

**SEMINOLE STATE COLLEGE
ASSOCIATE IN SCIENCE IN COMPUTER SCIENCE (226)**

Program Review Summary

October 1, 2018

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 twenty-three degree/certificate programs, including the Associate in Science in Computer Science. 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 STEM Division presents here the results of its self-review of the Associate in Science in Computer Science.

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, the Seminole State College 2017-18 Academic Plan 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, underprepared students, and faculty advising. Faculty members utilized student support services to better prepare students, participated in a faculty-mentoring program, and continue to improve articulation agreements.

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

Analysis and Assessment Abstract

Analysis of degree program productivity revealed that the degree program averaged about 28 declared majors and 5 graduates per year and generated 12,525 total credit hours per year over the five-year period under review. Other direct indicators used were course-embedded assessment and ACT Collegiate Assessment of Academic Proficiency (CAAP) Test. Principal indirect indicators used were the Entering Student Engagement Survey, Faculty Survey on Student Engagement, and SSC Student Feedback on Classroom Instruction. Course-embedded assessment of degree program outcomes showed an increase from 57 to 88 % when pre-test and post-test scores were compared. The CAAP Test scores reflect student learning outcomes in line with the national averages. The data reported on the CCSSE reflected the commuter campus atmosphere of Seminole State College.

Key findings from the most current evaluation of the Associate in Science in Computer Science

Faculty in the STEM Division see a need to develop a plan to increase student and faculty awareness of articulation agreements among colleges and universities in the state system and, the advantage of receiving an associate degree before transferring to a state institution. Faculty found a need for increased efforts to encourage students to choose and follow a specific degree program rather than choosing Liberal Studies.

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 Computer Science Degree Program:

Empowers people for academic success by preparing students for a range of careers in Business and at the same time improve their critical thinking skills necessary for success in all studies.

Empowers people for personal development by encouraging 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 will broaden a student’s appreciation and 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 Computers 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 in Science in Computer Science (226)

Outcome 3: Demonstrate problem-solving skills related to the world of Information Systems.

Measurable Indicators

Assessment data demonstrating students' ability to:

- a. Analyze a problem or case,
- b. Identify steps necessary for problem solving,
- c. Apply the steps identified for solution,
- d. Validate the results,
- e. Report the results in an understandable and timely manner.

Outcome 4: Demonstrate preparation for continued pursuit of courses leading to a baccalaureate degree in Information Systems.

Measurable Indicators

Assessment data demonstrating students' ability to:

- a. Interpret and manipulate data,
- b. Use appropriate technology to assist with problem-solving,
- c. Apply critical thinking to real-world scenarios.

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

The Computer Science 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 STEM division consistently review assessment tools and methods and revise those tools and methods, when necessary, to provide the most accurate assessment data possible. To measure the two outcomes specific to the Computer Science Degree Program course embedded assessment is the foremost method utilized. In the STEM division, 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 as necessary. In the past year the division has looked at modifying the curriculum in the Computer Science Degree. For example, we added a programming II course in C++, updated some of the books used in the major field and electives. A result of adding the programming II course this will help students to keep on track when they transfer to various 4-year institutions.

Assessment documents display the value of this program. Students majoring in Computer Science must take the most rigorous math courses at SSC. These students contribute to the five-year SSC mathematics average on the ACT Collegiate Assessment of Academic Proficiency which is only 0.1 of a point below the national average as recorded in the SSC General Education Evaluation 2017-18. In the Spring 2018 Institutional Statistics, the Computer Science Degree Program ranks 11th out of 18 degree programs in the number of students enrolled in the program.

Instructors calculate student score improvements from pre-test to post-test for every class every semester. While pre-tests and post-tests only assess improvements in a sampling of course objectives, the fact that major field requirement courses in the STEM areas show improvement verifies that student learning takes place and that the computer science degree program meets outcome expectations.

Faculty gathered course embedded assessment data from the fall 2017 to summer 2018 semesters as shown in the following table. Course-embedded assessment of general education outcomes 1-3 showed an averaged increase from 57% to 88% and outcome 4 showed an increase from 46 % to 88% when pre-test and post-test scores were compared. An average increase of 31% and 42% percentage points. Course-embedded assessment of degree program outcome 3 showed an average increase from 57% to 88% , and outcome 4 showed an average increase from 57% to 82% when pre-test and post-test scores were compared. Students displayed a good base knowledge of the subject with almost passing knowledge of 60% in three of the General Education Outcomes and both Degree Program Outcomes. The post-test average scores of above 80% demonstrate an adequate gain of knowledge in all major field courses.

Table 1. Combined Course Embedded Assessment Results For Fall 2017 through Summer 2018 for Major Field Courses in the Computer Science Degree Program

General Education Outcomes	Pre-Test % Correct	Post-Test % Correct	Difference
General Education Outcome 1	57%	88%	31%
General Education Outcome 2	57%	88%	31%
General Education Outcome 3	57%	88%	31%
General Education Outcome 4	46%	88%	42%
Specific Outcomes for Computers	Pre-Test % Correct	Post-Test % Correct	Difference
Degree Program Outcome 3	57%	88%	31%
Degree Program Outcome 4	57%	82%	25%

B.3. Minimum Productivity Indicators:

The following table provides data for the Computer Science Degree Program.

Table 2. Computer Science Declared Majors and Graduates

Academic Year	Semester	Declared Majors	Graduates
2013 - 2014	Summer 2013	3	0
	Fall 2013	16	1
	Spring 2014	16	2
2014 - 2015	Summer 2014	3	0
	Fall 2014	21	1
	Spring 2015	25	1
2015 - 2016	Summer 2015	5	1
	Fall 2015	26	0
	Spring 2016	27	6
2016 - 2017	Summer 2016	3	0
	Fall 2016	33	1
	Spring 2017	31	6
2017 - 2018	Summer 2017	12	2
	Fall 2017	36	1
	Spring 2018	27	1

In Table 2, the results show an approximate annual average of 28 students selecting the program each year and about 5 graduates from the program annually. The enrollment in the degree program has increased over the past few years and the number of graduates should also increase in the future as advisors and degree program mentors stress graduation. The growth of the program depends on being able to offer the required courses on a regular basis during peak hours. This degree program has a moderate demand level for any program but a high demand for STEM majors. The number of graduates could be higher, but a significant number of students in this major transfer before completing an associate degree at Seminole State College due to the lack of a fulltime Computer Science instructor. The data shows that the Computer Sciences Degree Program meets the minimum standards of productivity for majors enrolled and degrees conferred.

B.4. Other Quantitative Measures:

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

Table 3. Number of Sections Taught and Enrollment for Each Course in Major Field of Degree Program

Prefix	Number	Major Field Course Title	Number of Sections	Total Students	Ave. Class Size	Credit Hours
CS	1313	Programming in Java	1	21	21	63
CS	1183	Information Security	6	72	12	216
CAP	2603	Advanced Microsoft Access	5	51	10	153
CS	2013	C ++	5	63	13	189
CS	2023	C++ II	1	8	8	24

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

Table 4. Credit Hours Generated in Major Field Courses By Level

Academic Year	1000 Level Credit Hours Generated	2000 Level Credit Hours Generated
2017-18	45	69
2016-17	114	96
2015-16	78	87
2014-15	21	66
2013-14	21	48
Totals	279	366

Note: Table 4 shows the credit hours generated by all the major courses of the degree program for the given academic years. The hours do not represent the number of student credit hours generated only by those students declaring Computer Science as their major.

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

Instructional Costs:

No direct data was available that could be used to determine the exact amount of the instructional costs for individual STEM degree programs. The annual SSC budget report provided the total expenditures for the STEM Division as shown in Table 5. The annual STEM budget contains the instructional costs for three STEM degree programs.

Table 5. Instructional Costs

Academic Year	2013-14	2014-15	2015-16	2016-17	2017-18
Instructional Cost	\$423,548	\$460,621	\$459,621	\$463,449	\$462,949

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

Courses offered in the STEM areas support the general education philosophy of Seminole State College. The STEM instructors make every effort to provide experiences that will equip students with the necessary skills to make informed decisions and encourage life-long learning.

Please see Table 3 for a list of student credit hours generated in the major courses.

Table 6. Credit Hours Generated by Courses in Major Field of Degree Program That Are Part of General Education Requirements in Other Degree Programs

Major Field Course Information			
Prefix	Number	Title	Credit Hours Generated
n/a	n/a	n/a	n/a

All college level courses in the STEM area at Seminole State College support one or more of the General Education Outcomes. As students successfully progress through the course offerings in the Computer Science Degree Program, they will eventually achieve all four General Education Outcomes. To illustrate this support of the General Education Outcomes Table 7 shows the Major Field courses for the Associate in Science in Computer Science Degree Program and the General Education Outcomes each course addresses.

Table 7. 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
CS	1313	Programming in Java	X	X	X	X
CS	1183	Information Security	X	X	X	X
CAP	2603	Advanced Microsoft Access	X	X	X	
CS	2013	C ++	X	X	X	X
CS	2023	C++ II	X	X	X	X

e. A roster of faculty members, faculty credentials and faculty credential

Table 8. Current Business & Information System Division Faculty			
Full-Time Faculty			
Name	Teaching Area	Highest Degree	Institution
NA			
Current Full-Time Faculty From Other Divisions Teaching B & IS Classes			
Brad Schatzel	Business	MBA	University of Central Oklahoma
Current Adjunct Faculty			
Michael Schnell	Computer Science	MS	Florida Institute of Technology

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. Transfer reports received from East Central University, the University of Central Oklahoma, University of Oklahoma, and Oklahoma State University provided GPAs of students who had transferred from Seminole State College. Data in the Transfer Reports from Four-year Institutions 2017-18 shows that Seminole State College students have higher overall GPA's than the four-year institution average. The data in the reports confirmed our expectation that SSC students maintain similar GPAs upon transfer as those attained at SSC and verified 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 easy access to students in our five county service area wishing to pursue a degree in a computer field. The only duplication (in our five county area) are two private colleges 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 Computer Science Degree is a moderate demand level. The rates of declared majors and graduates exceed OSRHE productivity levels for most years. Approximately 25 students selected the Associate in Science in Computer Science Degree Program each year over the review period. Sixteen in 13-14, 23 students in 14-15, twenty-seven in 15-16, thirty-two students in 16-17 and in 17-18 thirty-two declared Computer Science as their major. There exists in the program a relatively high percentage of under-prepared students as indicated by ACT scores and placement into developmental mathematics courses.

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:

Graduates in Computer Science normally matriculate to a four-year program. The options available to these students include fields such as education, programming, software development, software engineer, systems administrator, web developer, cyber security consultant, system analyst, and game developer.

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 volunteer in community organizations such as Salvation Army, Rotary Club, Lion's Club, Boy's Ranch, churches, libraries, and the local Chambers of Commerce. Faculty members and students actively participate in the communities served by SSC in our five-county area.

B.5.e. The process of program review should address meeting demands for the program through alternative forms of delivery.

With the advances in technology, faculty members have the opportunity to expand to several different forms of delivery. Although still experimenting with new methods, faculty members have found that blended courses and Zoom prove to be successful delivery methods. SSC also addresses the community need for a variety in course scheduling by offering night courses, weekend courses, 8-week courses, 5-week Saturday courses, courses at correctional facilities and courses offered through the Gordon Cooper Technology Center.

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 are currently two student wage students working for the S.T.E.M. Division.

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 is in the process of upgrading network connectivity which includes the campus wireless network 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 computers in 16 different 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. Instructors use ZOOM technology for course sharing. 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 such a team made up of the MIS director and two technical personnel. 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, the Learning Management System (LMS) 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. SSC has implemented the “CORE Action” alert system to aid in supporting students for success.

Institutional Program Recommendations:

Table 9

Recommendation	Implementation Plan	Target Date
Increase student and awareness of the articulation agreements between colleges and universities in the state system and the advantage of receiving an associate degree before transferring to a four-year institution.	STEM faculty plan to increase student awareness of the articulation agreements between colleges and universities in the state system and further stress the to the advantage of receiving an associate degree before transferring to a four-year institution. Increased contact between faculty in the major area and students enrolled in the degree program has resulted in a faculty mentor	On-going

	program now in progress.	
Continue to 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 degree program by implementing a degree enrollment plan. Students are enrolling in a variety of degree programs, but increased awareness of graduating in the preferred degree program will be stressed.	On-going
Increase efforts in degree mentor program.	Implement degree completion initiative that involves degree planning and tracking procedures for students that require students to experience increased, high quality one on one interaction and mentorship with Computer Science faculty.	

Summary of Recommendations:

	Department	School/College	Institutional
Possible Recommendations:			
Expand program	<p>Improve graduation rates by 20% or at least one student per year for an increase to 10 graduates a year. (see next page for details)</p> <p>Continue increase the number of Computer Science majors by 20% or 5 students for the next evaluation period. (see next page for details)</p>		

Division Chair _____
(Signature)

Date _____

VCAA _____ Date _____
(Signature)

5. Recommendations and Other Relevant Items

SSC's receiving intuitions and 2 +2 agreements mandate degree requirements. The Oklahoma State Regents Course Equivalency Project and matrix dictate course content.

The STEM division recommends the following:

Improve graduation rates by 20% or at least one student per year.

Increase the number of Computer Science majors by 20% or 5 students for the next evaluation period.

The STEM division hopes to accomplish these recommendations by doing the following:

Encourage students to choose a STEM Division Major in lieu of Liberal Studies by providing degree major forms and encouragement in our STEM classes. Degree Program Mentor will focus efforts on engaging students in the program

The VPAA's office continues to work with the STEM Division to develop updated degree plans focusing on the changing requirements in this degree.