

Program Review Summary Page
For Instructional Programs

Program or Area(s) of Study under Review: Biology

Term/Year of Review: Spring 2020

Summary of Program Review:

A. Major Findings

1. Strengths:

1. Demand for Biology courses is strong. Fill rates are among the highest in the institution.
2. Biology has developed two new Associates degrees, the AS in Natural Science-Life Science and the AS in Pre-Health Science, which were activated in the 2018-2019 academic year.
3. Biology has been involved in many outreach programs to stimulate interest in the biological sciences and other STEM fields.

2. Areas for Improvement:

1. Equity analysis shows that the retention rate for African Americans and the completion rate for African Americans, Hispanics, and first generation students are lower than the institutional average.

3.

I. PROGRAM DATA

A. Demand

1.

RPIE Analysis: Over the past three years, the Biology Program has claimed an average of 29.8 students per section. The average class size in the program has exceeded the average class size of 25.1 students per section across the institution during this period. Average class size in the program decreased slightly (by 1.5%) between 2016-2017 and 2018-2019. Average class size at the institutional level remained stable between 2016-2017 and 2018-2019.

Average class size in the following courses changed by more than 10% ($\pm 10\%$) between 2016-2017 and 2018-2019:

Courses with increases in average class size:

- o BIOL-240 (17.9%)*
- o BIOL-112 (17.3%)*
- o BIOL-120 (11.5%)*

Course with a decrease in average class size:

- o BIOL-105 (-23.6%)*

Program Reflection:

The average class size in most Biology classes is determined by the size of its labs. The labs have space for 30 students per section. It becomes a safety issue to have more than 30 students in a lab at one time so the number of students enrolled per section should not be expected to grow.

When you consider that we have a program average of 29.8 students per section, this means that sections in Biology are at 99.3% of capacity. Perhaps more importantly, and more meaningful, is the fact that the average class size in 2017-2018 was 30.7 students per section in a lab room that only holds 30 students. In more than half our class (6 of 11) we are at more than 100% of capacity.

Not surprisingly, the more advanced classes like BIOL 220 have slightly lower enrollments. The requirements for entering this class are among the most restrictive and the discipline is narrower than other Biology classes.

The decrease in average class size in BIOL 105 was a result of adding the CHEM 110 pre/co-requisite to the course. Once this requirement is in place for a few years, it is expected that BIOL 105 class size will increase and stabilize.

Overall, the Biology program is in high demand and running at capacity. It is not possible to increase the size of the sections without compromising safety and instructional effectiveness. To be safe, there must be limits on the size that these labs are allowed to grow. Labs in the Life Sciences building hold 30 students by design, and this works well for students in the program. Larger labs become unsafe, reduce instructor-student interaction, and are not recommended.

3. Fill Rate and Productivity

Fill Rate*			
	Enrollments*	Capacity	Fill Rate
2016-2017	1,558	1,620	96.2%

RPIE Analysis: Fill rates within the Biology Program tend to be higher than the fill rates at the institutional level. [Compare program-level rate of 93.8% to institution-level rate of 80.3% over the past three years.] Between 2016-2017 and 2017-2018, enrollment increased and capacity increased, resulting in a slight decrease in fill rate. Between 2017-2018 and 2018-2019, enrollment and capacity decreased, resulting in a decrease in fill rate.

Productivity was relatively consistent over the three-year period, ranging from 15.2 to 16.5. [Productivity has not been calculated at the institutional level.] The three-year program productivity of 15.7 is lower than the target level of 17.5, which reflects 1 FTEF (full-time equivalent faculty) accounting for 17.5 FTES (full-time equivalent students) across the academic year. (This target reflects 525 weekly student contact hours for one full-time student across the academic year.)

**Note: Fill rates and productivity reported in the table do not include 5 Biology section offerings for summer terms over the past three years. As a result, the enrollment figures reported here might differ from those reported in Section I.A.1.*

Program Reflection:

The Biology program carefully plans the number of sections offered to correspond to the anticipated demand. We err on the side of too few sections when demand is unclear and then add sections as necessary. This keeps our fill rates high – at or near capacity.

A direct consequence of the way we plan our sections is that our productivity has remained relatively constant over the last few years. Productivity is measured as the ratio of the number of FTES to FTEF. It should be noted that productivity calculations are artificially low for laboratory classes, because each three hours of lab count as only one unit in FTES calculations, which decreases the numerator in the productivity ratio.

Productivity in the Biology program is at an appropriate level considering the high fill rates of biology classes and necessary limitations on lab class sizes. It is expected that productivity will remain relatively constant over the next few years.

4.

RPIE Analysis: Over the past three years, the retention rate for the Biology Program was significantly lower than the rate at the institutional level. The retention rates for BIOL-105, BIOL-218, and BIOL-219 were significantly lower than the program-level rate. The retention rates for BIOL-103, BIOL-110, BIOL-112, BIOL-117, BIOL-120, and BIOL-241 were significantly higher than the program-level rate. The retention rate for Biology Program falls in the 13.5th percentile among program-level retention rates (across 59 instructional programs, over the past three years).

Over the past three years, the successful course completion rate for the Biology Program was significantly lower than the rate at the institutional level. The successful course completion rates for BIOL-103, BIOL-105, and BIOL-218 were significantly lower than the program-level rate. The successful course completion rates for BIOL-110, BIOL-112, BIOL-117, BIOL

RPIE Analysis: This analysis of student equity focuses on the three demographic groups with significantly lower retention and/or successful course completion rates found at the institutional level (vs. the corresponding rates among all students) over the past three years. Tests of statistical significance were conducted to compare program-level and institution-level rates among the three groups listed above.

Within the Biology Program, the retention rate among Black/African American students was significantly lower than the retention rate at the institutional level.

Within the Biology Program, the successful course completion rates at the program level were significantly lower than the rates at the institutional level for all three groups.

This pattern reflects the

3.

Program Reflection:

The Biology department recently made significant changes to the AS degrees offered through the program. The new AS-Natural Science (AS-NS) degree is more rigorous than the AS-Natural Science and Mathematics (AS-NSM) degree that it replaces, and we created a new AS-Pre-Health Science (AS-PHS) degree. We believe these new degrees are more academically meaningful, and will be more useful to our biology and pre-health science students moving forward.

Because these degrees have only been offered starting in 2018-19, multi-year data are not yet available to evaluate trends in degrees awarded. We anticipate that we will see increase in number of these degrees awarded over the next few years, as the previous AS-NSM degree is phased out and more students become aware of the new degrees. Because of the rigorous nature of both degrees, we do not expect the average time to degree to change significantly, but implementation of Guided Pathways may help to reduce the average time for completion of the AS-Pre-Health Science degree.

2. Program-Set Standards: Job Placement and Licensure Exam Pass Rates

This section does not apply to the Biology Program, as the discipline is not included in the Perkins IV/Career Technical Education data provided by the California Community Colleges # \ ffile, and licensure exams are not required for jobs associated with the discipline.

II. CURRICULUM

A. Courses

Subject	Course Number	Approval Date	Has Prerequisite* Yes/No
---------	---------------	---------------	-----------------------------

Learning Outcomes Assessment at the Program/Degree/Certificate Level

Degree/Certificate	Number of Outcomes*	Number of Outcomes Assessed		Proportion of Outcomes Assessed	
		Over Last 4 Years	Over Last 6 Years	Over Last 4 Years	Over Last 6 Years
AS – Natural Science, Life Science	3	2	2	66%	66%
AS - Pre-Health Science	2	2	2	100%	100%

Program Reflection:

Since the new AS degrees have only been active for one year, there is not sufficient data to assess learning outcomes for them. In addition, the Biology department will need to coordinate learning outcomes assessment with the Chemistry department for the AS-NS degree. This degree has a substantial chemistry component and one of its program-level SLOs is associated with a CHEM 120 SLO. This analysis would need to identify and separately assess the subgroup of students who have taken both CHEM 120 and BIOL 120, in order for the results to be applicable to the AS-NS, Life Science degree. We anticipate this will be done in time for the next program review cycle.

B.

Currently the full time faculty share their course Canvas sites with adjunct faculty teaching the same course to give the adjuncts access to all the material that has been developed.

Assessment data has also been used to identify areas where, when comparing sections of the same course, differences in results between sections indicated that there were differences in rigor and level of detail of topics. The department strives to maintain consistency in rigor and content across sections, this data can identify courses where more collaboration between instructors is needed to maintain this consistency.

SLO assessment tools have also improved, rubrics have been developed and shared with the students. This has given the students a better understanding of what is expected of them with the

Describe the current state of program resources relative to the plan outlined above. (Resources include: personnel, technology, equipment, facilities, operating budget, training, and library/learning materials.) Identify any anticipated resource needs (beyond the current levels) necessary to implement the plan outlined above.

Note: Resources to support program plans are allocated through the annual planning and budget process (not the program review process). The information included in this report will be used as a starting point, to inform the development of plans and resource requests submitted by the program over the next three years.

Description of Current Program Resources Relative to Plan:

No additional resources are needed to implement the three-year plan.
--

V. PROGRAM HIGHLIGHTS

A. Recent Improvements

The B7nBT/F3 11.04 Tf1 0 0 1 63.504 531.58 Tm0 G()TJET@.00000400000912 0 612 792 reW* nBT/F2 11.0

Feedback and Follow-up Form

Completed by Supervising Administrator:

Robert Van Der Velde, Senior Dean, Arts
& Sciences

Date:

04/30/20

Strengths and successes of the program, as evidenced by analysis of data, outcomes assessment, and curriculum:

Biology is a strong program, academically rigorous, and with careful attention to enrollment management and planning. The new AS Natural Science and AS Pre-Health degrees are valuable contributions to the academic offerings of the college. The program is fortunate to have excellent full-time and part-time faculty, and enjoys good lab facilities.

Areas of concern, if any:

Significant enrollment declines in BIOL 105 (likely due to adding a Chemistry co-/pre-requisite and hopefully short lived) and very low success rates in that class constitute a cloud on an otherwise sunny horizon for Biology; without those declines the program would undoubtedly be classified as "Growth". BIOL 105 is a gateway into remaining courses in the program, and fewer students passing that course will have a ripple effect in enrollments throughout subsequent courses.

Recommendations for improvement:

The Biology faculty should become engaged in the development of Guided Pathways, as Biology is a very important path into allied health professions as well as transfer to Biology majors. Because of concerns about student success, BIOL 105 is a prime candidate to be an early adopter of the forthcoming Starfish early alert system with strong connections to Counseling. In addition, the faculty should consider participating in equity-minded training programs, as disparities in student success exist among some demographic groups.

Anticipated Resource Needs:

Resource Type	Description of Need (Initial, Including Justification and Direct Linkage to State of the Program)
Personnel: Faculty	Biology continues to need an additional full-time faculty member with expertise in Botany.
Personnel: Classified	
Personnel: Admin/Confidential	
Instructional Equipment	Lab equipment should be updated, with unit plan requests for refurbishing microscopes a high priority.
Instructional Technology	Unit plans have consistently requested addressing classroom screens that are not functional, and these should be funded.
Facilities	
Operating Budget	

Professional Development/ Training	As noted above, participation in equity-minded instruction training should be encouraged.
Library & Learning Materials	