobs addressing climate change, medical research initiatives, science education, health and nutrition, and expansion of the healthcare sector with consideration for an aging population, all suggest a strong need for the various programs offered within our department.

17b. Additional Assessment: Describe the results of any additional assessment or evaluation your program conducts and how the findings inform program planning and improvement.

- The Life Sciences faculty are highly trained professionals that are in continued contact/involvement with members of relevant industries, professional organizations, and colleagues in research institutions. Some, continue active participation in their field of expertise as researchers, consultants, or industry professionals. All these activities result in a continued assessment, evaluation, and adjustment of our curriculum so that our students have access to the most recent and relevant information in their areas of study.

## F. Your Program's Past and Future

### Past Action Plan:

18. Discuss the progress made on the action plan and objectives from your program's last review.

- Continue to update curriculum and equipment to keep up with the fast changing/advancing biological sciences field.

Curriculum updates are ongoing. Although some equipment updates have been made, overall, this has been difficult to address due to budgetary constraints.

- Continue to offer a broad range of classes for students to fulfill major requirements, professional program prerequisites, general education/continuing education requirement.

We have done our best in this area. Faculty were able to quickly adjust to pandemic needs and continue to offer the classes needed. Currently, class cuts due to budget constraints are however preventing us to serve our students as needed.

- Establish new certificates of achievement in Post-Baccalaureate Allied Health and Natural History/Wildlife management, to provide guidance in these courses of study, as well as to further address Environmental Literacy initiatives.

Although certificates were not established in the areas initially planned, we did create new programs in aquaculture and biotechnology.

- Address low enrollment and success rates observed in ethnically underrepresented populations.

Continue to collect data and develop new and innovative ways to bridge the observed performance gap.

This area is a “work in progress” for the Life Sciences Department. We continually work to break the achievement gap observed amongst underrepresented populations. Given the effect of the pandemic, and the post-pandemic budgetary issues of the college, it is difficult to know the full impact of our efforts. We do however recognize that a major success gap remains, and we must find better ways to address it.

### Future Action Plan:

19a. Considering your program’s past plan and this review’s findings, what challenges and concerns need to be addressed in the next review period?

The primary areas that need to be addressed are in closing equity gaps, increasing overall student success and retention, and maintaining relevancy in the everchanging and advancing biological fields.

19b. Identify 1 – 5 goals for your next review period’s Action Plan to address your program's challenges and concerns. Label the goals Ongoing, Revised, or New.

1. Continue work on low enrollment and success rates observed in underrepresented populations. (Ongoing)
2. Address low success rates amongst the first of our allied health courses. (New)
3. Update the Biology Majors’ course series to address student needs and equity concerns. (New)
4. Address the needs of our newly developed programs in biotechnology and aquaculture, build capacity, and help programs achieve a self-sustaining institutionalized status. (New)
5. Explore new workforce development areas to begin new certificates. (New)

## G. Resources and Budget

20. What are the most critical resources needed to implement your program’s Action Plan in the next review period?

1. **Faculty and Staff –**
   - The Life Sciences Department needs to hire and retain both fulltime and adjunct faculty, as well as laboratory technicians with expertise in their respective fields. We need to replace faculty that either retire or resign, and we must hire new faculty with expertise in advancements in their fields, new workforce development areas, and the ability and desire to address equity concerns in STEM education. Sufficient laboratory technicians must be hired to help faculty fully address their classroom needs. Additionally, we need to establish a collegewide commitment to institutional values that promote faculty retention -  These can take the form of not only competitive compensation and benefits, but also support for professional development, recognition of quality work, and establishment of a collaborative and supportive environment that appreciates workload balance and flexibility, as well as quality of life factors.

1. **Budgetary Needs –**
   - Infrastructure and facilities - We are excited for the new Math-Science building where we expect to offer our anatomy and genetics classes beginning Spring Semester 2025. However, we need funds to upgrade our current science building where most of our classes will continue to be taught, and we require updating of equipment and technology to keep up with scientific advancement in the various biological fields. Additional funds would be helpful in establishing collaborative partnerships and continued professional development and training for our faculty.

21. If additional resources are needed to implement your Action Plan, what new funding sources and/or budget reallocations is your program exploring?

- Although most of our funding comes directly from the college, we do rely on various grants through federal and state agencies to supplement our programs, particularly those associated with workforce development. The college recently hired a new Program Manager for our department to address our needs associated with the biotechnology and aquaculture programs. Part of the duties of this PM will be to explore new funding sources not only for these programs, but also for other potential areas.

---

This form is completed and ready for acceptance.