Program or Area(s) of Study under Review:

BIOLOGY

Summary of Program Review:

A. Major Findings

1. Strengths:

Although enrollments are down across the institution, demand for Biology courses is still relatively strong. The department maintains a high level of academic rigor. The department has well qualified faculty, both adjunct and full-time.

2. Areas for Improvement:

Equity analysis shows the retention rate among African American/Black and the successful course completion rate for African American/Black students, Latinx/Hispanic and first-generation students were lower than the institutional average.

3. Projected Program Growth, Stability, or Viability:

The biology program is currently in a relatively stable phase and this trend is likely to continue into the foreseeable future.

B. Program's Support of Institutional Mission and Goals

1. Description of Alignment between Program and Institutional Mission:

The Biology Department offers courses for transfer students in biology, prerequisite courses for pre-health science students, and general education courses in life sciences. The department faculty and staff are dedicated to providing excellent instruction and academic support to meet the diverse needs of our students.

2. Assessment of Program's Recent Contributions to Institutional Mission:

Provided quality instruction, preparing students for transfer, during a pandemic.

3. Recent Program Activities Promoting the Goals of the Institutional Strategic Plan and Other Institutional Plans/Initiatives:

The Biology Department offers classes which prepare students for transfer, health sciences and general education. In addition, two new Associates degrees, the AS in Natural Science-Life Science and the AS in Pre-Health Science were introduced in the 2018-2019 academic year. Since the introduction, 331 of these AS degrees have been conferred.

C. New Objectives/Goals:

Continue to improve the student success rates and retention among all equity groups

D. Description of Process Used to Ensure "Inclusive Program Review"

The Program Coordinator was the lead writer with input from both adjunct and full time faculty and the Instructional Assistant.

This report covers the following program, degrees, certificates, area(s) of study, and courses (based on the Taxonomy of Programs on file with the Office of Academic Affairs):

Program	**Biology**
Area of Study	Biology
Degree(s)/Certificate(s)	Natural Science: AS Pre-Health Science: AS
Courses	BIOL 103
	BIOL 105
	BIOL 110
	BIOL 112
	BIOL 117
	BIOL 120
	BIOL 199
	BIOL 218
	BIOL 219
	BIOL 220
	BIOL 240
	BIOL 241

Taxonomy of Programs, July 2022

I. PROGRAM DATA

A. Demand

1. Headcount and Enrollment

	2019-2020	2020-2021	2021-2022	Change over 3-Year Period
Headcount				
Within the Program	**1,125**	**1,214**	**979**	**-13.0%**
Across the Institution	**8,285**	**7,193**	**6,646**	**-19.8%**
Enrollments				
BIOL-103	209	239	159	-23.9%
BIOL-105	267	318	278	4.1%
BIOL-110	211	231	170	-19.4%
BIOL-112	169	219	176	4.1%
BIOL-117	65	61	60	-7.7%
BIOL-120	69	69	58	-15.9%
BIOL-218	107	90	80	-25.2%
BIOL-219	151	140	132	-12.6%
BIOL-220	89	90	67	-24.7%
BIOL-240	27	26	22	-18.5%
BIOL-241	27	24	21	-22.2%
Within the Program	**1,391**	**1,507**	**1,223**	**-12.1%**
Across the Institution	**33,414**	**30,381**	**25,203**	**-24.6%**
Source: SQL Queries for Spring 2023 Program Review				

RPIE Analysis: The number of students enrolled (headcount) in the Biology Program decreased by 13.0% over the past three years, while headcount across the institution decreased by 19.8%. Enrollment within the Biology Program decreased by 12.1%, while enrollment across the institution decreased by 24.6%.

Enrollment in the following courses changed by more than 10% (±10%) between 2019-2020 and 2021-2022:

Courses with enrollment decreases:

- *BIOL-218 (-25.2%)*
- *BIOL-220 (-24.7%)*
- *BIOL-103 (-23.9%)*
- *BIOL-241 (-22.2%)*
- *BIOL-110 (-19.4%)*
- *BIOL-240 (-18.5%)*
- *BIOL-120 (-15.9%)*
- *BIOL-219 (-12.6%)*

Program Reflection:

Enrollment and head counts declined in the program and at Napa Valley College in 2021-2022. The Biology program has experienced less of a decline compared to the institutional level. Some of the greatest declines came in the two GE courses, Introduction to Nutrition (Biol 103) and Survey of Biology (Biol 110). This may reflect the overall decline at the institution. But declines were also seen in the science major's courses (Biol 120, 240 and 241) and in the pre-health science courses (Biol 218, 219 and 220). One of the contributing factor to the decline in enrollments for these pre-health science courses is the reduction in class capacity limit to allow for a

return to in person laboratories and comply with COVID restrictions. Biol 220 remained in person instruction throughout the pandemic but reduced class size to 12 students per section. In 2020-21 the number of sections was increased to accommodate more students but this was not feasible in 2021-2022 due to limited staffing. Biol 218 and 219 returned to in-person laboratories in Fall 2021 but with a reduced class capacity of 24.

Human Biology (Biol 105) showed a modest gain in enrollments, this is a prerequisite course for the rest of the pre-health science courses. The gain in this course will likely lead to a gain in the subsequent courses in this track.

Strategies to increase enrollments in the program should include more outreach to the local high students to attract more science majors and general education students. Increasing student success in the lower-level pre-health science course (Biol 105) can lead to increases in enrollments in the upper-level courses.

Average Class Size

	2019-2020		2020-2021		2021-2022		Three-Year	
	Sections	**Average Size**	**Sections**	**Average Size**	**Sections**	**Average Size**	**Average Section Size**	**Trend**
BIOL-103	5	41.8	6	39.8	4	39.8	40.5	-4.8%
BIOL-105	10	26.7	11	28.9	10	27.8	27.8	4.1%
BIOL-110	7	30.1	7	33.0	6	28.3	30.6	-6.0%
BIOL-112	5	33.8	6	36.5	5	35.2	35.3	4.1%
BIOL-117	2	32.5	2	30.5	2	30.0	31.0	-7.7%
BIOL-120	3	23.0	2	34.5	2	29.0	28.0	26.1%
BIOL-218	4	26.8	4	22.5	4	20.0	23.1	-25.4%
BIOL-219	5	30.2	5	28.0	5	26.4	28.2	-12.6%
BIOL-220	4	22.3	8	11.3	5	13.4	14.5	-39.9%
BIOL-240	1	27.0	1	26.0	1	22.0	25.0	-18.5%
BIOL-241	1	27.0	1	24.0	1	21.0	24.0	-22.2%
Program Average*	**47**	**29.6**	**53**	**28.4**	**45**	**27.2**	**28.4**	**-8.1%**
Institutional Average*	**1,332**	**25.1**	**1,202**	**25.3**	**1,111**	**22.7**	**24.4**	**-9.6%**

Source: SQL Queries for Spring 2023 Program Review

Average Section Size across the three-year period for courses, and both within academic years and across the three-year period for the program and institutional levels is calculated as:

$$\frac{\text{Total \# Enrollments}}{\text{Total \# Sections}}.$$

It is not the average of the three annual averages.

RPIE Analysis: Over the past three years, the Biology Program has claimed an average of 28.4 students per section. The average class size in the program has exceeded the average class size of 24.4 students per section across the institution during this period. Average class size in the program decreased by 8.1% between 2019-2020 and 2021-2022. Average class size at the institutional level decreased by 9.6% over the same period.

Average class size in the following courses changed by more than 10% (±10%) between 2019-2020 and 2021-2022:

Course with an increase in average class size:

- *BIOL-120 (26.1%)*

Courses with decreases in average class size:

- *BIOL-220 (-39.9%)*
- *BIOL-218 (-25.4%)*
- *BIOL-241 (-22.2%)*
- *BIOL-240 (-18.5%)*
- *BIOL-219 (-12.6%)*

Program Reflection:

Although head counts were down in 2021-2022, the class sizes remained relatively strong. The classes held in a laboratory are limited to 30 students per section, therefore the average class size of 28 is at or near capacity. The introductory lab courses all had close to or above capacity section sizes (Biol 105, 110, 117 and 120). Some of the upper level lab classes had smaller class sizes (Biol 218, 220, 240 and 241). As stated above, there was a reduction in the class capacity limit due to COVID restrictions. Biol 220 remained in person instruction throughout the pandemic but reduced class size to 12 students per section. The Biol 220 had at or above capacity for these years. Biol 218 and 219 returned to in-person laboratories in Fall 2021 but with a reduced class capacity of 24 and this is reflected in the lower class sizes. Although the section sizes in the upper-level science major courses are below the capacity, they are required for our students to transfer to four-year institutions.

The number of sections that are offered are consistent with the current demand.

2. Fill Rate and Productivity

Fill Rate			
	Enrollments	**Capacity**	**Fill Rate**
2019-2020	1,391	1,530	90.9%
2020-2021	1,507	1,581	95.3%
2021-2022	1,223	1,403	87.2%
Three-Year Program Total	**4,121**	**4,514**	**91.3%**
Productivity			
	FTES	**FTEF**	**Productivity**
2019-2020	270.8	17.5	15.5
2020-2021	280.6	20.3	13.8
2021-2022	235.1	17.5	13.4
Three-Year Program Total	**786.5**	**55.3**	**14.2**
Sources: SQL Queries for Spring 2023 Program Review; SQL Server Reporting Services – Term to Term Enrollment FTES Load Comparison Report (by Credit Course)			

<u>RPIE Analysis</u>: The fill rate within the Biology Program ranged from 87.2% to 95.3% over the past three years, and the fill rate across the three-year period was 91.3%. [Fill rate has not been calculated at the institutional level.] Between 2019-2020 and 2020-2021, both enrollment and capacity increased, resulting in an increase in fill rate (due to a higher rate of increase in enrollment). Between 2020-2021 and 2021-2022, both enrollment and capacity decreased, resulting in a decrease in fill rate (due to a higher rate of decrease in enrollment).

Productivity within the Biology Program ranged from 13.4 to 15.5 over the past three years, totaling 14.2 across the three-year period. [Productivity has not been calculated at the institutional level.] The three-year program productivity

of 14.2 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.)

Program Reflection:

The Biology program carefully plans the number of sections offered each semester, this is reflected in our high class fill rates. Even though the fill rates decreased in 2021-2022, they remained relatively high. As we engage in outreach strategies to increase enrollments and student success, this should also be reflected in an increased fill rate.

Since 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.

3. Labor Market Demand

This section does not apply to the Biology Program, as it is not within the Career Technical Education Division.

B. Momentum

1. Retention and Successful Course Completion Rates

	Retention Rates (Across Three Years)			Successful Course Completion Rates (Across Three Years)		
Level	**Rate**	**Course Rate vs. Program Rate**		**Rate**	**Course Rate vs. Program Rate**	
		Above	**Below**		**Above**	**Below**
BIOL-103	86.1%		X	66.8%		***X***
BIOL-105	85.3%		***X***	62.7%		***X***
BIOL-110	95.0%	***X***		85.8%	***X***	
BIOL-112	93.2%	***X***		81.8%	***X***	
BIOL-117	96.8%	***X***		77.8%	X	
BIOL-120	87.0%		X	67.4%		X
BIOL-218	70.0%		***X***	54.5%		***X***
BIOL-219	84.6%		***X***	72.6%	--	--
BIOL-220	88.1%	--	--	80.5%	***X***	
BIOL-240	91.3%	X		82.6%	***X***	
BIOL-241	100%	***X***		100%	***X***	
Program Level	**88.1%**			73.0%		
Institutional Level	89.6%			74.0%		

Source: SQL Queries for Spring 2023 Program Review
-- Indicates a value that is within 1% of the program-level rate.
Bold italics denote a statistically significant difference between the course-level rate and the program-level rate.

Bold denotes a statistically significant difference between the program-level rate and the institutional rate.
Note: Grades of EW (Excused Withdrawal) for spring 2020 and beyond are not included in the calculations of the three-year retention and successful course completion rates reported above. This approach reflects the standard recommended research practice of not including EWs in either the numerator or the denominator for these rates.

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-110, BIOL-112, BIOL-117, and BIOL-241 were significantly higher than the program-level rate. The retention rate for the Biology Program falls within the first quartile (Q1) among program-level retention rates (across 58 instructional programs, over the past three years). The retention rate for Biology is among the lowest 25% of retention rates among NVC programs.

Over the past three years, the successful course completion rate for the Biology Program reflected 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. Biology courses with successful course completion rates significantly higher than the program-level rate are noted in the table above. The successful course completion rate for the Biology Program falls within the second quartile (Q2) among program-level successful course completion rate (across 58 instructional programs, over the past three years). The successful course completion rate for Biology falls within the 25%-50% range of successful course completion rates among NVC courses.

Over the past three years, the difference between retention and successful course completion at the program level (15.1%) mirrored the difference at the institutional level (15.6%). This figure represents the proportion of non-passing grades assigned to students (i.e., grades of D, F, I, NP).

The following Biology courses claimed a difference (between retention and successful course completion) that exceeded 10%:

- *BIOL-105 (22.6%)*
- *BIOL-120 (19.6%)*
- *BIOL-103 (19.3%)*
- *BIOL-117 (19.0%)*
- *BIOL-218 (15.5%)*
- *BIOL-219 (12.0%)*
- *BIOL-112 (11.4%)*

Program Reflection:

The program level successful course completion rates are above the institution-set standard of 70% and comparable to the institutional level rates. But there are still some courses that have lower than the institution-set standard rates, including Biol 103, 105 and 218. Biology 105 is the introductory pre-health occupations course and has had low successful course completion rates in the past. Although the rate is still low, 62.7%, it is significantly higher that the rates seen in the last program review (2016-2019) when the rate was 46.7%. We believe this increase is due to Chem 110 being added as a pre/co-requisite. Additionally, a great deal of material was developed to aid the students. Videos of all the lectures were produced and added to the Canvas site so the students could watch the lectures many times and at their convenience. Many pre-lab exercises and activities were developed to prepare the students for the lab, allowing the students to get more out of the laboratory experience.

Another course that still has low rates but has made improvements is Biol 103. This was offered online prior to the pandemic, the increase in success rates may be due, in part, to the students gaining experience taking online classes during the pandemic. Other courses that showed increases in student success from the previous program review include: Biol 110, 219, 240 and 241. This may be due to the creation of additional material including videos of the lecture material.

Human Anatomy (Biol 218) continues to have low success rates, but this is not surprising. This is a challenging course and is designed to prepare students for a career in nursing. This goal is to give the students the knowledge and preparation to succeed at the next level of their career path. This rigorous course became even more challenging for students during the pandemic when much of the instruction was given online. Anatomy is a hands-on course where the students benefit from the interactive labs with models and dissections. General Biology (Biol 120) also has a relatively low success rate (67.4%) but this is also not surprising. This is a rigorous introductory course for the science major students and is designed to prepare these students for the upper level courses and to transfer to four-year institutions.

Biology has three distinct paths: pre-health science, general education and science majors. The student course completion rates are different between the paths. The program-level success rate is 73% but the pre-health science path courses average 67.6%, the general education courses average 78% and science major's courses average 83%. These rates reflect the greater rigor of the pre-health science courses compared to the general education courses -, as well as differences in student preparation for biology courses, with the science major students in general being more prepared to succeed in rigorous courses.

Although lower student success rates are to be expected in the more rigorous pre-health science courses and some introductory courses, we are identifying and implementing strategies to increase these rates, particularly in the pre-health science courses. Strategies for improving student success that have been identified include additional training -of department faculty in ways to increase success for students in the sciences. Science classes have a level of rigor and complexity that is new to most freshman college students. Inviting outside professionals who specialize in developing and implementing strategies that increase student success in the sciences may be very beneficial. Additional strategies include examining our assessment data to identify specific areas for improvement.

2. Student Equity

	Retention Rates (Across Three Years)		Successful Course Completion Rates (Across Three Years)	
	Program Level	**Institution Level**	**Program Level**	**Institution Level**
African American/Black	83.2%	86.4%	***57.4%***	65.6%
Latinx/Hispanic		88.7%	69.9%	70.3%
First Generation		89.2%	71.4%	72.7%
Veteran		91.1%	72.6%	71.9%
19 or Younger		89.8%	74.2%	72.3%

Source: SQL Queries for Spring 2023 Program Review

Bold italics denote a statistically significant difference between rates at the program and institutional levels, with the lower of the two rates in ***bold italics***.

Shaded cells pertaining to retention rates indicate that statistically significant differences for those groups were not found at the institutional level.

Note: Grades of EW (Excused Withdrawal) for spring 2020 and beyond are not included in the calculations of the three-year retention and successful course completion rates reported above. This approach reflects the standard recommended research practice of not including EWs in either the numerator or the denominator for these rates.

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

Within the Biology Program, the retention rate among African American/Black students was lower than the rate at the institutional level. (The difference was not statistically significant.)

Within the Biology Program, the successful course completion rate among African American/Black students was significantly lower than the rate at the institutional level. The successful course completion rates among Latinx/Hispanic and first-generation students were lower at the program level vs. the institutional level, while the successful course completion rates among veterans and students ages 19 or younger at the program level were higher than the corresponding rates at the institutional level. (The differences were not statistically significant.)

The findings regarding African American/Black students deviate from the findings that emerged from the comparison of retention and successful course completion at the program vs. institutional level, where the program-level rate was significantly lower than the institution-level rate for retention and the program-level rate mirrored the institution-level rate for successful course completion. (See Section I.B.1 above.)

Program Reflection:

The successful course completion rates for African American/Black students was markedly lower than the rate for this equity group at the institutional level and for all students at the program level. Although the success rates were lower, this was an improvement over the previous program review period (2016-2019) where the success rate was 49.5%. As noted above, the success rates for the three paths vary, therefore we also looked at the success rates of African American/Black students in the three paths compared to the institutional averages. The success rates were lower in both the pre-health science courses (49% vs 67.6% institution-level) and general education courses (59.5% vs 78%). There were not enough African American/Black students in the major's courses to generate meaningful data for that path.

The successful course completion rates for Latinx/Hispanic, First Generation, and Veteran students were not significantly different from institutional averages. The success rates for Latinx/Hispanic and first generation students showed an improvement from the previous program review data. The overall success rates for Latinx/Hispanic students increased from 62.7% to 69.9% and for first generation students, the rates increased from 63% to 71.4%

To continue to improve the student success rates among all equity groups, we have requested training to Biology faculty in strategies to increase student success, with an emphasis on promoting equitable outcomes, from outside of the institution trainers with experience in training specifically in the sciences. Since the greatest challenges to student success are seen in the pre-health science courses, our focus will be on these courses.

3. Retention and Successful Course Completion Rates by Delivery Mode (of Courses Taught through Multiple Delivery Modes, i.e., In-Person, Hybrid, and Online)

	Retention Rates (Across Three Years)			Successful Course Completion Rates (Across Three Years)		
	In-Person	Hybrid	Online	In-Person	Hybrid	Online
BIOL-110						
Hybrid vs. Online		90.6%	96.8%		***79.9%***	96.8%
BIOL-112						

Hybrid vs. Online		94.4%	89.2%		88.9%	77.7%
BIOL-117						
Hybrid vs. Online		96.6%	90.3%		65.5%	77.4%
Program Level						
Hybrid vs. Online		**91.9%**	**90.4%**		**78.5%**	**80.4%**

Source: SQL Queries for Spring 2023 Program Review
This table compares student performance in courses offered through multiple delivery modes within the same academic year.
Bold italics denote a significantly lower rate within that delivery mode.
Note: The analysis of retention and successful course completion by delivery mode does not include spring 2020 – spring 2021 because most courses shifted to an online/hybrid delivery mode beginning in spring 2020 due to the COVID-19 pandemic (thereby blurring the distinction between delivery modes).

RPIE Analysis: Over the past three years, three courses within the Biology Program have been offered through at least two delivery modes within the same academic year. In 2021-2022, BIOL-110, BIOL-112, and BIOL-117 were offered through hybrid and online formats. This analysis focuses on program-level rates. Details for the course level are reported in the table above.

Within the Biology Program:

- *The retention rate in online sections was lower than the retention rate in hybrid sections. (The difference was not statistically significant.)*
- *The successful course completion rate in hybrid sections was lower than the successful course completion rate in online sections. (The difference was not statistically significant.)*

Program Reflection:

The data from online vs hybrid is from three courses offered Fall 2021 and Spring 2022. During this time, we were transitioning back to in-person/hybrid instruction. The instructional methods are being reviewed to determine the practices that were most successful for in-person, hybrid and online instruction.

C. Student Achievement

1. Program Completion

	2019-2020	2020-2021	2021-2022
Degrees			
Natural Science AS	39	42	40
Pre-Health Science AS	69	82	59
Total AS within the Program	108	124	99
Institutional: AS Degrees	**422**	**394**	**305**
Average Time to Degree (in Years)+			
Natural Science AS	4.3	4.5	3.9
Pre-Health Science AS	5.0	4.8	4.3
Average within the Program	4.7	4.7	4.1
Institutional: AS Degrees	**4.7**	**4.9**	**4.6**

Source: SQL Queries for Spring 2023 Program Review
*Time to degree/certificate within the program reported among cohorts with at least 10 graduates within the academic year. Asterisk indicates that data have been suppressed.
+Average time to degree/certificate was calculated among students who completed a degree/certificate within 10 years (between first year of enrollment at NVC and award

conferral year). Among 2018-2019 completers, the average time to degree/certificate was calculated among students who enrolled at NVC for the first time in 2009-2010 or later. Among 2019-2020 completers, the average time to degree was calculated among students who enrolled at NVC for the first time in 2010-2011 or later.
Note: Degrees include Natural Science, Natural Science – Life Science, and Pre-Health Science.

RPIE Analysis: The number of AS degrees conferred by the Biology Program decreased by 8.3% between 2019-2020 and 2021-2022. Over the same period, the number of AS degrees conferred by the institution decreased by 27.7%. The Biology Program accounted for 25.6% of the AS degrees conferred in 2019-2020 and 32.5% of those conferred in 2021-2022. The average time to degree ranged between 4 and 5 years between 2019-2020 and 2021-2022. This range reflects the institutional average time to degree among AS recipients.

Program Reflection:

The number of degrees conferred for these degrees is high considering they have only been offered since 2018-2019. In 2018-19, only 10 Natural Science AS degrees were conferred along with 57 Pre-Health Science AS degrees. We anticipate that we will see increase in number of these degrees awarded over the next few years as more students become aware of the new degrees. The average time to complete the degrees is lower that the institutional average for an AS degree, which is surprising given the rigorous nature of courses required for these degrees. Although the time to complete these degrees is lower than the institutional average, we anticipate that implementation of the Guided Pathways program may decrease this even more in the future.

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 Chancellor's Office, and licensure exams are not required for jobs associated with the discipline.

II. CURRICULUM

A. Courses

Subject	Course Number	Date of Last Review *(Courses with last review dates of 6 years or more must be scheduled for immediate review)*	Has Prerequisite* Yes/No **& Data of Last Review**	In Need of Revision *Indicate Non-Substantive (NS) or Substantive (S)* ***& Academic Year***	To Be Archived *(as Obsolete, Outdated, or Irrelevant)* **& Academic Year**	No Change
BIOL	103	Spring 2018	No	No		X
BIOL	105	Fall 2018	Yes 2018	S In process		
BIOL	110	Summer 2020	No	No		X
BIOL	112	Summer 20202	No	No		X
BIOL	117	Fall 2021	No	No		X
BIOL	120	Summer 2020	Yes	No		
BIOL	199	Fall 2013	Yes 2013	S 2023/24	Under review	
BIOL	218	Fall 2021	Yes	No		
BIOL	219	Fall 2021	Yes	No		
BIOL	220	Fall 2018	Yes	NS 2023/24		
BIOL	240	Sp 2023	Yes	In process, awaiting articulation approval		
BIOL	241	Spring 2017	Yes	S 2023/24		

*As of fall 2018, prerequisites need to be validated (in subsequent process) through Curriculum Committee.

B. Degrees and Certificates[+]

Degree or Certificate & Title	Implementation Date	Has Documentation Yes/No	In Need of Revision+ *and/or Missing Documentation* **& Academic Year**	To Be Archived* *(as Obsolete, Outdated, or Irrelevant)* **& Academic Year**	No Change
AS - Natural Science, Life Science	Spring 2019	Yes	No	No	X
AS - Pre-Health Science	Fall 2018	Yes	No	No	X

*As of fall 2018, discontinuance or archival of degrees or certificates must go through the Program Discontinuance or Archival Task Force.

[+]Degrees and Certificates cannot be implemented until the required courses in them are approved and active.

Program Reflection:

Below college level math and English courses are no longer offered and therefore are being removed as pre-requisites in our Course Outlines of Records. We have started this process with Biol 105 and Biol 240. We will update the COR for Biol 220 and 241 in 2023/24 academic year. We are reviewing the need for Biol 119, this course has not been offered for many years. Historically it has been taken by students participating in research internships. In recent years, the students enrolled in Work Experience courses.

III. LEARNING OUTCOMES ASSESSMENT

A. Status of Learning Outcomes Assessment

Learning Outcomes Assessment at the Course Level

	Number of Courses with Outcomes Assessed		Proportion of Courses with Outcomes Assessed	
Number of Courses	Over Last 4 Years	Over Last 6 Years	Over Last 4 Years	Over Last 6 Years
11	11	11	100%	100%

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
Natural Science A.S	3	3	3	100%	100%
Pre-Health Science A.S	2	1	1	100%	100%

Program Reflection:

Learning outcomes have been assessed every 3 to 5 years as scheduled. All courses were assessed in the last 3 years. All data was entered into TracDat. Improvements were implemented as planned and our next assessment will be used to determine their effectiveness. All Biology faculty engage in ongoing dialogue regarding the assessment methods and data. The Learning Outcomes are regularly reviewed to determine if changes need to be made.

B. Summary of Learning Outcomes Assessment Findings and Actions

The Biology Department has regularly assessed the Student Learning Outcomes and will continue to assess the courses on a 3-5 year cycle. The assessment/dialogue/improvements cycle has become ingrained in the department's routine.

Program Reflection:

Biology has been regularly accessing the course student learning outcomes, engaging in dialog to share the results and collaborate on developing strategies to improve student success. The data is analyzed to determine which concepts and skills the students are mastering and which they are struggling to master. Faculty use the information to develop and implement new strategies and then reassess to determine if the strategies were successful. Examples of interventions that have been made to instruction include: streamlining lectures, rearranging the order topics are introduced, creating lecture videos, and creating more practice assignments. The information is up to date in TracDat. We are in the process of reviewing the outcomes to determine if revisions are needed. Biology recently assessed the Pre-Health Science AS degree outcomes and collaborated with Chemistry on the Natural Science AS outcomes.

PROGRAM PLAN

Based on the information included in this document, the program is described as being in a state of:

- ○ Viability
- ● Stability
- ○ Growth

*Please select ONE of the above.

This evaluation of the state of the program is supported by the following parts of this report:

Sections 1A1 (Headcount and enrollment) and 1A3 (Fill Rate and Productivity): Although enrollments have fallen, they remain relatively strong and fill rates are high.

Section I.B. 1. Retention and Successful Course Completion Rates. With the exception of BIOL 103, 105, 120, 218, all other biology courses have successful course completion rates near or above institutional averages. In addition, there is a strong trend of increasing retention and successful completion rates as students progress through the science major course sequence (BIOL 120, 240, and 241).

Complete the table below to outline a three-year plan for the program, within the context of the current state of the program.

PROGRAM: BIOLOGY

Plan Years: 2023-2024 through 2025-2026

Strategic Initiatives Emerging from Program Review	Relevant Section(s) of Report	Implementation Timeline: Activity/Activities & Date(s)	Measure(s) of Progress or Effectiveness
Continue to improve the student success rates and retention among all equity groups particularly in the pre-health science courses Biol 105 and 218.	Section I.B. 1.	Training to Biology faculty in strategies to increase student success with an emphasis on promoting equitable outcomes in student success. The training should be from an outside trainer with experience in training specifically in the sciences. The request has been made in the 2023/24 Unit Plan. Training to be completed in 2024/25	Student success rates in Biol 105 and 218

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:

Training to Biology faculty by outside trainers with expertise in the sciences.

IV. PROGRAM HIGHLIGHTS

The program-level plan that emerged from the last review (Spring 2020) included the following initiatives:

- Analyze new AS degrees.
- Add resources for BIOL 105 to help improve student success.

A. Accomplishments/Achievements Associated with Most Recent Three-Year Program-Level Plan

The new AS degrees have been a success with over 300 students receiving the degrees.

B. Recent Improvements

- The last program review identified the initiatives to improve student success in Biol 105. Many strategies for improvement were implemented for this course. Although the rate is still low, 62.7%, it is significantly higher that the rates seen in the last program review (2016-2019) when the rate was 46.7%.
- The department has effectively implemented online instruction using Canvas and Zoom during the pandemic. Extensive online instructional content was developed including recorded lectures,

online discussions, pre-lab exercises and assignments. These resources are now being used in the in-person and hybrid courses.

C. Effective Practices

- The Biology department maintains high academic standards and high quality laboratory programs.
- The department's full-time faculty, adjunct faculty, and support staff work cooperatively to maintain continuity and excellence in the biology program.
- The department evaluates and updates the biology curriculum regularly.
- Student Learning Outcomes are assessed regularly and the result are used for program improvements.
- The department has effectively utilized Supplemental Instruction in several of our courses to the benefit of many students.
- Biology faculty actively engage students and maintain a high level of instructor-student interaction in labs and discussions.

FEEDBACK AND FOLLOW-UP FORM

BIOLOGY SPRING 2023

Completed by Supervising Administrator:
Robert Van Der Velde, Senior Dean

Date:
4/25/23

Strengths and successes of the program, as evidenced by analysis of data, outcomes assessment, and curriculum:
Biology is a strong department, with a well-established curriculum and a steady stream of students. Like other lab sciences, it was impacted by the COVID-19 pandemic, but adapted quickly and returned (at least for labs) sooner than other areas, with a resulting rebound in enrollments. The program enjoys good resources, an attractive albeit occasionally uncomfortable new building, and exceptional doctorally-qualified faculty.

Areas of concern, if any:
As identified above, student success among disparately impacted students, in particular the Black/African-American student population, and in the more rigorous pre-health perquisites is a concern.

Recommendations for improvement:
Biology's unit plan includes a request for funding for training in achieving equity, with an outside trainer with particular experience in the sciences. This training could also be open to other lab science programs, and appears to be needed and worthwhile.

Anticipated Resource Needs:

Resource Type	**Description of Need (Initial, Including Justification and Direct Linkage to State of the Program)**
Personnel: Faculty	
Personnel: Classified	

Personnel: Admin/Confidential	
Instructional Equipment	Current unit plans include budget requests for refresh and maintenance of microscopes which should be approved
Instructional Technology	Current technology plans call for replacement of classroom computers, projectors, and screens.
Facilities	Climate control, though not mentioned above, continues to be a problem in the Biology building (2000)
Operating Budget	
Professional Development/ Training	
Library & Learning Materials	