SEMINOLE STATE COLLEGE

# ASSOCIATE IN SCIENCE IN BIOLOGY (210)

## Program Review Summary

## October 2022

### Introduction

The mission of Seminole State College is to empower people for academic success, personal development, and lifelong learning. To that end, the College offers thirty-eight degree/ certificate programs, including the Associate in Science for in Biology. In accordance with requirements set forth by the Oklahoma State Regents for Higher Education, the College conducts a thorough review of this degree program every five years. The Science, Technology, Mathematics, and Engineering (S.T.E.M.) Division presents here the results of its self-review of the Associate in Science in Biology.

Assessment of this transfer degree program employed a number of direct and indirect indicators. The focus of this process was to evaluate degree program productivity and the achievement of specific degree program and general education outcomes by students. Additionally, this review relates these findings to a number of relevant Higher Learning Commission Criteria and Components and the educational mission of the College. Based on the information presented here, the academic division makes recommendations regarding the degree program.

**3.7.5 Process** (Internal/External Review): Self-review by academic division
Previous Reviews and Actions from those reviews: In the previous review, recommendations addressed issues related to articulation agreements and faculty mentoring. Faculty members used student support services to prepare students, participated in a newly created faculty advisor program, and prepared plans to improve articulation agreements. Courses for transfer are on the Oklahoma State Regents Higher Education Course Equivalency Matrix.

Analysis and Assessment (including quantitative and qualitative measures) noting key findings from internal or external reviews and including developments since the last review:

Analysis of degree program productivity revealed that the degree program averaged about 29 declared majors per year with an average of 6 graduates per year and an average of 4395 total credit hours generated per year over the five-year period under review. Other direct indicators used were course-embedded assessment and Educational Testing Service Proficiency Profile Test (ETS). Principal indirect indicator used was the SSC Graduate Exit Survey. Students increased knowledge by a 2.0 to 1 ratio in a comparison of the pre-test and post-test scores. The ETS test scores reflect learning slightly below (0.3%) the national averages over the past 4 years.

**Key findings from the most current evaluation of the Associate in Science in Biology**
Faculty in the S.T.E.M. Division discovered a need to develop a plan to increase student and faculty awareness of the course equivalency plan among colleges and universities in the state system and the advantage of receiving an associate degree before transferring to a regional

institution. Faculty cited a need for increased efforts to encourage students to enroll in and a follow specific degree program rather than choosing Liberal Studies. The Biology Degree Program has been redesigned specifically to include a pre-professional emphasis in medicine, dentistry, pharmacy, and optometry. Pre-requisite courses and application requirements for these programs are regularly reviewed by faculty and used to accurately advise students as they plan to apply and transfer into 4-year baccalaureate programs and/or healthcare professional programs. Healthcare industry needs and shortages are also regularly evaluated across our state to ensure job placement upon graduation.

**A.** Centrality of the Program to the Institution's Mission:

**SSC Mission Statement**

Seminole State College empowers people for academic success, personal development, and lifelong learning.

The Associate in Science in Biology Degree Program:
**Empowers people for academic success** by preparing students for a range of careers involving Biology and at the same time improve their critical thinking skills necessary for success in all studies.
**Empowers people for personal development** by training students to set and achieve educational goals by developing responsibility, organizational skills, and academic skills. The program places students in appropriate developmental or college level courses, allowing students the opportunity to progress through the curriculum to achieve success.
**Empowers people for life-long learning** by providing a variety of courses that vary in content and have the purpose of broadening a student's appreciation of and creating a desire for continued learning once they have completed their education.

Seminole State College prepares students to continue their education beyond the two-year level, trains students for careers and other educational opportunities, and makes available resources and services designed to benefit students and the community at large. Seminole State College also enhances the capabilities of individuals to achieve their goals for personal development by providing quality learning experiences and services that respond to diverse individual and community needs in a changing global society.

**B.** Vitality of the Program:

**B.1**.Program Objectives and Goals:

**Associate in Science in Biology Degree Program Outcomes**
**Outcomes for Transfer Degree Programs**

Outcome 1: Demonstrate successful articulation of Seminole State College transfer degree programs to state and professional institutions of higher learning granting professional and baccalaureate degrees in Oklahoma.

Outcome 2: Demonstrate successful academic achievement by Seminole State College transfer degree students at primary receiving state baccalaureate institutions of higher learning in Oklahoma. Successful academic achievement is defined as the maintenance of satisfactory academic progress toward degree completion as

determined by the receiving institution.

**Outcomes Specific to Associate of Science in Biology**

Outcome 3: Demonstrate a grasp of biological and related concepts foundational to advanced courses in Biology. Advanced courses shall be defined as courses commonly considered Junior and Senior level at baccalaureate degree granting institutions.

Outcome 4: Demonstrate preparation for continued pursuit of Biology education leading to a baccalaureate or professional degree in a branch of Biology.

**B.2** Quality Indicators (including Higher Learning Commission issues):

The SSC Biology Degree Program fulfills Higher Learning Commission Criteria by providing evidence of student learning, faculty engagement that encourages quality teaching, and effective assessment of the student learning process. Instructors in the S.T.E.M. areas consistently review assessment tools and methods and revise those tools and methods, when necessary, to provide the most accurate assessment data possible. Instructors use formative assessment to evaluate the needs of individual students. To measure the two outcomes specific to the Biology Degree Program course embedded assessment is the foremost method. In the S.T.E.M. areas, instructors used pre-tests and post-tests as tools to obtain assessment data. Faculty members regularly review and change pre-test and post-test questions when necessary. This process illustrates that the Biology Degree Program fulfills academic priorities such as improving the assessment of student learning and striving for instructional quality.

Instructors calculate and report student score improvements from pre-test to post-test for every class in the fall semester. While pre-tests and post-tests only assess improvements in a sampling of course objectives, the fact that all courses in the Mathematics and Science areas show improvement verifies that student learning takes place and that outcomes specific to the Biology Degree Program are met.

Key personnel gathered course embedded assessment data from the fall 2021 and spring 2022 semesters as shown in the following table. The percent increase reflects the difference between the average of the post-test scores and the pre-test scores. For the Major Field courses, the average growth rate was 39%.

**Table 1. Combined Course Embedded Assessment Results for Fall 2021 through Spring 2022 for Major Field Courses in Degree Program**

| General Education Outcomes | Pre-Test % Correct | Post-Test % Correct | Difference |
|---|---|---|---|
| General Education Outcome 1 | 36% | 85% | 49% |
| General Education Outcome 2 | 41% | 76% | 35% |
| General Education Outcome 3 | 36% | 77% | 41% |
| General Education Outcome 4 | 38% | 80% | 42% |
| **Specific Outcomes for Biology** | **Pre-Test % Correct** | **Post-Test % Correct** | **Difference** |
| Degree Program Outcome 3 | 42% | 78% | 36% |
| Degree Program Outcome 4 | 45% | 78% | 33% |

**B.3.** Minimum Productivity Indicators:

The following table provides data for the Biology Degree Program. Report Date September 2022

**Table 2**

| Biology Declared Majors and Graduates | | | |
|---|---|---|---|
| **Academic Year** | **Semester** | **Declared Majors** | **Graduates Total Per Year** |
| 2017-2018 | Summer | 18 | |
| | Fall | 35 | |
| | Spring | 41 | 4 |
| 2018-2019 | Summer | 23 | |
| | Fall | 34 | |
| | Spring | 37 | 5 |
| 2019-2020 | Summer | 14 | |
| | Fall | 33 | |
| | Spring | 31 | 8 |
| 2020-2021 | Summer | 23 | |
| | Fall | 40 | |
| | Spring | 28 | 10 |
| 2021-2022 | Summer | 11 | |
| | Fall | 35 | |
| | Spring | 27 | 7 |

Table 2 shows approximately 29 students selecting the program each year and an average of 6 students successfully completing the program annually. This degree program has a low to moderate demand level. Relative to the number of students declaring Biology as a major, the graduation rate is 21%. Analysts partially attributed the low graduation rate to the concept that many of the students who declare Biology as their major, succumb to the rigor of the courses and do not complete their degree or decide to change majors. Additionally, a significant number of students transfer to other institutions before completing an associate degree at Seminole State College.

These data show that the Biology Degree Program exceeds the minimum standards of productivity for Majors Enrolled (25) and Degrees Conferred (5).

**B.4.** Other Quantitative Measures:

**a.** Number of courses taught exclusively for the major program for each of the last five years and the size of classes:

Since all courses offered in this major may be used as lower division general education courses, no courses exclusively for this degree were taught in the past five years. However, the thirteen courses considered major courses for this program are listed in Table 5. The classes range in size from 10 to 50 students.

**b.** Student credit hours by level generated in all major courses that make up the degree program for five years:

**Student Credit Hours Generated in the Major Courses (Five Year Period)**

**Table 3. Credit Hours Generated in Major Field Courses By Level**

| Academic Year | 1000 Level Credit Hours Generated | 2000 Level Credit Hours Generated |
|---|---|---|
| 2017-18 | 2376 | 2423 |
| 2018-19 | 2161 | 2048 |
| 2019-20 | 1897 | 2450 |
| 2020-21 | 2449 | 2169 |
| 2021-22 | 2242 | 1758 |
| Totals | 11125 | 10848 |

Note: In Table 3, the "Credit Hours Generated" column represents the student credit hours generated by all the Major courses of the degree program for the given academic year. The hours do not represent the number of student credit hours generated only by those students declaring Biology as their major.

**c.** Direct instructional costs for the program for the review period:

**Instructional Cost (Estimate):**

No direct data were available that could be used to determine the exact amount of the instructional cost for any of the math and science degree programs. The annual SSC budget report provided the total expenditures for the science department as shown in Table 4. The annual science department budget contains the instructional costs for four of the S.T.E.M. division degree programs.

**Table 4**

| Academic Year | 2017-2018 | 2018-2019 | 2019-2020 | 2020-2021 | 2021-2022 |
|---|---|---|---|---|---|
| Instructional Cost | $996,965 | $463,449 | $562, 778 | $906,012 | $903,307 |

**d.** The number of credits and credit hours generated in the program that support the general education component and other major programs including certificates:

**Support of General Education Outcomes**

All courses offered in the S.T.E.M. areas support the General Education philosophy of Seminole State College. S.T.E.M. instructors make every effort to provide experiences that will equip students with the necessary skills to make informed decisions and encourage life-long learning. Instructors also attempt to provide experiences that will prepare students to be citizens who will be thoughtful about their attitudes toward human life, cultural diversity, and biological and physical environments. Please see Table 3 for a list of student credit hours generated in the major courses.

All college level courses in the Science area at Seminole State College support one or more of the General Education Outcomes. As students successfully progress through the course offerings in the Biology Degree Program, they will eventually achieve all four General Education Outcomes. To illustrate this support of the General Education Outcomes Table 5 shows the Major Field courses for the Associate in Science for Biology Degree Program and the General Education Outcomes each course addresses.

**Table 5**
**All General Education Outcomes addressed by a specific course are marked with the letter "X."**

| Major Field Course Information | | | General Education Outcome | | | |
|---|---|---|---|---|---|---|
| **Prefix** | **Number** | **Title** | **1** | **2** | **3** | **4** |
| BIOL | 1113 | Introduction to Environmental Science (not offered this period) | | X | X | X |
| BIOL | 1214 | Principles of Biology | | X | | |
| BIOL | 1224 | General Botany | X | X | | |
| BIOL | 1234 | General Zoology | | X | | X |
| CHEM | 1114 | Introduction to Chemistry | X | X | X | X |
| CHEM | 1315 | General Chemistry I | X | X | X | X |
| CHEM | 1515 | General Chemistry II | X | X | X | X |
| BIOL | 2113 | Introduction to Nutrition | X | X | | |
| BIOL | 2114 | Human Anatomy | | X | | X |
| BIOL | 2214 | Human Physiology | | X | | X |
| BIOL | 2224 | Microbiology | X | X | | |
| BIOL | 2300 | Special Projects in Biology | X | X | X | |
| PHYS | 2114 | General Physics I | X | X | X | X |
| PHYS | 2224 | General Physics II | X | X | X | |

**e.** A roster of faculty members, faculty credentials and faculty credential institution(s). Also include the number of full-time equivalent faculty in the specialized courses within the curriculum:

## Current Science/Technology/Engineering/Mathematics Division Faculty

**Table 6**

| Current Full-Time Mathematics/Science/Engineering Faculty | | | |
|---|---|---|---|
| **Name** | **Teaching Area** | **Highest Degree** | **Institution** |
| Miles, Deanna | Science | M.D. | University of Oklahoma |
| Senaratne, Nilmini | Science | Ph.D. | University of Kansas |
| Jobe, Noble | Science | Ph.D. | Oklahoma State University |
| Tollett, Jarrod | Mathematics / Science | M.Ed. | East Central University |
| Streight, Ricky | Mathematics | Ph D. | University of Oklahoma |
| Bryant, Melissa | Mathematics | M.Ed. | East Central University |
| Carpenter, Emily | Mathematics | M.S. | Oklahoma State University |
| Eubank, Truitt | Science | M.S. | Stephen F. Austin State University |
| Soward, Amanda | Science | M.S. | University of Oklahoma HS |
| Rich, Wendy | Agriculture Science | M.S. | Oklahoma State University |
| | | | |
| **Current Full-Time Faculty from Other Divisions Teaching MSE Classes (Instructors with ** beside their name teach only zero-level classes)** | | | |
| | | | |
| **Current Adjunct Mathematics/Science/Engineering Faculty (Instructors with ** beside their name teach only zero-level classes)** | | | |
| Helseth, Dave | Science | M.S. | Oklahoma State University |
| Hernandez, Theran | Science | M.Ed. | Grand Canyon University, Phoenix |
| Stanley, Kara | Science | M.S. | West Texas A&M University |
| Walker, Susan | Science | M.S. | Oklahoma State University |

| | | | |
|---|---|---|---|
| Cook, Jason | Science | M.S. | University of Oklahoma |
| Berry, Ana | Math | M.S. | Southwest Oklahoma State University |
| Blackwood, Kevin | Science | M.S. | East Central University |
| Hobbs, Charles | Math | Ph D. | University of Wisconsin |
| Howser, Cheri** | Math | B.S. | East Central University |
| Johnson, David | Science | M.S. | Texas A&M |
| Kirk, Susan | Math | Ph D. | Oklahoma State University |
| Kidney, Allison | Math | M.A. | Southern Nazarene University |

**f.** If available, information about employment or advanced studies of graduates of the program over the past five years:

No data

**g.** If available, information about the success of students from this program who have transferred to another institution:

**Transfer Reports from Four-Year Institutions:**

Seminole State College routinely seeks transfer data from the primary transfer baccalaureate institutions but receipt of transfer data from those institutions has been sporadic. Transfer reports received from East Central University, the University of Central Oklahoma, Oklahoma University, and Oklahoma State University provided GPAs of students who had transferred from Seminole State College. Transfer data in 2021-22 showed that SSC students who transferred to these universities had a slightly higher G.P.A. (approximately 0.07 higher) than the average student at these schools. The data in those reports confirm our expectation that SSC students perform well when compared with other students upon transfer and verifies the competence of SSC students in their academic preparation.

**B.5.** Duplication and Demand:

**B.5.** Duplication and Demand Issues:

**Review of Duplicated Programs**

Seminole State College provides local access to students in our five-county service area to pursue the Biology Degree. The only near duplications (in our five-county area) are a few private schools that are cost prohibitive for many students.

**B.5.a.** Detail demand from students, taking into account the profiles of applicants, enrollment, completion data, and occupational data:

The Biology Degree is a low to moderate demand program and the rates of declared majors and graduation exceed OSRHE productivity levels. Approximately 29 students selected the Associate in Science in Biology degree program each year over the review period with an average of 6 graduates each year. Relative to the number of students declaring Biology as a major, the graduation rate is 21%. The students in the Biology degree program are predominately under the age of 24 at 85% in spring 2022. The percent of under-prepared learners in spring 2021 was 26% as indicated by the Biology degree program ACT composite scores 19 and under. There exists a relatively high percentage of under-prepared students

declaring Biology as a major as indicated by ACT scores.

**B.5.b.** Detail demand for students produced by the program, taking into account employer demands, demands for skills of graduates, and job placement data:

Faculty members encourage students with a Biology Degree to matriculate to a four-year program. The options available to these students include fields such as education, research, health care, and consultancy.

**B.5.c.** Detail demand for services or intellectual property of the program, including demands in the form of grants, contracts, or consulting:

Not applicable to SSC.

**B.5.d.** Detail indirect demands in the form of faculty and student contributions to the cultural life and well-being of the community:

Although many of the faculty members commute, they also participate in community activities such as blood drives, Lion's Club, Rotary Club, churches, and the local chambers of commerce. Faculty members and students actively participate in the five county area communities served by SSC.

**B.5.e.** The process of program review should address meeting demands for the program through alternative forms of delivery. Detail how the program has met these demands:

With the advances in technology, faculty members have expanded to several different forms of delivery. They have found that online, hybrid or blended courses, and zoom courses prove to be successful delivery methods. SSC also addresses the community need for a variety of course scheduling by offering online and accelerated courses. Online lab simulations have been utilized as many students have needed to complete labs virtually either due to enrolling in an online science course or to the recent pandemic.

**B.6**. Effective Use of Resources:

**Staff Support**

The S.T.E.M. Division has a full-time secretary who primarily supports the Division Chair, and secondarily supports the other functions of the division including purchasing, maintaining budgets and various records, and facilitating the various needs of the S.T.E.M. faculty members. There is currently one student wage student working for the S.T.E.M. Division along with a student tutor working in the STEM lab.

**Educational Technology Support**

The infusion of technology into academic programs and processes currently receives priority implementation and funding at Seminole State College. Through this focus, the College creates a technologically enhanced academic environment focused on student learning. As a result, technology has never been a limiting factor in classroom instruction. Primary funding sources are E&G funds, federal grants, dedicated student fees, and private donations.

Seminole State College has a wireless network with two control centers providing Internet and

Seminole State College Intranet connectivity to campus academic and residential buildings. In addition to wireless connectivity, all classrooms are hard-wired for Internet and Seminole State College Intranet access. Students have access to personal email accounts, online enrollment, student records, and can obtain copies of their transcripts online. Students may use one of the computers in 16 computer labs stationed across campus to access these sites.
Technologically equipped classrooms have computer systems with current instructional and multimedia software, CD/DVD/VCR players, digital multimedia projectors and a Smart Board. Faculty members use the internet for instructional activities and information research in courses throughout the curriculum.
Technological services provided by the Testing Center include computerized Advanced Placement testing, class placement testing, ACT residual testing, telecourse testing, and technologically aided ADA appropriate testing for students with special needs.

**Instructional Technology Support Services**
Maintaining all forms of technology used in instruction requires a qualified support team. Seminole State College has just such a team made up of the MIS director and two tech persons. They are responsible for maintaining all campus technology such as computers, Smart Boards, IETV equipment, and keeping the campus Intranet and Internet operable in all offices and classrooms.

**Web-based Support Services**
Brightspace is available to instructors for course management and not just for online course delivery. Through MySSCOK, instructors report student grades electronically, receive emergency response, and make announcements.

**Institutional Program Recommendations**: (describe detailed recommendations for the program as a result of this thorough review and how these recommendations will be implemented, as well as the timeline for key elements)

**Table 7**

| Recommendation | Implementation Plan | Target Date |
|---|---|---|
| Increase student and faculty awareness of the advantage of receiving an associate degree before transferring to a four-year institution. | S.T.E.M. faculty plan to increase awareness of the CEP between colleges and universities in the state system and alert them to the advantage of receiving an associate degree before transferring to a four-year institution. | On-going |
| Encourage students to enroll in specific degree programs rather than choosing Liberal Studies. | Faculty, along with student support services, will continue the efforts to inform students of the advantages of enrolling in a specific S.T.E.M. degree program by implementing a degree enrollment plan that is created in Learning Strategies. | On-going |

| | | |
|---|---|---|
| Consider revising the degree program to include more flexibility in the major field electives to better meet specific needs of students entering pre-professional programs or already working in healthcare industry or biology fields. | Faculty will review the major field electives included on the Health Science degree program along with the Liberal Studies-Biology emphasis to determine if any additions should be made. Equivalent experience/certification may be considered as a Special Projects course as more investigation is needed by faculty to determine this option. | On-going |

**Summary of Recommendations:**

| | Department | School/College | Institutional |
|---|---|---|---|
| **Possible Recommendations:** | | | |
| Expand program (# of students) | We recommend expanding the program about 10 students per year. | | |
| Maintain program at current level | | | |
| Reduce program in size or scope | | | |
| Reorganize program | | | |
| Suspend program | | | |
| Delete program | | | |

Department/
Program Head Emily Carpenter Date 11/15/2022
(Signature)

Vice President for Academic Affairs _____ Date 11-16-22
(Signature)

President Lam Reynolds Date 11-29-22
(Signature)