SELF-STUDY REPORT

COMPUTER INFORMATION SYSTEMS

AND

COMPUTER SCIENCE

Department of Chemistry, Computer, and Physical Sciences
Southeastern Oklahoma State University
Durant, Oklahoma
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Chapter I. Departmental Overview

The Department of Chemistry, Computer, and Physical Sciences was formed out of the Department of Physical Sciences and the Department Computer Science and Technology in 2004 due to an administrative mandate to reduce the number of departments for fiscal reasons. It is currently a member of the School of Arts and Sciences, which was established in August of 1999. The department's offerings are an integral part of the university's general education program, and departmental major programs prepare students for professional careers in many areas, including health care, biotechnology, chemistry, computer information systems, computer science, and science education.

The degree programs in *Computer Science* (CS) and *Computer Information Systems* (CIS) are offered through the Department of Chemistry, Computer, and Physical Sciences. The *Computer Science program* is designed to prepare students to secure positions in business and industry that require a strong foundation in programming, networking, and other areas, as well as, enter graduate programs. The *Computer Information Systems* program aims to prepare its students to obtain and enjoy successful careers in the dynamic information technology (IT) industry. The CIS program strives to understand the needs of local, regional and national employers. Its graduates have strong IT skills including real world usage of productivity software, security, ethics, network management, and systems analysis, as well as, enter graduate programs.

The primary goal of the Computer Science and Computer Information Systems programs at Southeastern Oklahoma State University is to prepare students for careers in computer science and information technology in business, industry, and government. Our programs mainly serve students in the southeastern Oklahoma and northern Texas areas.

The CS and CIS programs enjoy a unique role in our country's migration from an industrial economy to an information economy by being at the heart of this paradigm shift. Offering programs that address the current issues in this economy is critical to the future of Oklahoma and the United States. Computer technology is evolving at an exponential pace, and the implementation of this technology is critical for success. Our programs offer solutions that keep pace with this dynamic environment.

The CS and CIS faculty have worked together and individually to assess the needs of the computer and information technology industries. They have also been engaged in planning strategies to meet those needs. The results of their labor have manifested as the modification of the degree programs during the past five years.

Since the last program review in 2010, our former colleagues Mrs. Betty Clay, Mr. Mike Morris, Dr. Rhonda Richards, Mr. Jesse Smith, Dr. Majdi Maabreh, and Ms. Charlene Ridgway have left our programs due to retirement or job changes.

Currently we have four full-time faculty that teach and support the computer science and computer information systems courses in the department. They are Dr. Lie Qian, Dr. Ming-Shan Su, Ms. Dena Rymel, and Dr. Nirmala Soundararajan, who just joined the department in fall 2021. Table 1

shows the faculty in the department. Their Vitae can be found in Appendix I and some brief background information of the faculty can be found in Chapter IV. Faculty.

Table 2 shows the department budget. The department consists of programs and faculty from Chemistry, Computer and Physical Sciences. Therefore, the amounts shown in the table were for the whole department so there were no indications for what percentages of the amounts were allocated for the CIS/CS programs. As you can see, the amount of total allocation fluctuated each year but stayed between 2% and 8%.

There are three computer labs mainly used for teaching the CS/CIS courses. Each lab has 32 computers for students to use and one additional computer for the instructor. Sound tracing microphones are installed in all three labs to facilitate lecture recording/zooming. Wacom writing tablets are provided for instructors so the handwriting and/or drawing can be reflected on the projector screen. Microsoft office suite is installed on all computers. In addition, all southeastern students have free office 365 subscriptions that can be installed on at least 3 devices. A Linux server with a public IP address is also maintained by our department. It is mainly used by students to develop web applications and deploy course projects. Software like Microsoft visual studio, Java JDK/IDE, NetBeans, and VirtualBox etc. are installed on all computers to support the entry level and advanced CS/CIS programming classes. With three computer labs, we are able to schedule and teach all CS/CIS courses since most of CIS courses are delivered in online mode only.

Table 3 shows the results of a faculty survey in the department. Most responses were rated between average to above average. However, there were no distinguishment between responses from the faculty in the chemistry, computer and physical science disciplines in the survey. For example, the "overall level of funding avail. to faculty in dept. for scholarly/creative activ. and prof." was rated "below average" by 5 faculty, but we believe that this does not apply to cis/cs faculty.

The strengths of our programs include a good retention rate in high level CS/CIS courses, adequate physical spaces and technological equipment for students and faculty, and cutting edge electives for both cis/cs students even with the limited number of faculty. Most graduates found good work placements before and after graduation.

The weaknesses of our programs include high DFW on the entry level CS/CIS courses, a trend of low enrollment in CS program in recent years, which is the trend seen in all the regional universities in Oklahoma. We also unable to offer courses in the areas of Data Science or Security due to the heaviness of the teaching load plus overload on faculty for years.

Overall the cis/cs programs are good to outstanding. Between 2016 and 2021, with the limited number of faculty (two full-time faculty, one full-time instructor, and few adjunct instructors) available, the heaviness of the teaching load plus overload (usually at least 15 hours or more), the vast arrays of courses to offer each semester, and the number of students to serve, we believe that we have done a good job of providing the best quality of education possible to our students. We keep our students' growth and development as the highest priority and these results were reflected on their job placements after graduation and entrance to graduate schools for their continuing education. We get along well among the faculty and with the students. Additionally, the department chair and the cis/cs program coordinator provide an environment in which faculty members can strive to collaborate and support each other in teaching, advising and scholar activity.

Chapter II. Implementation of Recommendations from Previous Program Review

Our last program review was in the 2009-2010 academic year. Program review is supposed to occur once every five years, but Southeastern experienced high administrative turnover and severe financial difficulties in the 2016-2017 academic year, followed by the pandemic. Due to these factors, the program review was postponed many times until this year.

The following is a list of our consultant's recommendations from the 2009-2010 academic year, along with our comments on each recommendation.

(Note: We first listed the responses from 2010 followed by our responses now based on the same reviewer's recommendations. However, due to the administrative turnover, some of the responses from 2010 were not available to us.)

1. A plan and process should be established for the development and promotion of faculty and the assignment of faculty to teaching and non-teaching responsibilities. Provisions should be made to enable faculty to maintain currency in their respective disciplines without sacrificing existing teaching and service performance.

   Responses-2010: the department concurs and the recommendation will be pursued.

   Responses-2022: The faculty senates has updated a tenure and promotion guideline as well as a faculty development plan, which can be used as a reference for both teaching and non-teaching responsibilities.

2. A process should be established to plan and manage the programs of study and formally approve the introduction, revision, and deletion of courses consistent with the requirements of the programs and the availability of resources. A curriculum audit is recommended to simplify the curriculum, eliminate duplication, and ensure attractiveness to students and industry.

   Responses-2010: the department concurs and the recommendation will be pursued.

   Responses-2022: With the limited number of faculty, resources, and the heaviness of the regular teaching load plus the overload, we are not able to establish an efficient process to perform the curriculum audit. However, our faculty do constantly give feedback about the new course developments in various areas.

   After the last review cycle in 2010, in addition to the Major and Minor degree options (58 credit hours) in the Computer Science (CS) and Computer Information System (CIS) programs, our faculty have worked together to develop a new Major-only option (40 credit hours only) in the both the CS and CIS degree plans for students who might want to major in either CS or CIS but minor in different field (e.g., Music, Business, etc.) or pursue a double-major.

3. A program advising board or board of visitors should be created to include both the CS and the CIS programs. The board should have at least a recent alumni (graduated 2 to 5 years ago), representatives from industry that hire the programs graduates, and a representative of one or two universities that offer graduate programs for the CS and CIS alums.

   Responses-2010: the department concurs and we will invite the following alumni to be the board members.

   a. Keith Robison (2005 Alumni, First United Bank)
   b. Dustin Stark (2008 Alumni, Choctaw Nation)
   c. Abu-Arja Rami (2005 Alumni, Univ. of North Texas).

   Responses-2022: we are considering the formation of an advisory committee with members from the industries and other academic institutes who will audit the curriculum and give suggestions.

4. A formal plan to manage the introduction, use, revision, and deletion of technology should be established to ensure appropriate technologies can be acquired and implemented as needed by the programs over time. Adherence to the current plan is a required first step.

   Responses-2010: the department concurs and the recommendation will be pursued.

   Responses-2022: With the limited number of faculty and resources and the heaviness of the teaching load plus the overload, we are not able to establish a formal plan. However, our faculty do constantly give feedback about the new technologies being implemented in various areas.

5. A refocusing of the undergraduate programs to take full advantage of the strengths of the department and its relationship with industry. The revision should be done with a minimum change in the courses offered. However, their content should create a theme across all the courses. This theme should create a unique identity for the program and its graduates.

   Responses-2010: the department concurs and the recommendation will be pursued. (theme: medical information, networking, security).

   Responses-2022: With the limited number of faculty and resources available, our theme is specializing our students in the areas of Advance Web Application Development and the application of Information Technologies. We do plan to provide different additions like Data Mining/Data Science and/or Security in the future.

   With the addition of our new faculty member Dr. Nirmala Soundararajan in 2021, we are able to offer a new course titled “CIS/CS 4970 Introduction to Data Mining” as an elective in Fall 2022 for the first time.

6. A formal program assessment plan and process should be established to provide concrete direction for the department and evidence for future accreditation and program review

activities. Students, alumni and employers should be surveyed and perceptions should be formalized with a focus on the continuous quality improvement of the programs, facilities, and supporting resources.

Responses-2010: the department concurs and the recommendation will be pursued.

Responses-2022: The department does perform an annual program assessment report. We will try to incorporate the survey data from students, alumni and employers, if available, into the report in the future.

7. A program to provide the CS and CIS programs with their own servers (3), UPS capabilities and supporting hardware and software. Students can then have the flexibility to develop new skills under faculty supervision. The support will provide the programs with capabilities that cannot, because of volume or security/risk, be provided at the university level.

   Responses-2010: the department concurs and the recommendation will be suggested to the Dean of Arts and Sciences since it requires financial support from school officials.

   Responses-2022: With the limited amount of faculty, we are not able to provide extra man-power to set up three servers since the servers needs to be maintained and consistently updated on the security patches and software upgrades. However, if we have more faculty in the future, we do hope that we can set up and maintain three servers.

8. The department should look at: VMware Academic Program, VMware, Inc., 650-427-5000, as a resource to provide virtualization capabilities for the students and faculty.

   Responses-2010: the department concurs and the recommendation will be suggested to the Dean of Arts and Sciences since it requires financial support from school officials.

   Responses-2022: With the limited resources available, we have been teaching our students using Oracle's VirtualBox, instead of VMware which requires a dedicated server machine, to provide the similar virtualization capabilities.

9. The programs should be moved out of their current department and made a department of their own as soon as it is feasible. This will serve to give the programs more visibility among the students and local industry, as well as stronger sense of ownership of the programs for the faculty.

   Responses-2010: N/A.

   Comments/Responses: The suggestion has been recommended by some cis/cs faculty to the upper-level administration occasionally but we do not know the plan from the university yet.

Chapter III. Review of Programs

Our department offers two degree programs: the Computer Information Systems (CIS) and the Computer Science (CS) degree programs. Both the CIS and CS programs have required courses which are similar to the other programs in some regional universities in Oklahoma. The cis and cs degree sheets are available in Appendix III.A and Appendix III.B, respectively. Appendix III.C shows the cis program comparisons with two other regional universities, almost all the cis programs are pretty much the same with the exception of the additional offering of Computer Information System II course which equips students with better programming abilities, as well as the Intermediate Database Analysis course which prepares students with a better understanding of database designs. Appendix III.D shows the cs program comparisons with two other regional universities, all the cs programs are pretty much the same with the exception of the additional offering of Algorithm Analysis course to our students since we believe in the importance of that students learning about different algorithms with the ability to analyze them. In addition, the Applied Net-Centric Computing curse has been helping our cis/cs graduates secure jobs in the Information Technology area if they choose Networking as their career instead of Software Development. The department also offers three minor options including Information Technology, Health Information System, and Computer Science. Appendix III.E shows the course requirements for the minors.

Tables 4A, 4B, and 4C show the summarized program productivity and the enrollment and graduation trends. Table 4A shows that the total number of students (or headcount) in total (including students from Option-1, both major and minor in cis, and Option-2, only major in cis) in the Computer Information Systems program is about 60 in the last 5 years and 62.4 on total average, which is almost doubled compared to the last review cycle's number of 28 on average (years 04/05-08/09). In 2020/21 the headcount bumped up 87. A possible explanation for this bump could be due to students realizing the important of computer technology during the Covid-19 pandemic. However, we do need the coming year's data to decide whether the bump signals an uptrend or involves other factors. The Computer Information System program has had around 10 students graduating every year or about 10.2 graduates on average, which is higher than the last review cycle's number of 5.2 graduates every year (years 04/05-08/09). In 2019-20, the graduates dropped to 5, with a possible explanation being due to the Covid-19 pandemics. The SCH of Computer Information System has been relatively stable in the range of 1100 and 1200, except for in 2020/21 when SCH bumped to 1427 along with a headcount number increase.

Table 4A also shows that the number of students in total (including students from Option-1, both major and minor in cs, and Option-2, only major in cs) in the Computer Science program is about 80 in the last 5 years and 79.8 on total average, which is higher than the last review cycle's number of 55.8 on average (years 04/05-08/09). During the last 5 years, there was not much observed up or down trend. The Computer Science program has had more than 10 students graduating every year or 12 graduates on average, which is higher than the last review cycle's number of 7 graduates every year (years 04/05-08/09). The SCH of Computer Science program is relatively stable around 1600, with no obvious up or down trend.

Table 4B contains data on double majors that was not included in Table 4A. Very few students double major in both Computer Information Systems or Computer Science. In the last 5 years, there were only 2 students in total who graduated with a CIS double major. Only one student graduated with a CS double major.

Tables 4C.1 (face-to-face mode of delivery, 16-week), 4C.3 (online mode 16-week), 4C.5 (online mode,

fast-track: 7 or 8-week or other short terms) contain the enrollment information for our General Education coursework which is CIS1003. It is a computer proficiency required course for every student. However, a student can opt to take BIM11513 from the school of Business instead. A side note: the reason that the data from year 15-16 was included is that if that data column were to be removed, the format of the table can not be retained well. Table 4C.1 (face-to-face mode 16-week) shows that the headcount average was about 419.25 between years 16-17 and 19-20 but dropped to 48 in year 20-21. The overall university average shows a similar drop in year 2020-21. This could be due to a student's preferences for online courses as a safety precaution due to Covid-19. As you can see from Table 4C.3 (online mode 16-week), the headcount average was 82 between years 16-17 and 19-20 but jumped to 402 in year 20-21. The university average shows a similar jump in year 20-21. This could be due to a student's preferences for online courses as a safety precaution due to Covid-19. Table 4C.5 (online mode but fast-track: 7 or 7-week or other short terms) shows that the headcount average was about 94.5 between years 16-17 and 19-20 but jumped to 155 in year 20-21. The university average shows a similar jump in year 20-21.

Tables 4C.2 (face-to-face mode of delivery, 16-week), 4C.4 (online mode, 16-week), 4C.6 (online mode, fast-track: 7 or 8-week or other short terms) contain the enrollment information for our Non-General Education course work. Starting from year 16/17, for cs1613 and cs1623, the department provides both the face-to-face and online mode of delivery (i.e., the dual formats) in order to attract students to the cs program and increase enrollment. Before Covid-19, the face-to-face option had more enrollment than the corresponding online option. During the Covid-19 pandemic in year 20/21, most of the traditional face-to-face computer science courses were offered in dual formats to accommodate the pandemic isolation policy for both faculty and students. Many of our courses are cross-referenced (e.g., cis/cs 2343, cis/cs 3123, cis/cs 3223, cis/cs 4413, cis/cs 4970, and cis/cs 4980) which means that the same course are provided to the cis and cs students and students can choose to enroll in courses with the cis or cs course prefix. Our school previously had a collaboration nursing program with East Central University but the discontinuation of partnership affected the enrollments related to the Health Information Systems courses. Due to the lower enrollment, cis 4613 is only offered on a two-year rotation basis.

Tables 5A, 5B, and 5C show the demographics of the student in the cis/cs programs. Table 5A shows that there are more male students than female students enrolled in both cis and cs programs. Additionally, the ACT scores in both the cis and cs programs were higher than the university average which is a typical situation in science related programs. The average age of cis and cs students is about the same as the university average. Since we have both the cis and cs 2+2 programs with many surrounding junior colleges, we have a higher percentage of transfer students than university average. Tables 5B and 5C shows the demographics information related to students with double-majors, and minor in cs or information technology options. Overall the ratings show that the students were satisfied with the program and faculty in general and if they were to allowed a "do-over" many cis students would choose the same program at SE again. Of the two cs students, one chose the same program at SE but the other chose the same program but at a different school.

Table 6[1] shows the results of the student survey from 2019. Only 11 students participated in the survey which included 8 CIS students and 3 CS students. Among the 8 CIS students, we believe that one was a double-major (both CIS and CS). Furthermore, some questions were not answered by all the participants. Due to the small size of students who participated in the survey, this insufficient survey data may not provide an accurate reflection of our students' opinions about the programs under review.

[1] The formats of tables 6 and 7 are referenced from the Self-Study report of Biology.

Overall, the ratings for the overall learning environment in your major in both cis and cs were above average. The ratings for the face-to-face and online instruction in your major in both cis and cs were above average.

Table 7 shows the results of the alumni survey in which 8 respondents included 5 cis graduates and 3 cs graduates from two programs. Due to the small size of the students who participated in the survey, this insufficient survey data may not provide an accurate reflection of our graduates' opinions about the programs under review. Overall, the survey results did not indicate the need to change course delivery modes. Most alumni graduated earlier than the expected time span or the same as expected. The work/employment and family obligations were the two main factors that determined how much time was needed to earn the degree. Only 2 graduates reported that they worked in the fields within first year of graduation. This result does not match our experience with our students. Our experience over the years tells us that most students in Computer Science started working in computer related fields even before they graduate. More than half of the responses indicated that the major/minor study in Southeastern prepared them adequately or above for their job and future education. Overall, alumni ranked our program's overall quality between average and above average and most of the responses indicated that they would recommend Southeastern to others.

Table 8 shows the enrollment of students in the one general education class including for the non-majors and the majors.

A student completing a B.S. in Computer Information Systems should be able to:

1. Demonstrate an ability to identify problems in an information system and to select appropriate hardware and software packages to address the problems in a satisfactory manner.
2. Show competence in basic statistical analysis, the fundamentals of accounting, marketing, and management.
3. Demonstrate an understanding of data architecture, data management, systems integration, and the systems development cycle.
4. Manifest interpersonal communication skills through the preparation and presentation of reports.

A student completing a B.S. in Computer Science should be able to:

1. Be fluent in at least two programming languages.
2. Create and describe the programming concepts of arrays.
3. Create and describe functions and recursive programming.
4. Be able to troubleshoot hardware and software problem.
5. Have a firm grasp of the layers of computer architecture.
6. Create and describe the basics of algorithm analysis for problem solving.

We assess these learning objectives annually in the Program Outcomes Assessment Reports (POAR). The last five POARS are available in Appendix III. As of now, we evaluate student's basic knowledge using in-house exams but plan to use ETS Major Field exam to assess our students in the future. Overall the student have been doing well in our assessments.

Table 9 lists the average GPA and DFW of students in various classes. The GPA and the DFW rates are about the same as our general education class and the university average. For non-general education classes, the overall DFW rates both in cis and cs programs are higher than the university average which is not uncommon as science classes are in general more difficult than some other majors on campus. The DFW rates are high for classes like CIS 3223, CIS 4343, CS 2513 and CS 4623 because those classes focus on hands-on projects which require students to produce software products, not just write small amount of code, take exams or write reports. According to the alumni, these classes have been adequately equipped with the software skills necessary for students to take on challenges after they enter the software development job markets.

In the effort to improve the Computer Science entry level retention rate, the programming language used in Computer Science I and II, and Data Structures was changed from C++ to Java. Compared to C++, Java simplifies the reference management (no pointers) and introduces the Object Oriented concept early. It also provides easier GUI design package such as Scene Builder which allow students to practice GUI coding as early as the Computer Science II class.

We also introduced Python language to our cis/cs students. It is a very good programming language for new students to learn basic programming concepts early and help existing students reinforce their programming skill to succeed in advanced CS/CIS courses or in the fields of Machine Learning, Artificial Intelligent, and Data Science in the future.

Chapter IV.Faculty

The faculty teach courses in the areas of computer science and computer information systems. Table 1 contains a summary of faculty demographics in both programs.

Dr. Lie Qian is a full professor in Computer Science and Computer Information Systems. He has a Ph.D. in Computer Science from the University of Texas at Dallas and joined Southeastern in 2006. His primary research areas include network QoS, network security, wireless networks, software defined network and machine learning. He has extensive experience in teaching database, programming, algorithm, software engineering, operating system, compiler, and security courses. He is very active in promoting student participation in intercollegiate computer competitions. He developed new courses in areas like database and computer forensics.

Mrs. Dena Rymel is an instructor in Computer Science and Computer Information Systems and has a M.T. degree (Master's in Information Technology) from Southeastern Oklahoma State University. She joined our program as an adjunct instructor in 2014 and became a full-time instructor in 2018. Mrs. Rymel's teaching focuses on programming, business solutions, software productivity and system analysis. She developed new courses in areas like computer building/repair and E-Sport.

Dr. Ming-Shan Su is a full professor in Computer Science and Computer Information Systems. He joined our programs in 2002. He has a Ph.D. in Computer Science from the University of Oklahoma. His research areas are in distributed systems integrating telecommunication networks and software engineering technologies. Dr. Su's teaching focuses on programming, computer networks, web applications, app development, e-commerce and internet of things (IoT). In recent years, he developed many new courses like Python, Android programming, and IOS programming. In addition, this summer he organized IT-Camps that teach middle/high school students IoT and webpage design.

Dr. Nirmala Soundararajan joined the department in Fall 2021 and is an assistant professor in Computer Science and Computer Information Systems. She has a Ph.D. in Information Technology (Computer Science Track) from Towson University. Her primary research areas include developing applications on Bare Machine, operating systems, and machine learning. Dr. Soundararajan's teaching focuses on programming, operating systems, software productivity, networks, and programming languages design. She is developing a new course in data mining that will be taught in fall 2022.

The instructional load of departmental faculty is included in Table 10. The regular teaching load for full-time faculty is four classes and for instructors is five classes. Dr. Su is the cis/cs program coordinator and Mrs. Rymel is in charge of advising most of the CIS majors. Due to this, both faculty have a reduced teaching load. Due the short-staff situation, the average SCH for the faculty and instructor is two to three times the university average. For the last five years, each faculty member has to teach at least one to two overloads in order to cover all the amount and vast array of cis and cs classes. In spring 2020, the SCH was very high for Dr. Qian, Mrs. Rymel, and Dr. Su. Each of them had to teach at least two overloads due to the withdrawal of a new faculty who was to cover three of the courses. Additionally, Mrs. Rymel has been helping the department teach extra online classes while the department has had difficulties finding an adjunct instructor since 2015. Among the faculty members,

we get along well and help each other. The faculty was rated very positively ranging from average to above average by students in the category of “Assistance in Continuing My Education By Faculty and Staff In Your Major Department” in the student survey.

In addition to teaching, the faculty are also active in scholarly activities and services. Table 11 lists the scholarly, creative and service activities of faculty. The faculty have some publications and presentations which involved under-graduate students in the last five years. Some faculty have awarded SE internal grants through the Organized Research Fund and some have external grants from Google Cloud Platform Education Grant ranging from several hundred to several thousand dollars. The faculty are also active in service. Many faculty serve in multiple university committees and one serves in a cross-state committee and is involved in university recruitment as well. Table 12 shows that some faculty also provided professional services as an IT consultant to the community and many are involved in community engagements such as IT-Field trips, the Science Olympiad and College Fair as well.

Chapter V. Self-Study Recommendations and Conclusions

Our overall self-evaluations of the Computer Science and Computer Information Systems programs are Good based on the rating of "*Needs Signification Improvement (lowest rating), Adequate, Satisfactory (average), Good, or Outstanding (highest possible rating)*".

Through the years 2016 and 2021, with the limited number of faculty (two full-time faculty, one full-time instructor, and few adjunct instructors) and resources available, the heaviness of the teaching load plus overload, the amount of courses offered, and the number of students served, we believe that we have done a good job at providing the best quality of education possible to our students.

In addition, the faculty managed to offer top industry demanded courses such as "iOS App development" and "Python for All", and new courses like "Computer Maintenance" and "E-Sport" to our cis and cs students in the last five years during their busy teaching and service schedules. With the addition of a new faculty member, Dr. Nirmala Soundararajan, in 2021, the new course "Introduction to Data Mining" has been schedule to be offered by her in Fall 2022.

Additionally, with the success and positive feedback from teaching three IoT (Internet of Things) workshops to 5-12th graders and one Webpage Design workshop to 5-10th graders in the IT-Camp for Kids and Guardians (please refer to Appendix VII) with a total of 54 participants (48 kids and 6 adults) in the 2022 summer camp, the camp provided excellent opportunities for areas like Community Service (Durant campus, Idabel campus, Marietta School District), Civic Engagement, Professional Development, and Recruitment. In addition, the department is planning to offer a new course "IoT (Internet of Things)" to our students in the near future.

The programs are successful in preparing graduates for professional careers in computer related areas. With every growing demand for computer and information professionals, the success of these two programs is important to our university and community.

The following is a list of self-study recommendations:

1. Hire a new full-time faculty specialized in Data Science.
   There are huge market demands to hire students equipped with the knowledge and training in Data Science. By offering Data Science related courses we can enrich our students' knowledge and strengthen the CS/CIS programs.

2. Improve DFW rate and retention rate in both programs' entry level courses (i.e., Computer Science I, CS-I, Computer Information System I, CIS-I).
   The possible strategies could be raising the admission criteria for the entry level courses, adding one CS/CIS introduction course as a prerequisite for CS-I and CIS-I, or hiring programming Teaching Assistant to provide more support to first time programmers.

3. Find a way to encourage students to participate in the survey to help use better assessing our programs.

4. Track our graduates better to help us better assessing our programs.

5. Continually monitor the changes in the CS and CIS areas.

6. Offer Data Science and Machine Learning related courses as electives to our students.
   We are aware of the needs of equipping our students with the knowledge and training in Data Science. Therefore, we are offering an "Introduction to Data Mining" course in fall 2022 for the first time in our department. Studying data science and machine learning will help our students to gain the knowledge and skills to level up their career in the world of Artificial Intelligent. The Machine learning market size was USD 15.44 billion in 2021 and is expected to rise from USD 21.17 billion in 2022 to USD 209.91 billion by 2029 at a 38.8% growth rate (globenewswire.com 2022 April).

Tables 1-12

Table 1. Faculty Demographics (all faculty and adjuncts- past 5 years, current faculty listed first) in the CIS/CS Programs.

Name	Current rank	Teaching Field(s)	Terminal degree and field (list additional degrees if related to teaching assignment in a field outside of terminal degree)	Years at Southeastern	Course delivery mode experience (Y/N)		Number of professional development courses and trainings attended; and certificates earned.	
					Face-to-face	Distance	> 5 yrs. ago	Within last 5 years
Ming-Shan Su	Professor	CS and CIS	Ph. D. in Computer Science	19	Y	Y	8	10+
Lie Qian	Professor	CS and CIS	Ph.D. in Computer Science	16	Y	Y	11	13+
Dena Rymel	Instructor	CIS	M.T. in CIS	8	Y	Y	8	10+
Nirmala Soundararajan	Assistant Professor	CS and CIS	Ph. D. in Information Technology (Computer Science Track)	1	Y	Y	N/A	N/A
Shawn Ridenour	Adjunct	CIS	Master's	5		Y		
Don Mercer	Adjunct	CIS	MBA	5		Y		
*Karl Frinkle / *Mike Morris	Adjunct	CS	Ph.D. in Math / M.S in Math	5	Y			
C. Jobe	Adjunct	CIS	N/A (Employee of School of Business)	2		Y		
**Charlene Ridgway	Adjunct	CIS	M.T. in Education	3	Y	Y		
**Dan Moore	Adjunct	CIS	MBA	1	Y			
**Alisha Ridenour	Adjunct	CIS	M.T.	0.5		Y		
**Madji Maabreh	Assistant Professor	CS and CIS	Ph. D. in Computer Science	1	Y	Y		
**Cathleen Campbell	Adjunct	CIS	Hospital Administrator	1.5		Y		
**Michael Stout	Adjunct	CIS	Master's	1		Y		
**J. Cicio	Adjunct	CIS	Master's	0.5		Y		
**C. Moore	Adjunct	CIS	Ph.D. in Education	1		Y		
**K. Tollett	Adjunct	CIS	Master's	0.5		Y		
**J. Wood	Adjunct	CIS	M.T.	1		Y		

*: Dr. Frinkle and our retired faculty Mr. Morris worked together to offer the "Parallel Computing" course as an elective to CIS/CS and Math students.

**: no longer with the department or with SE or change jobs,

Table 2. Departmental Allocations by Budget Category from FY2017 to FY2021

Chemistry, Computer & Physical Sciences					
BUDGET CATEGORIES	**FY2017**	**FY2018**	**FY2019**	**FY2020**	**FY2021**
Teaching Salaries	$ 794,709.00	$ 772,374.00	$ 836,867.00	$ 865,367.00	$ 810,075.00
Professional Salaries	$ 42,426.00	$ 7,000.00	$ 7,000.00	$ 43,426.00	$ 43,091.00
Non-Professional Salaries	$ 39,299.00	$ 74,725.00	$ 74,725.00	$ 40,299.00	$ 31,449.00
Fringe Benefits	$ 344,527.35	$ 337,553.00	$ 372,536.00	$ 370,146.00	$ 348,633.00
Professional Services	$ -	$ -	$ -	$ -	$ -
TOTAL PERSONNEL SERVICES	$ 1,220,961.35	$ 1,191,652.00	$ 1,291,128.00	$ 1,319,238.00	$ 1,233,248.00
Travel	$ 2,067	$ 942.00	$ 1,093.00	$ 944.00	$ 1,940.00
Supplies and Other Operating Expenses	$ 39,453	$ 52,168.00	$ 33,169.00	$ 40,329.00	$ 33,460.00
Academic Partnerships	$ -	$ -	$ -	$ -	$ -
Transfers and Other Disbursement	$ -	$ -	$ -	$ -	$ -
Property, Furniture, and Equipment	$ 4,598.00	$ 4,600.00	$ 4,600.00	$ -	$ 6,890.00
TOTAL NON-PERSONNEL SERVICES	$ 46,118.00	$ 57,710.00	$ 38,862.00	$ 41,273.00	$ 42,290.00
TOTAL ALLOCATION	$ 1,267,079.35	$ 1,249,362.00	$ 1,329,990.00	$ 1,360,511.00	$ 1,275,538.00

Note: The department consists of programs and faculty from Chemistry, Computer and Physical Science. The amounts shown were for the whole department so there were no indications that what percentages of the amounts were allocated for the CIS/CS programs or faculty.

Table 3: Faculty Survey

1. Rate the overall quality of the following within your department

Q5 Rate the overall quality of the following within your department	Poor	Below Ave.	Ave.	Above Ave.	Outstanding	NA
F-2-F learning environment	0	1	1	2	4	
Online learning environment	0	0	3	2	3	
Scholarship of Faculty	0	1	1	5	2	
Instruction in Face-to-Face Courses	0	2	3	1	2	
Instruction in Online Courses	0	1	2	3	1	1
Physical Work Environment	0	2	1	2	2	1
Library Resources for Scholarly/ Creative Activities of Faculty	1	1	1	2	0	3
Library Resources for Students in Your Courses	0	1	2	2	1	2
Instructional Technology Available for Faculty Use	0	1	3	2	2	
Instructional Technology Support for Faculty	0	2	2	2	2	
Equipment Available for Teaching	1	1	3	2	1	
Equipment Available for Research	1	0	5	1	0	1
Level of Collegiality of Faculty	1	1	2	2	2	
Level of Communication Between Faculty and Students	0	0	3	2	3	
Breadth of Curriculum	0	2	1	3	2	
Depth of Curriculum	0	0	1	5	3	
Faculty Concern for Students	0	0	3	1	4	
Rigor of Courses Offered by the Department	0	0	4	3	1	
Rigor of Courses Offered by Other Departments	0	1	2	1	1	3
Q6-Overall level of funding avail. to faculty in dept. for scholarly/creative activ. and prof. develop.	1	5	1	1	0	
Q7-Overall level of interaction between dept. faculty and students outside reg. class/lab	0	1	3	2	2	
Overall quality of academic advising by depart.	0	0	2	3	3	
Q8-Overall quality of academic advising by SE	0	1	6	1	0	
Overall quality of academic programs offered by Department	0	0	1	6	1	
Q12-Overall quality of academic programs offered by SE	0	1	6	0	1	

2. Q16-Rate the overall mix of the following modes of delivery used by the departmental faculty

	Too much	About right	Too little	Does not apply
Face-to-face	0	8	0	0
100% Online	1	6	0	1
Blended (F2F and online)	0	4	0	4
SIDE (synchronous interactive distance educ.)	0	2	1	5

3. Rate the level of agreement

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Q13-The dept. has used the results of Program Outcomes Assessment Reports to make meaningful changes to the program requirements in the last 5 years	1	4	2	1	0
Q15-There are opportunities for meaningful faculty development	0	1	6	1	0

4. Q14-Why does the department complete Program Outcomes Assessment? Rank the level of importance for each

	Highly important	Important	Neither	Unimportant	N/A
To improve student learning	4	3	1	0	0
To Improve the Overall Quality of the Program	4	3	1	0	0
To fulfill OSRHE/RUSO requirements	3	5	0	0	0
To fulfill Specialty Accreditation requirements	2	3	1	0	2
To fulfill Regional Accreditation (Higher Learning Commission) requirements	4	3	1	0	0

	Q17 List up to three things in your department that should not be changed.
First	5 Reponses: 1. We need to maintain long, rigorous hands-on lab experiences, despite student complaints. 2. Major and minor programs 3. The scholarship provided to the students 4. class sizes 5. Rigor
Second	5 Reponses: 1. maintain face-to-face classes; cheating is rampant in some online classes, and students still fail. 2. face-2-face courses 3. The amount of online and face-to-face courses 4. advising/mentoring between majors and academic advisors 5. Course sequences
Third	2 Reponses: 1. encourage students to visit with a major advisor early and often; advising center still makes many errors and lets students continue to use them much too long 2. students' faculty interaction

	Q18 List up to three things that you would change in your department.
First	6 Reponses: 6 our chair makes 95% of the spending decisions; faculty should get more say or an allotment for things to improve their labs or classrooms. 7 Hire more faculty to reduce teaching overload 8 The DFW (Drop, Fail, Withdraw) rate should not be used as a component to evaluate the performance of a faculty during the annual faculty evaluation. A higher DFW rate will be classified as an instructor "Need a lot of improvement on teaching" whereas a lower DFW rate being "a good instructor". In order to be a good instructor, some of our faculty (including myself) have to give a grade that the student doesn't earn it. 9 Faculty should be given more time for research 10 classroom and laboratory renovation 11 Adding another full-time instructor
Second	5 Reponses: 6. Some teaching labs are in serious need of repairs, both for cosmetic and safety reasons. 7. Fewer department wide meetings, use email to deliver information more 8. Faculty in our area are demanded by our department chair to take shifts to stay in the department up to 3:00pm on every Friday afternoon in order to help students who show up without an appointment. The demand is not reasonable because it is not enforced by most of the departments campus-wide to my knowledge. In addition, students should learn how to make an appointment with a faculty during the off-office hours. 9. More opportunities for faculty professional development

	10. annual operational budget (supplies and equipment)
Third	3 Reponses: 3. Stop relying on student evaluations of instructors's knowledge and course content; if a student gets a low grade in a course they refused to do work in, it is not the instructor's fault. 4. Give senior adjunct instructors a chance to teach full-load (e.g., 4 or 5 classes) so we don't have to hire so many new and inexperienced adjunct instructors to cover so many different sections of the same course. Our department prefers not to provide the opportunity because we don't want to pay the benefits of the senior adjunct out of our department's budget if he/she is given the full teaching load. 5. support for faculty development (start up packages, funding for travel, funding for research)

5. Q19-Provide any other comments that you would like to share.

Reponses:

1. As a colleague at another institute says, the administrative approach in our department suffers from "too much stick, not enough carrot". We are frequently threatened with punishments or yelled at when an administrator thinks something is wrong, especially if a student "reports" their version of reality and the problem does not exist, but there is no incentive offered for doing a good job or working outside of the normal work day at events or when things go well. In talking to people from other departments, they are very surprised or concerned by what they hear goes on in our department.
2. In recent years, I learned that the influence of depression and anxiety has grown rapidly on the younger generation which include my students as well. Due to the health issues, some of my students' grades have dropped and some even quit school. I would recommend our school to consult with some expert(s) so we can help students to alleviate the negative influence of depression and anxiety.
3. Our stockroom and laboratories have been in need of renovation for +20 years. In adequate power in the labs. Lack of space. Proper storage chemical storage areas. Proper ventilation/hoods for organic labs. These have all been discussed in detail in the past and plans have been draw up three times to address with expansions and renovation. Each time the cost came back well beyond the expectation and funding has been diverted to other projects on campus.
4. I love SE, I love my department, I love my students and what I do. We need another full-time faculty member.

Q9 I would refer a friend/colleague to apply for a faculty position at	Yes	No
Responses:	6	2

Table 4. Productivity in the Department Programs.

A. Enrollment and Graduation Trends- Primary Majors

	Num. of students					Num. Graduates					SCH				
	16-17	17-18	18-19	19-20	20-21	16-17	17-18	18-19	19-20	20-21	16-17	17-18	18-19	19-20	20-21
University Average	87.7	89.7	91.4	93.3	97.8	16.8	15.9	15.7	15.4	19.3	1752	1835	1879	1929	1902
CIS (Total)	50	57	62	56	87	9	11	16	5	10	1112	1269	1222	1101	1427
Option 1 (Maj.+Min.)	50	57	62	56	57	9	11	16	5	5	1112	1269	1222	1101	912
Option 2 (Major only)					30					5					515
CS (Total)	84	79	76	77	83	11	10	12	13	14	1633	1645	1625	1573	1561
Option 1 (Maj.+Min.)	84	79	76	77	63	11	10	12	13	10	1633	1645	1625	1573	1191
Option 2 (Major only)					20					4					370

Legends: Maj.+Min.: Major and Minor, SCH: Student Credit Hours

B. Enrollment of Graduation Trends – Secondary Majors (Double majors not included above)

	Num. of students					Num. Graduates					SCH				
	16-17	17-18	18-19	19-20	20-21	16-17	17-18	18-19	19-20	20-21	16-17	17-18	18-19	19-20	20-21
University Average	4.2	3.5	3.6	3.4	1.9	3.0	1.8	2.7	2.1	1.8	92.2	78.3	80.8	74.9	13.4
CIS (Total)			1	1			1		1				13	18	
Option 1 (Maj.+Min.)			1	1			1		1				13	18	
Option 2 (Major only)															
CS (Total)	4	3	3				1				84	55	91		
Option 1 (Maj.+Min.)	4	3	3								84	55	91		
Option 2 (Major only)															

C. Enrollment Trends by Mode of Delivery- by Gen. Ed. And Departmental Prefixes

1. Face-to-Face Mode for the General Education Course

	Face-to-Face					
Course	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**
General Education	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**
University Average	133.8	138.8	132.7	127.5	114.5	66.6
CIS 1003	397	381	467	418	411	48

2. Face-to-Face Mode for All Other Courses

	Face-to-Face					
Course	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**
All Other Courses	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**
University Average (UG)	21.9	21.7	20.8	19.3	18.9	14.7
University Average (GR)	13.6	13.4	14.7	14.6	14.8	8.5
CIS 1613	8	15	16	12	6	
CIS 1623	6	9	6	6	6	5
CIS 2103	11					
CIS 2343	21	21	10	6	9	
CIS 3103		1				
CIS 3123	10					
CIS 3223	12	18	25		2	
CIS 4343	12	18	15	9	10	12

CIS 4413	10					
CIS 4970						12
CIS 4973	5	3	8	18	6	
CS 1613	31	29	14	38	28	7
CS 1623	19	12	5	13	17	4
CS 2343				16	10	
CS 2513	10	1	22		20	
CS 2813	14	18	15	12	15	
CS 3143	13	18	11	16	11	15
CS 3223				12	9	
CS 4113	12	7	16	18	10	16
CS 4223	7	23	2	30	5	
CS 4323	25	1	21	3	15	
CS 4413	4					
CS 4423	16	13	20	13	15	12
CS 4623	15	14	17	14	17	15
CS 4643	21	2	26		11	
CS 4950	11	3	8	6	4	4
CS 4970	2					1
CS 4973	38	24	29	46	22	
CS 5973	1	1				

3. Online Mode for the General Education Course

	Online - Full Semester (16 week)					
Course	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**
General Education	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**
University Average	61.2	59.9	56.3	47.5	54.3	87.4
CIS 1003	60	67	70	67	124	402

4. Online Mode for the All Other Courses

	Online - Full Semester (16 week)					
Course	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**
All Other Courses	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**
University Average (UG)	37.8	33.2	30.2	26.6	25.8	24.8
University Average (GR)	15.6	15.2	18.4	13.1	16.6	15.4
CIS 1613	3	5	3	13	7	25
CIS 1623	1	6	11	9	10	16
CIS 2103	5	28	16	22	18	25
CIS 2343			20	7	10	23
CIS 3003	19		13		7	9
CIS 3103	12	24	13	15	17	17
CIS 3123	4	20	16	24	21	22
CIS 3223						7
CIS 3323	3	26	23	26	31	27
CIS 3533	3	16	13	14	17	12
CIS 3543		1				
CIS 4103	10	20	13	12	17	19
CIS 4113	19	24	18	10	23	22
CIS 4343					1	1
CIS 4413	7	19	12	14	16	13
CIS 4613			2			
CIS 4970						10
CIS 4973				4	12	
CIS 4980	8					10
CIS 4981	10	11	17	12	9	
CS 1613		7	7	15	21	46

CS 1623			8	9	6	13
CS 2343						9
CS 2513						22
CS 2813						19
CS 3223						5
CS 4223						19
CS 4323						3
CS 4413		6	8	7		2
CS 4423						1
CS 4623					2	3
CS 4643						1
CS 4970						15
CS 4973				11	10	
CS 4980	7					14
CS 4981	8	12	11	18	16	

5. Online Mode (7 or 8-week or other short term) for the General Education Course

	Online - 7 or 8-week (or other short term)					
Course	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**
General Education	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**
University Average	32.0	34.1	33.6	54.1	61.3	91.1
CIS 1003	83	103	92	89	94	155

6. Online Mode (7 or 8-week or other short term) for Other Course

	Online - 7 or 8-week (or other short term)					
Course	**15-16**	**16-17**	**17-18**	**18-19**	**19-20**	**20-21**
All Other Courses	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**	**Headcount**
University Average (UG)	24.8	31.2	32.1	39.9	46.1	41.2
University Average (GR)	21.3	32.2	39.6	62.7	83.0	91.7

CIS 3103					1	
CIS 3533	3					
CIS 3543	15	15	23	12	16	15
CIS 4103	9					
CIS 4113	1					
CIS 4613	13	29	6	3	7	17
CIS 4623	12	17	4			
CIS 4970	1					
CIS 4973		14	16	8	6	8
CS 4950						4
CS 4981					1	

Table 5A. Student Demographics in the Department Programs: A Comparison Between Current Students and Those Five Years Ago

Majors	Year	Num.	Females	Males	Asian	African-Amer.	Hispanic	Native Amer	Hawiian/ Pacific Isl	Caucasian	2 or More	Fresh	Soph.	Junior	Senior	Graduate	Ave. Age	ACT Comp.	% Transfer
University Average (UG)	1617	195.6	54.6	45.8	2.7	7.2	7.4	15.4	1.2	53.9	18.1	27.5	16.8	24.5	31.9	3.2	24.8	20.7	36.6%
	2021	101.1	30.5	25.0	2.3	4.9	6.6	8.8	1.0	28.6	11.1	13.5	10.7	11.7	22.6	1.7	25.3	20.9	23.4%
University Average (GR)	1617	67.2	32.0	46.9	12.0	9.6	5.0	16.3	1.0	35.3	10.1				1.0	66.9	36.6	20.8	1.4%
	2021	256.1	45.7	35.8	16.0	29.4	18.8	25.8	0.7	155.2	34.2				2.6	74.4	36.0	21.1	2.6%
CIS.BS	1617	0																	
	2021	30	7	23		2	4	5		15	4	1	6	7	16		26.3	22.9	53.3%
CIS.MM.BS	1617	50	16	34	8	4	1	8		25	4	4	10	8	26	2	26.7	21.2	56.0%
	2021	57	11	46			2	8		37	10	12	6	12	27		27.6	22.0	49.1%
CS.BS	1617	0																	
	2021	20	2	18			2			12	6	2	7	6	5		22.8	24.1	35.0%
CS.MM.BS	1617	84	10	74	4	3	10	9		44	14	27	12	17	24	4	24.2	22.0	39.3%
	2021	63	17	46	4	2	8	8		23	18	14	12	10	27		24.3	22.3	41.3%

Legends: MM: Major and Minor.

Table 5B. Student Demographics with a Double-Major in the Department Programs

Second Majors	Year	Num.	Females	Males	Asian	African-Amer.	Hispanic	Native Amer	Hawiian/ Pacific Isl	Caucasian	2 or More	Fresh	Soph.	Junior	Senior	Graduate	Ave. Age	ACT Comp.	% Transfer
University Average (UG)	1617	4.1	3.3	1.7	1.0	1.3	1.1	1.4	1.0	2.6	1.7	1.3	1.5	1.8	2.0	1.3	26.0	22.0	36.6%
	2021	1.9	1.3	1.5		1.0	1.0	1.5		1.6	1.2	1.0	1.0	1.2	1.6		24.5	24.3	23.4%
CS.MM.BS	1617	4	2	2	1		1			1	1		2	1	1		23.0	21.8	0.0%
	2021	0																	

Table 5C. Student Demographics with a Minor in CS or Information Technology (INFOTECH) in the Department Programs

Minors	Year	Num.	Females	Males	Asian	African-Amer.	Hispanic	Native Amer	Hawiian/ Pacific Isl	Caucasian	2 or More	Fresh	Soph.	Junior	Senior	Graduate	Ave. Age	ACT Comp.	% Transfer
University Average (UG)	1617	8.5	5.2	4.7	2.0	1.6	1.7	1.9	1.0	5.1	2.7	2.0	1.7	3.3	4.3	1.0	25.2	20.8	36.6%
	2021	5.5	3.8	2.7	1.0	1.7	1.0	1.8		3.8	1.8	1.0	1.6	2.1	4.4		25.7	20.9	23.4%
CS	1617	6	1	5						6		1		1	4		21.0	21.7	16.7%
	2021	3	1	2						3					3		29.3		100.0%
INFOTECH	1617	2	1	1				1		1					2		25.0	23.5	50.0%
	2021	0																	

Table 6: Results of Student Survey

Question Computer Information Systems (CIS) Computer Science (CS) *Note: it seems that there is a student having a double-major (both in CIS and CS)	**Responses** Note: 11 students participated (CIS x 8 and CS x 3) But not all the students answered all the questions
Q1 What type of degree are you currently enrolled in at SE?	CIS x 8 students CS x (3+1) students Note: it seems that there is a student having a double-major (both in CIS and CS)
Q2 Select the undergraduate degree program that you are currently enrolled in.	CIS x 8 CS x (3+1)
Q3 Which of the following best reflects your opinion regarding the availability of different modes of course delivery in the department?	MORE FACE-TO-FACE COURSES SHOULDBE OFFERED x 1 MORE ONLINE COURSES SHOULD BEOFFERED x 4 NO NEED TOCHANGE x 6
Q4 Select the degree program that you are currently enrolled in.	Answered: 0
Q5 What is your student classification?	FRESHMAN: CIS x1, CS x 1 SOPHOMORE: CIS x 2 JUNIOR: SENIOR: CIS x 3, CS x 2

Q6 Rate the overall quality of the following. **Note: the responses format:** **cis (e.g., 6 students)** **cs (e.g., 2 students)**	Poor	Below Average	Average	Above Average	Outstanding	N/A
a. Overall Learning Environment In Your Major			1 1	5	 1	
b. Overall Learning Environment At Southeastern		 1	3 1	3		
c. Face-to-Face Instruction In Your Major			2	2	1 2	1
d. Face-to Face Instruction Outside Your Major		2 1	3	2		
e. Online Instruction In Your Major		 1	2	3	1 1	
f. Online Instruction Outside Your Major	 1	 1	4	2		
g. Overall Concern For Students By Faculty Teaching In Your Major		 1	3	2	1 1	
h. Overall Concern For Students By Faculty Teaching Outside Your Major		 1	4 1	3		
i. Assistance In Finding Employment By Faculty And Staff In Your Major Department			2	1	2 1	1 1
j. Assistance In Continuing My Education By Faculty And Staff In Your Major Department			2	3	1 1	 1

k. Faculty Providing Letters Of Reference/Recommendation			2	2	1 1	1 1
l. Breadth (Variety) Of Courses Offered In Your Major		1 1	2	2	1	1
m. Depth of Courses Offered In Your Major		1	2 1	1 1	2	
n. Academic Advising Provided By Faculty And Staff In Your Major Department			2 1	3	1 1	
o. Academic Advising Provided By The Academic Advising And Outreach Center		1	2	2	1 1	1
p. Level Of Communication Between Students And Major Departmental Faculty			3		3 2	
q. Ability To Interact With Major Department Faculty Outside The Classroom/Laboratory			3	1	2 2	
r. Rigor Of Courses In Your Major.			3 1	1	2	1
s. Rigor Of Courses Outside Your Major.			3 1	2	1	1

Q7 Rate your overall level of satisfaction with your academic experience for the following areas. **Note: the responses format:** **cis (e.g., 6 students)** **cs (e.g., 2 students)**	Poor	Below Average	Average	Above Average	Outstanding	N/A
a. Your Major Field Of Study			3 1	2	1 1	
b. Your Minor Field Of Study			5	1	1	1
c. General Education Courses		1 2	2	2		1
d. Overall Experience At Southeastern			4 2	1	1	
e. Internship/Practicum Opportunities		1	5			1 1
f. Fieldwork/Creative Activities/Research Opportunities			5	1 1		1 1

Q8 On average each week, how many hours do you spend completing the following activities? Note: the responses format: cis (e.g., 7 students) cs (e.g., 2 students)	0 Unit: hour(s)	1-10	11-20	21-30	31-40	> 40
a. In the classroom/laboratory		3 2	1	1		
b. Studying/homework outside the classroom		2	5		1	
c. Participating in Collegiate Sports						
d. Participating in extra-curricular activities on campus		2 1	1			

e. On-campus work			1	2		
f. Off-campus work	1		1 1		1	1
g. Participating in community activities such as church, civic/service clubs and school		3	1 1			
h. Family Obligations		1 1	1	1		1

Q9 If you were allowed a "do-over," which of the following best reflects your choice?
a. Response b. Other (please specify) **CIS:** 1. a. I would enroll in the same Department/Degree Program again at Southeastern. b. just collin/grayson CC and transfer - i attended utd first which wasted time 2. I would enroll in the same Department/Degree Program again at Southeastern. 3. I would enroll in the same Department/Degree Program again at Southeastern. 4. I would enroll in the same Department/Degree Program again at Southeastern. 5. I would enroll in the same Department/Degree Program but at another institution. 6. I would enroll in the same Department/Degree Program again at Southeastern. **CS:** 7. I would enroll in the same Department/Degree Program but at another institution. 8. I would enroll in the same Department/Degree Program again at Southeastern.
Q10 Would you recommend attending Southeastern to your friends and family?
Response: CIS: Yes x 6, CS: Yes x 2

Q11. Rate your level of agreement with the following statements regarding departmental activities. Note: the responses format: cis (e.g., 6 students) cs (e.g., 2 students)	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
a. Faculty treat students in the department with respect and fairness.	1 1	3 1	1	1	
b. Faculty provide a syllabus at the beginning of each course.	3 2	3			
c. Faculty provide appropriate feedback on assignments in face-to-face courses (e.g., quizzes, tests, papers, presentations).	2 1	2 1	1		1
d. Faculty provide appropriate feedback on assignments in online courses (e.g., quizzes, tests, papers, presentations).		3 1	2 1		1
e. Faculty assign grades based on the quality of work and performance by students.	1	3 1	1	1	1
f. Students have the ability to evaluate the quality of instruction at the end of each course.	2 1	4	1		

Q12 What office or individual helped you the most since you enrolled at Southeastern.

Open-Ended Response

CIS:

1. Dr.Su
2. Dr. Rymel
3. Dena Rymel
4. The Native American Institute
5. Dena Rymel

CS:

6. student services
7. Dr. Qian and Dr. Su

Q13 Please list the top three things that you like about your major field of study and would not change.

Open-Ended Response.

CIS:

1. online classes, smaller classes, can interact with professor easier than in bigger classes
2. I like the professors, creativity involved, and the work they give us is
3. Fun, Interesting, Challenging
4. 1.) The type of people associated with my major. 2.) The work that I would be doing after graduation. 3.) Dealing with Software and Hardware of Computers.
5. Easy to follow Enjoy the classes Would not change anything

CS:

6. 1. Currently highest paying field 2. Professors that care and help when needed 3. Good advisement
7. Learning Java, instructors, and programming assignments.

Q14 Please list the top three things that you would change about your major field of study.

Open-Ended Response.

CIS:

1. more professors, more times/classes added (i work full time and try to fit school in online or 2 days a week), variance in classes offered each semeste r- not just fall only or spring only
2. Most of the classes are only online, maybe more face to face classes,
3. Nothing
4. 1.) The difficulty of classes. 2.) Require more math. 3.) Drop classes that have nothing to do with the major.
5. Nothing

CS:

6. 1. Currently highest paying field and only has two professors in the study. Needs more courses. 2. Needs more online courses. 3. More teamwork projects and better course work
7. I am unsure. I haven't explored my major field much.

Q15 Please provide any additional comments about your experience at Southeastern.

Open-Ended Response

CIS:

1. NA

2. For classes that are supposed to be general education there's been several bs assignments that reflect work that graduate students I know have done. I don't mind hard courses and difficult assignments as long as they're in classes that matter.
3. I have enjoyed my experience overall, but have had a few professors that have ruined my experience here for a semester.
4. Nothing

CS:

5. Computer Science is on the rise and southeastern is not raising to the occasion. Spend more money on the fastest growing field. Also highest paid field. Want your stats for graduates getting jobs after they graduate to go up then invest in the CS department. The CS department should be top priority for every university but it defiantly is not here at southeastern.

Table 7. Alumni Survey

A. How did each of the following prepare you to enter the work force or continue your education upon graduation

CS responses: 3	Not at all Unit: %	Not very well	Adequately	Fairly Well	Very well	N/A
Major Field of Study		33.33	66.67			
Minor Field of Study	33.33		33.33			33.33
General Education Courses	33.33	33.33				33.33
Overall Educational Experience at SE		33.33		33.33	33.33	

CIS responses: 5	Not at all Unit: %	Not very well	Adequately	Fairly Well	Very well	N/A
Major Field of Study		40.0	40.0		20.0	
Minor Field of Study		20.0	60.0		20.0	
General Education Courses		20.0	60.0	20.0		
Overall Educational Experience at SE			40.0	40.0	20.0	

B. Level of agreement as to whether your degree and experience at Southeastern prepared you for the following activities.

CS responses: 3	Strongly Agree Unit: %	Agree	Neither	Disagree	Strongly Disagree	N/A
Acquiring a lasting knowledge of the key facts in your field of study	33.33		33.33	33.33		
Acquiring job or work-related skills	33.33			33.33	33.33	
Getting the opportunity you wanted after graduation such as employment or additional education			33.33	33.33	33.33	
Being successful in your current position	33.33		33.33	33.33		
Responding to new career opportunities	33.33			66.67		
Assuming leadership responsibilities	33.33		33.33		33.33	
Contributing to your community	33.33		33.33	33.33		
Deepening your commitment to personal development						
Continuing to learn in your field of study	33.33		66.7			
Continuing to learn outside your field of study	33.33		66.7			

CIS responses: 5	Strongly Agree Unit: %	Agree	Neither	Disagree	Strongly Disagree	N/A
Acquiring a lasting knowledge of the key facts in your field of study		100.0				
Acquiring job or work-related skills		80.0		20.0		
Getting the opportunity you wanted after graduation such as employment or additional education	40.0	40.0			20.0	
Being successful in your current position	20.0	40.0	20.0	20.0		
Responding to new career opportunities		60.0	20.0	20.0		
Assuming leadership responsibilities	20.0	60.0	20.0			
Contributing to your community		80.0	20.0			
Deepening your commitment to personal development	20.0	80.0				
Continuing to learn in your field of study	20.0	60.0		20.0		
Continuing to learn outside your field of study	20.0	80.0				

C. Rating of overall quality of the following

CS responses: 3	Poor Unit: %	Below Ave.	Ave.	Above Ave.	Outstanding	N/A
Overall Learning Environment in Major		33.33		33.33	33.33	
Overall Learning Environment at Southeastern		33.33	66.7			
Face-to-Face Instruction in Major		33.33	33.33	33.33		
Face-to-Face Instruction Outside the Major		33.33	33.33	33.33		
Online Instruction in Major			66.67			33.33
Online Instruction Outside the Major			100			
Overall Concern for Students by Departmental Faculty		33.33	33.33		33.33	
Overall Concern for Students by Non-Departmental Faculty		33.33	33.33			33.33
Assistance in Finding Employment by Departmental Faculty and Staff	33.33	33.33			33.33	
Assistance in Continuing My Education by Departmental Faculty and Staff	33.33			33.33		33.33

CIS responses: 5	Poor Unit: %	Below Ave.	Ave.	Above Ave.	Outstanding	N/A
Overall Learning Environment in Major		20.0	20.0	40.0	20.0	
Overall Learning Environment at Southeastern			40.0	40.0	20.0	
Face-to-Face Instruction in Major		20.0	20.0		60.0	
Face-to-Face Instruction Outside the Major		20.0	20.0	20.0	40.0	
Online Instruction in Major		20.0		60.0	20.0	
Online Instruction Outside the Major	20.0		20.0	40.0	20.0	
Overall Concern for Students by Departmental Faculty				80.0	20.0	
Overall Concern for Students by Non-Departmental Faculty				80.0	20.0	
Assistance in Finding Employment by Departmental Faculty and Staff	20.0		20.0	20.0	20.0	20.0
Assistance in Continuing My Education by Departmental Faculty and Staff			20.0	40.0	40.0	

D. Which of the following best describes your activity within the first year after graduating SE

CS responses: 3	
Employed in my field of study	0%
Employed but not in my field of study (college degree required)	0
Employed but not in my field of study (no college degree required)	100%
Enrolled in a graduate program	0
Enrolled in a professional school (e.g., Law, Medical, Optometry, Pharmacy, Physical Therapy)	0
Unemployed	0
Prefer not to respond	0

CIS responses: 5	
Employed in my field of study	40.0%
Employed but not in my field of study (college degree required)	20.0%
Employed but not in my field of study (no college degree required)	20.0%
Enrolled in a graduate program	0
Enrolled in a professional school (e.g., Law, Medical, Optometry, Pharmacy, Physical Therapy)	0
Unemployed	20.0%
Prefer not to respond	0

E. If you were allowed a "do-over," which of the following best reflects your choice?

CS responses: 3	
I would enroll in this Department/Degree Program again at Southeastern.	33.33%
I would enroll in a different Department/Degree Program at Southeastern.	0
I would enroll in the same Department/Degree Program but at another institution.	0
I would enroll in a different Department/Degree Program but at another institution	33.33
I would do something other than attend a college/university.	33.33

CIS responses: 5	
I would enroll in this Department/Degree Program again at Southeastern.	60.0%
I would enroll in a different Department/Degree Program at Southeastern.	20.0
I would enroll in the same Department/Degree Program but at another institution.	0
I would enroll in a different Department/Degree Program but at another institution	0
I would do something other than attend a college/university.	20.0

F. How important were the following factors in determining the time it took for you to earn your degree?

CS responses: 3	Major Importance Unit: %	Minor Importance	Not important
Changed major more than 1 time		33.33	66.67
Completed additional majors, options, minors, or coursework		33.33	66.67
Couldn't get the courses I needed when I needed them	33.33	33.33	33.33
Poor advising		33.33	66.67
Took extra time to improve my GPA		33.33	66.67
Participated in internship(s)/practicums		33.33	66.67
Extracurricular activities	33.33	33.33	33.33
Work/employment	33.33		66.67
Family obligations	33.33		66.67
Illness or accident	33.33		66.67
Other		66.67	33.33

CIS responses: 5	Major Importance Unit: %	Minor Importance	Not important
Changed major more than 1 time	40.0		60.0
Completed additional majors, options, minors, or coursework	40.0	20.0	40.0
Couldn't get the courses I needed when I needed them		20.0	80.0
Poor advising		20.0	80.0
Took extra time to improve my GPA	20.0	40.0	40.0
Participated in internship(s)/practicums		20.0	80.0
Extracurricular activities		20.0	80.0
Work/employment	60.0	20.0	20.0
Family obligations	60.0	20.0	20.0
Illness or accident		20.0	80.0
Other			100.0

Table 8. List of General Education Courses offered by the Department.

General Education Course	Num. of Majors enrolled					Num. of Non-majors enrolled					
	16-17	17-18	18-19	19-20	20-21	15-16	16-17	17-18	18-19	19-20	20-21
University Average	11.1	10.3	12.9	13.7	12.4	148.1	147.9	150.0	147.4	141.9	140.5
CIS 1003	18	26	15	19	21	526	533	603	559	610	584

Note:

For gened courses taught in the department where multiple majors are offered, the enrollment is only included in the "majors enrolled" group if it is either 1) the same subject as the major offered (Psy in Psy) or 2) when no major is offered in the subject, it is included for any major in the department (BIM 1553 in any JMSB business major).

Table 9. List of Student Results in the Department.

	16-17		17-18		18-19		19-20		20-21	
General Education	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**
University Ave	2.78	23.3%	2.75	24.6%	2.72	25.4%	2.94	21.3%	2.65	28.2%
CIS 1003	2.79	24.5%	3.11	19.9%	2.97	22.3%	3.00	22.3%	2.63	29.1%

	16-17		17-18		18-19		19-20		20-21	
All Other Courses	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**	**Ave. GPA**	**% DFW**
University Ave (UG)	3.13	13.5%	3.16	13.0%	3.12	13.6%	3.25	11.7%	3.07	14.7%
University Ave (GR)	3.63	7.0%	3.61	7.2%	3.63	6.0%	3.69	4.6%	3.74	5.0%
CIS 1613	2.39	30.0%	2.78	21.1%	2.96	24.0%	2.83	23.1%	3.57	16.0%
CIS 1623	3.57	13.3%	3.63	5.9%	3.47	6.7%	3.73	31.3%	2.94	38.1%
CIS 2103	2.82	17.9%	2.94	18.8%	3.38	13.6%	3.12	11.1%	3.04	16.0%
CIS 2343	3.43	4.8%	2.66	26.7%	3.27	23.1%	2.67	15.8%	2.52	26.1%
CIS 3003			3.00	30.8%			3.20	28.6%	3.50	11.1%
CIS 3103	3.33	8.0%	2.92	15.4%	3.27	13.3%	3.00	22.2%	2.88	17.6%
CIS 3123	2.80	20.0%	2.23	43.8%	3.55	20.8%	2.79	23.8%	2.76	22.7%
CIS 3223	2.17	44.4%	2.68	20.0%			3.50	0.0%	2.00	42.9%
CIS 3323	3.20	7.7%	2.77	17.4%	2.92	19.2%	3.42	16.1%	3.11	11.1%
CIS 3533	3.38	18.8%	3.31	0.0%	3.30	28.6%	3.67	11.8%	3.50	16.7%
CIS 3543	3.69	0.0%	3.26	4.3%	3.08	8.3%	3.44	12.5%	3.73	0.0%
CIS 4103	3.05	20.0%	3.45	15.4%	3.50	8.3%	3.64	17.6%	3.74	5.3%
CIS 4113	3.46	8.3%	3.61	5.6%	3.20	10.0%	3.78	4.3%	3.73	9.1%
CIS 4343	2.25	27.8%	2.07	46.7%	1.88	44.4%	3.00	45.5%	2.00	46.2%
CIS 4413	3.16	0.0%	2.91	8.3%	3.00	14.3%	3.38	6.3%	3.27	23.1%
CIS 4613	2.63	20.7%	2.00	37.5%	3.33	0.0%	2.71	14.3%	2.94	11.8%

CIS 4623	2.31	47.1%	3.33	25.0%						
CIS 4970									3.50	13.6%
CIS 4973	3.59	5.9%	3.29	8.3%	3.57	13.3%	3.18	20.8%	4.00	0.0%
CIS 4980									3.70	0.0%
CIS 4981	3.90	9.1%	3.44	5.9%	3.92	0.0%	3.56	0.0%		
CS 1613	2.69	27.8%	2.05	47.6%	2.16	49.1%	2.43	32.7%	2.05	50.9%
CS 1623	3.33	8.3%	2.92	23.1%	3.19	18.2%	3.35	13.0%	3.38	11.8%
CS 2343					2.93	25.0%	3.50	10.0%	2.33	22.2%
CS 2513	4.00	0.0%	3.29	13.6%			2.67	30.0%	2.16	50.0%
CS 2813	3.00	22.2%	3.13	6.7%	3.17	0.0%	3.31	20.0%	2.72	21.1%
CS 3143	3.50	5.6%	3.18	0.0%	2.93	12.5%	3.13	27.3%	2.73	26.7%
CS 3223					2.36	33.3%	2.22	33.3%	1.80	20.0%
CS 4113	3.57	0.0%	2.81	6.3%	2.89	11.1%	3.44	0.0%	2.93	18.8%
CS 4223	3.00	13.0%	1.50	50.0%	3.03	10.0%	3.20	0.0%	2.83	26.3%
CS 4323	2.00	0.0%	2.79	19.0%	4.00	33.3%	3.07	6.7%	3.50	33.3%
CS 4413	3.80	0.0%	3.43	12.5%	2.50	14.3%			4.00	0.0%
CS 4423	3.42	23.1%	3.32	10.0%	3.67	7.7%	3.20	33.3%	3.23	7.7%
CS 4623	2.54	21.4%	2.31	29.4%	2.17	28.6%	2.85	31.6%	1.71	55.6%
CS 4643	3.00	0.0%	3.67	7.7%			3.20	9.1%	4.00	0.0%
CS 4950	4.00	0.0%	4.00	0.0%	4.00	0.0%	4.00	0.0%	3.50	12.5%
CS 4970									3.13	25.0%
CS 4973	3.61	4.2%	3.04	17.2%	3.11	15.8%	3.32	21.9%		
CS 4980									2.50	35.7%
CS 4981	3.67	0.0%	2.91	18.2%	3.11	16.7%	2.94	29.4%		
CS 5973	4.00	0.0%								

Table 10 Instructional Load for Departmental Faculty

Instructor Name	15-16	16-17	17-18	18-19	19-20	20-21	Total SCH	Average SCH
University Average (UG)	294.9	308.8	294.4	300.3	300.7	311.2	978.6	240.9
University Average (GR)	92.6	110.7	175.6	275.7	338.3	400.9	691.7	191.8
Undergraduate								
CAMPBELL C		138	30	9			177	59.0
CICIO J					84	261	345	172.5
CLAY B	723						723	723.0
FRINKLE K	30	33	27	24	24	18	156	26.0
JOBE C					21	51	72	36.0
MAABREH M				264	42		306	153.0
MERCER D			144	168	153	111	576	144.0
MOORE C		288					288	288.0
MOORE D		90	183				273	136.5
MORRIS M	593						593	593.0
QIAN L	666	676	781	761	939	769	4592	765.3
RIDENOUR A		93	156				249	124.5
RIDENOUR S					138	252	390	195.0
RIDGEWAY C						327	327	327.0
RIDGWAY C	354	594	633	456	363		2400	480.0
RYMEL D	285	729	807	813	945	930	4509	751.5
STOUT M			93	201			294	147.0
SU M	497	540	649	624	605	594	3509	584.8
TOLLETT K		72					72	72.0
WOOD JA					171	183	354	177.0
Graduate								
QIAN L		3					3	3.0
SU M	3						3	3.0

Table 11. Scholarly, Creative and Service Activities of Faculty in CIS and CS

Item	2016-17	2017-18	2018-19	2019-20	2020-21
Number of Publications (Peer-Reviewed)		1	1		
Other Publications- Not Peer Reviewed					
Number of Presentations		1	2	1	1
Number of Student Presentations					
Number of Internal Grants		3		1	
Dollar Value of Internal Grants		$3,331			
Number of External Grants		4	1	2	
Dollar Value of External Grants		$5,550	$1,110	$2,750	
Number of Memberships in Professional Societies					
Number of offices, editorships, governing boards					
Number of Committees on in Professional Societies	1	3	2	2	3
Number of University Committees	4	4	6	4	6
Professional Development Workshops Presented					
Professional Development Workshops Participated In	1	1	2	4	2
Articles Reviewed for Journals			16		
Chapters/Textbooks Reviewed					
University Recruitment Activities	1	3	4	3	3

Note: The table above doesn't contain any data from Dr. Nirmala Soundararajan since she just joined the department in fall 2022.

Table 12. Community Service and Engagement of Departmental Faculty

Item	2016-17	2017-18	2018-19	2019-20	2020-21
Number of Civic Engagement Projects in program/courses				2	
Describe Key examples: In 2019, the department organized two IT Field Trips to visit the IT Department of the Choctaw Nation Triable Headquarters.					
Number of Community Service Activities in program/courses				1	
Describe Key examples: In 2019 Dr. Su served as a temporary IT consultant for the City of Durant to retrieve thousands of emails under certain search criteria using Google Vault function.					
Number of Faculty Community Service Activities	2	2	1		1
Describe Key examples: helped in Science Olympiad, participated in Texoma College Fair					
Number of Leadership Roles in Faculty Community Service Activities					
Describe Key examples:					

Appendices of supporting documentation

I. Curriculum Vitae of Faculty

The current teaching faculty members' curricula vitae are listed in the order below:

- Dr. Ming-Shan Su
- Dr. Lie Qian
- Ms. Dena Rymel
- Dr. Nirmala Soundararajan
    - (Dr. Soundararajan just joined the department in Fall 2021)

CURRICULUM VITA

Ming-Shan Su

Professor, Dept. of Chemistry, Computer, and Physical Sciences
Coordinator, the CIS/CS Programs
Southeastern Oklahoma State University
1405 North 4th Ave. PMB 4183
Durant, Oklahoma 74701
Tel: (580) 745-2280
Fax: (580) 745-7503
Email: msu@se.edu

EDUCATION

2002	Ph.D.	Computer Science	University of Oklahoma - OU, Norman, OK
1995	M.S.	Computer Science	University of Oklahoma - OU, Norman, OK
1992	B.S.	General Study	University of Central Oklahoma - UCO, Edmond, OK
1982	A.A.	Marine Engineering	Taipei College Marine Technology, Taipei, Taiwan
		(Formally known as China Junior College of Marine Technology, Taipei, Taiwan)	

ACADEMIC AND RELATED NON-ACADEMIC EXPERIENCE

08/12 – Present Professor, Department of Chemistry, Computer, and Physical Sciences, Southeastern Oklahoma State University (SE)

08/07 – 07/12 Associate Professor, Department of Chemistry, Computer, and Physical Sciences, Southeastern Oklahoma State University (SE)

08/02 – 07/07 Assistant Professor, Department of Chemistry, Computer, and Physical Sciences, Southeastern Oklahoma State University (SE)

01/02 – 07/02 Postdoctoral Fellow, School of Computer Science, University of Oklahoma (I finished my Ph.D. work on 01/18/02)

08/99 – 04/00 Graduate Assistant

- ISCAS 99 Database Manager & Advance Technical Program Designer
- ISCAS 99 - Conference Technical Program Management Project (as in the attachments):
  - Design a Database to store the information of 1,300 technical papers
  - Design the format and content of the Advance Program Booklet
  - Design a Technical Program Management Software for 1,300 papers with 3,500 authors
  - Publish the On-Line Advance Program over the http://www.cs.ou.edu/iscas99 website
  - Implement the TPMS to produce the Advance and Final Program Booklets

01/98 – 01/99 Graduate Assistant, Lucent Application Programmer

- Lucent Web-based Warehouse Parts On-Line Prediction Project:

08/97 – 12/97 Teaching Assistant

- Assist the instructor to teach the Operating Systems and Data Networks courses in the School of Computer Science at OU.

08/96 – 05/97 Graduate Assistant – System Administrator

- Manage the Computer Laboratory for the School of Communication at OU

02/94 – 05/96 Graduate Assistant – IBM Mainframe Application Programmer

- Maintain and Update the report programs for main library staff at OU

05/85 – 08/89 (Sales Engineer - Swire Trading Ltd., Taipei, Taiwan

- Responsible for the Marketing and Technical support for marine engines to yacht and fishing boat manufacturers

PROFESSIONAL INTERESTS

Research in the area of Distributed Systems, Telecommunication Networks, and Software Engineering Technologies, (e.g., Mobile/Ad-Hoc Networks and Distributed Network Fault Management), Integration of Operation Research and Web Technology using ASP.NET. Recently, I also research in the areas of App Developments on Smart-Phone/Tablet Devices both for iOS-Devices and Android devices, iBeacons, Bluetooth, and IoT (Internet of Things) technologies.

SELECTED COMMITTEES AND SPECIAL ASSIGNMENTS

University

2021-Present	Member, Grievance Committee
2004-Present	Member, Oklahoma Faculty Transfer Curriculum Committee, Computer Science Discipline for the Course Equivalency Project
2016-Present	Supervisor/Sponsor, Science Olympia for high school student
3/30/2022	**Proctor, 107th Annual Curriculum Contest for high school students**
2008-Present	Proctor, Curricula Contest for high school students
2021-Spring	Member, Post-Tenure Review Committee of Dr. Halet Poovey
2021-Spring	Member, Post-Tenure Review Committee of Dr. Nick Nichols
2021-Spring	Member, Post-Tenure Review Committee of Dr. Nancy Paiva
2021-Spring	Member, Post-Tenure Review Committee of Dr. Glenn Melancon
2020-2021	Chair, CIS Faculty Search Committee
2017-2021	Member, Curriculum Committee
2020-Spring	Member, Post-Tenure Review Committee of Dr. Steve McKim
2020-Spring	Member, Post-Tenure Review Committee of Dr. Tim Smith
2019-Fall	Chair, Promotion and Tenure Committee of Dr. Lie Qian
2019-Fall	Member, Promotion Committee of Ms. Mellena Nichols
2018-Fall	Member, Promotion and Tenure Committee of Dr. Hansheng Chan
2018-Fall	Member, Promotion and Tenure Committee of Dr. Rhonda Richards
2018-Fall	Member, Promotion and Tenure Committee of Dr. Hal Poovey
2017-Spring	Member, Post-Tenure Review Committee of Dr. Steve McKim
2017-Spring	Member, Post-Tenure Review Committee of Dr. Chris Moretti
2016-Spring	Member, Post-Tenure Review Committee of Dr. Loide Wasmund
2016-2017	Member, General Education Committee
2008-2016	President's Council on Diversity Committee in the area of Web Technology and Images subcommittee
2015-2016	Member, Promotion and Tenure Committee of Dr. YingChou Lin
2013-2014	Member, Promotion and Tenure Committee of Dr. Richard Braley

2012-2013	Member, Promotion and Tenure Committee of Dr. Hal Poovey
2010-2011	Chair, Promotion and Tenure Committee of Dr. Lie Qian

Cross-State and Community

2006-Present	Member, Computer Science Advisory Committee, Grayson Community College, Texas
2004-2013	Member, the BCM (Baptist Collegiate Ministry) at SE

AWARDS AND HONORS

2021/spring	Nominee for the 2021 Faculty Senate Recognition Award for Excellence in Teaching
2021/spring	Faculty Senate Award – for Excellence in Service (Math & Science) • The recipient of the 2022-2021 Faculty Senate Recognition Award for Meritorious Service to the University and/or Profession from the School of Arts and Sciences
2020/spring	Nominee for the 2020 Faculty Senate Recognition Award for Excellence in Teaching
2009-2010	Faculty Senate Recognition Award – for Excellence in Service (the Free Computer Clinic Service) from the School of Arts and Sciences

PROFESSIONAL MEMBERSHIPS

2017/spring	Apple Developer Program Annual member
2015/spring	Android Developer life-time member
Current Memberships:	None.
Former member:	IEEE (Institute of Electrical and Electronics Engineers) society IACIS(International Association for Computer Information Systems, 2010-2011)

PROFESSIONAL DEVELOPMENT/CERTIFICATES

5/31/2021	Introduction to GPT-3: A Leap in Artificial Intelligence, Certificate of Completion, LinkedIn Learning
5/25/2021	Raspberry Pi: GPIO, Certificate of Completion, LinkedIn Learning
5/24/2021	Raspberry Pi Essential Training, Certificate of Completion, LinkedIn Learning
3/10-12/21	2021 Virtual Cengage Computing Experience (3/10/21 – 3/12/21) Certificates
4/22-24/20	Virtual 2020 Cengage Computing Experience (4/22/20 – 4/24/20) Certificates
4/16/2020	Coping with the Pandemic: Lessons from Psychological Science, hosted by Pearson publisher.
3/19/2020	Just in Time: Professional Development for Transitioning to an Online Classroom, hosted by Tutor.com

EFFECTIVE TEACHING

<u>Major Curriculum Development Initiated</u>

- Major Computer Science Program updates (2007)

New Course Initiated

- CS4973 Python for All (Spring 2019)
  - This course provides an overview of the Python language, a language being ranked No. 1 language to learn in years 2018 and 2019.

- CS4973 E-Commerce (Electronic Commerce) (Summer 2016)
  - This course provides an overview of the key business and technology of electronic commerce (e-commerce). Topics covered will include: Introduction to Electronic Commerce, Technology Structure: Internet and WWW (Web), Selling on the Web, Marketing on the Web, Social Media, and Payment Systems for E-Commerce.

- CS4973 iOS app dev-SWIFT (i.e., iOS app development using SWIFT) (Fall 2015)
  - This course is designed for people who have no programming experience or are new to iOS programming and want to move into the exciting world of developing apps for Apple's iOS mobile devices on a Mac computer. Advanced topics include: Core Data Database, GPS (location awareness applications), Push Notification Technology, and App integration with Social media (e.g., Facebook, Twitter, … etc.) if time permits.

- CS4973 Smartphone/Tablet Apps (Spring 2015)
  - This course is designed for people who have some programming experience or are new to Java programming and want to move into the exciting world of developing apps for Android mobile devices on a Windows or Mac computer. Advanced topics include: SQLite Database and Persistent Data, GPS (location awareness applications), QR (Quick Response Code) creator and reader, Client-Server online App, if time permits.

- CS5970 Distributed Networks (Fall 2013)
  - In this semester, students will focus on learning topics of Cloud Computing, such as software as a service (Saas), platform as a service (Paas), infrastructure as a service (IaaS), server and desktop virtualization, and much more throughout the semester.

- CS 4970 Web Applications using ASP.NET (Summer 2005)
  - now CS 4623 Advanced Web-based Applications: Using ASP.NET (Spring 2006)
  - This course teaches students how to build advanced and customized Web sites from the ground up. Topics include: understanding ASP.NET and the .NET architecture, building Web applications using rapid application development techniques, developing Web forms with server controls, displaying dynamic data from a database using ADO.NET, creating Web services, and deploying Web applications. In addition, HTTP, XML, SOAP, and WSDL will be introduced if time permits

- CS 4970 Unix Networking and Programming (Summer 2004)
  - now CIS 4343 Applied Net-Centric Computing (Spring 2005)

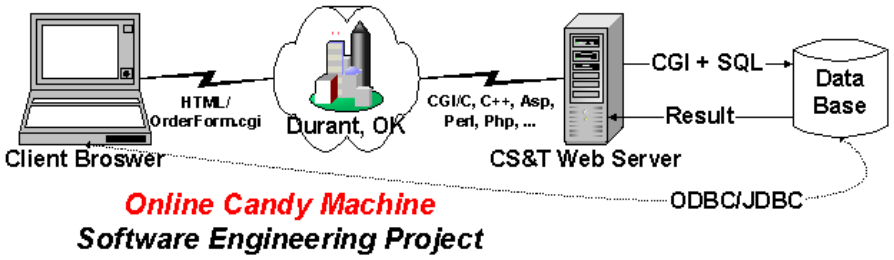
- The purpose of this course is to apply the knowledge of Computer Networking to meet the network needs of your organization by integrating the Windows operating systems, Linux operating system, wired/wireless routers, network printer servers, and various network services/servers.

- CS5970 Distributed Networks (Fall 2002)
  - The purpose of this course is to learn the general concepts of distributed network computing and to realize how those concepts have been applied in computer network technologies. Also, the advantages and disadvantages of those technologies will be discussed.

Teaching Innovations

- CIS/CS 4423 Software Engineering, Spring 2003, 2004, 2005, 2006
  For this course, I have set up an Internet World Wide Web Client-Server environment under the Linux platform which is a networking system totally different from SE's Windows system, so each student will have his/her own personal website and different real world hands-on experiences on Operating Systems and Networking platforms. In addition, based on the new system students create their "On-line Shopping Candy Machine" (similar to Amazon.com or E-Bay) E-Commerce application. Under that environment, students can generate dynamic web pages on their own web sites, write CGI (Common Gateway Interface) networking programs, and interact with the Database server to produce a prototype "E-Commerce On-Line Shopping Software" (as shown in the figure below or test them at http://www.SE.edu/faculty/msu/se.html).

  Online Candy Machines is one of the Online Shopping Cart Projects assigned in the Software Engineering course:



Courses Taught

CIS 1003 - Computers in Society
CIS 3223 - Net-Centric Computing
CIS 4343 - Applied Net-Centric Computing
CS 1613 - Computer Science – I
CS 1623 - Computer Science – II
CS 2510 - Seminar in Programming
CS 2813 - Data Structures
CS 4113 - Operating Systems
CS 4223 - Algorithm Analysis

CS 4314 - Compiler Construction
CS 4423 - Software Engineering
CS 4623 - Advanced Web-based Application Development
CS 4973 - Smartphone/Tablet Apps (Android devices)
CS 4973 - iOS app dev-SWIFT (iOS devices)
CIS 4973 - E-Commerce (Electronic Commerce)
CS 4973 - Python for All
CS 5103 - Foundations of Computer Science
CS 5973 - Distributed Networks
CS 5990 - Research Maters Thesis

PUBLICATIONS

Thulasiraman, K., Su, M.-S. (2012, May). Diagnosis in a Network of Processors: Centralized and Distributed Models and Algorithms, *the proceedings of NCTCSDM 2012 which was published as a special issue of JCMCC.*

Phelps, D., Su, M.-S., and Thulasiraman, K., Distributed Testing and Diagnosis in a Mobile Ad-Hoc Environment, *Journal of Network and Computer Applications,* under the review process.

Tiger, A., Su, M.-S., Hicks, J., (2010, Oct 6). Using Discrete Event Simulation to Evaluate the Benefits of RFID in Reducing Traffic Congestion and Pollution While Increasing Student Safety in Rural Oklahoma Schools, *International Association for Computer Information Systems (IACIS 2010) conference and was nominated for the best technical paper*

Phelps, D., Su, M.-S., and Thulasiraman, K., (2010, June 28). Distributed Testing and Diagnosis in a Mobile Computing Environment, *International Wireless Communications & Mobile Computing Conference (IWCMC 2010)*

Tiger, A., Su, M.-S., Fogle, C., (2006 Oct.). A New Trend in Teaching to Meet AACSB Mandates: Integrating Computer Information Systems and Management Science by Using Microsoft's .NET And LINDO API, *International Association for Computer Information Systems (IACIS 2006)*

Thulasiraman, K., Su, M.-S., Goel, V., (2003, May). Multi-Level Distributed Fault Detection in Computer Networks, *IEEE International Symposium on Circuits and Systems (ISCAS 2003)*

Su, M.-S., Thulasiraman, K., Das, A., (2002 Nov.). A Scalable On-Line and Multi-Level Distributed Fault Detection/Monitoring System based on the SNMP Protocol, *IEEE Global Telecommunications Conference (GLOBECOM'02)*

Su, M.-S. (2002 Jan.) , *Multilevel Distributed Diagnosis and the Design of a Distributed Network Fault Detection System Based on the SNMP Protocol*, Ph.D. Dissertation, School of Computer Science, University of Oklahoma

Su, M.-S., Thulasiraman, K., Das, A., (2001 Oct.). A Multi-Level Adaptive Distributed Diagnosis Algorithm for Fault Detection in a Network of Processors, *Proc. 39th Annual Allerton Conf. on Communication, Control, and Computers*

OTHER PROFESSIONAL ACTIVITIES

Creative Work (Software)

Summer/2016 Developed the "Counseling Center Intake Form Database" for the Student Wellness Services at SE
Spring/2015 Published the "SE-Campus Guide app" to the Google App store

RESEARCH GUIDENCE
Master's Thesis Mentor

Danny Phelps, "Distributed Testing and Diagnosis in a Mobile Computing Environment", School of Art and Sciences, Southeastern Oklahoma State University, Durant, Oklahoma, Sept. 2006, USA

Poster Presentations on Oklahoma Research Day

2022 Ming-Shan Su, A Class Project - "A STEM Project - A Simplified and Low-Cost Home Monitoring Online System Built with Raspberry Pi and IoT", ORD-2022, Cameron University

2021 Austin Roach and Ming-Shan Su, A Class Project - "A Two-In-One Symmetric-Key Cryptography App using Enhanced Monoalphabetic Cipher and Polyalphabetic Cipher", ORD-2021, Cameron University

2019 Ashlee Carr, Ieysha Cheney, Spencer Patton, Shannon McCraw, and Ming-Shan Su Department of Art, Communication, and Theatre * Department of Computer Science, Exploring a University's Twitter Hashtag: Performing A Sentiment and Semantic Network Analysis, ORD-2019, Southwestern Oklahoma State University

2018 Michael Kellner and Ming-Shan Su, A Class Project - "A Three-In-One Symmetric-Key Cryptography Program using Additive Key, Auto Key, and Transposition Ciphers."

2018 Esdras Teixeira and Ming-Shan Su, "Fuel Calculator - MPG" My First iOS-SWIFT App that Keeps Track of how Many Miles per Gallon a Vehicle is Getting

2016 Keith Pearce and Ming-Shan Su, "A Class Project - A Multi-Feature SE School App for Android Devices", presented at the Brain Storm of SE, May, 2016 and the posted was awarded the 2nd place in the area of Chemistry and Computer Science

2016 Keith Pearce and Ming-Shan Su, "A Class Project - A Multi-Feature SE School App for Android Devices", *Oklahoma Research Day 2016, Tahlequah, Oklahoma*

2014 Ryan Summit and Ming-Shan Su, "Implement the PaaS (Platform as a Service) on Windows Azure Cloud and Deploy a PHP-MySQL Cloud-based Online Registration Web Application Using FTP" *Oklahoma Research Day 2014, Edmond, Oklahoma*

2010 Justin Davis and Ming-Shan Su, "An Implementation of the Asynchronous Decentralized Leader Election Algorithm In a Ring Network", *Oklahoma Research Day 2010*, Lawton, Oklahoma

2010 Aaron Hamilton and Ming-Shan Su, An Implementation Of a Real-time Streaming Video Server and Client", *Oklahoma Research Day 2010*, Lawton, Oklahoma

2009 Daniel Phelps and Ming-Shan Su, "Distributed Testing and Diagnosis in a Mobile Ad-Hoc Wireless Network", *Oklahoma Research Day 2009*, Broken Arrow, Oklahoma

2008 Aaron Hamilton and Ming-Shan Su, "An Online E-Grocery Store", *Oklahoma Research Day 2008*, Broken Arrow, Oklahoma

2008 Aaron Hamilton and Ming-Shan Su, "A Real-Time Internet Tic-Tac-Toe Game", *Oklahoma Research Day 2008*, Broken Arrow, Oklahoma

2005 David Kobosky and Ming-Shan Su, "A Simplified Windows Explorer Using Visual Basic.NET", *Oklahoma Research Day 2005*, Edmond, Oklahoma

2005 Daniel Phelps and Ming-Shan Su, "An Online Animated Teaching Tool for Floye-Warshall's All-Pairs Shortest Paths Algorithm", *Oklahoma Research Day 2005*, Edmond, Oklahoma

2005 Daniel Phelps and Ming-Shan Su, "An Online Animated Towers of Hanoi Program: A Simplified Game Using JAVA Applet", *Oklahoma Research Day 2005*, Edmond, Oklahoma

2004 Keith Robinson, Larry McKevitt, and Ming-Shan Su, "Toddy Bear Online Library System – A Three-tier Database-Driven Architecture Integrating LAMP Technologies", *Oklahoma Research Day 2004*, Edmond, Oklahoma
Keith Robinson's presentation was awarded for Outstanding Student Poster (S-308)

2003 Kevin Roark, Stephan Terrill, Taron Graves, William Raines, and Ming-Shan Su, "MORETHAN8BUCKSBACK.COM – An On-Line Buy-Sell-Buy WWW System To Maximize College Textbook Value", *Oklahoma Research Day 2003*, Edmond, Oklahoma

July/2016	Software Developer of the Counseling Center Intake Form Database for the Student Wellness Services of SE

RESEARCH COLLABORATION

2002-2017	K. Thulasiraman, University of Oklahoma, Norman, Oklahoma
2002-2010	Andrew Tiger, Southeastern Oklahoma State University, Durant, Oklahoma

GRANTS and CONTRACTS

Summer/2022	Google Cloud Platform Education Grant, $1,500.00 (Awarded for CIS 4970.W1)
Fall/2019	Research mini-grant titled "Use Raspberry PI STEM kit for learning CCPS", $414.00 (Awarded)
Fall/2019	Google Cloud Platform Education Grant, $1,500.00 (Awarded for CS 4643)
Fall/2019	Google Cloud Platform Education Grant, $1,250.00 (Awarded for CIS 4113)
Spring/2019	Research mini-grant titled "Offer Drone Programming to promote STEM related courses, se, and interdisciplinary research opportunities and to recruit students", $1,618.00 (Awarded). This grant application included my colleague Dr. Lie Qian as well.
Spring/2018	Google Cloud Platform Education Grant, $1,100.00 (Awarded for the CIS4343 course)
Fall/2017	Google Cloud Platform Education Grant, $1,300.00 (Awarded for CS 4623)
Spring/2017	Google Cloud Platform Education Grant, $1,400.00 (Awarded for the CIS4113 course)
Spring/2017	Google Cloud Platform Education Grant, $1,450.00 (Awarded for the CIS4343 course)
Fall/2017	Google Cloud Platform Education Grant, $1,400.00 (Awarded)
Fall/2017	Research mini-grant titled "Use Beacons (IoT-Internet of Things) to server as an interactive campus/building guide", $299.00 (Awarded)
Spring/2016	Research mini-grant titled "Develop a Student-Budget app and a Blue-Clicker classroom response app", $1,399.00 (Awarded)
July/2015	Microsoft's Windows Azure Educator Grant, $21,000 (Awarded)
Summer/2015	Presidential Partners Award – SE Connect App (Awarded: $1,000)
Spring/2015	Presidential Partners Award – Android Devices (Awarded: $1,724)
Sept./2013	Microsoft's Windows Azure Educator Grant, $ 44,400 (Awarded)
Spring/2011	Southeastern Organized Research Fund, $1575.00 (Funded: $1275+300)
Fall/2010	Southeastern Organized Research Fund, $1394.75 (Funded)
Fall/2006	Southeastern Organized Research Fund, $609.25 (Funded)

PROFESSIONAL SERVICE

6/27-30/2022	Hosted the IT-Camp for Kids and taught the Workshop-3: IoT (Internet of Things) using Raspberry Pi and Scratch to 9-12th Graders and Guardians and Workshop-4: Webpage Design to 5-10th Graders and Guardians
6/20-23/2022	Hosted the IT-Camp for Kids and taught the Workshop-1: IoT (Internet of Things) using Raspberry Pi and Scratch to 5-6th Graders and Guardians and Workshop-2: IoT (Internet of Things) using Raspberry Pi and Scratch to 7-8th Graders and Guardians
03/10/2022	Gave a Presentation with the topic of "Introduction to Computer Science and Computer Information Systems programs" to our school's Professional Advising Unit (Durant and Satellite campus) through Zoom
10/29/2019	Organized two IT Field Trips (10/29, 10/30) to visit the IT Department of the Choctaw Nation Tribal Headquarters.
10/24/2019-11/07/2019	Serves as a temporary IT consultant for the City of Durant to retrieve thousands of emails under certain search criteria using Google Vault function
2/12/2018-2/14/20182018	Organized three IT Field Trips (2/12, 2/13, 2/14) to visit the Choctaw Nation Data Center, each trip is limited 12 students.
Summer/2016	Member of the Website Redesign Committee of City of Durant, OK
8/2011	Program Committee Chair - the 13th IEEE Joint International Computer Science and Information Technology Conference
8/2011	Program Committee Chair - the 6th IEEE Joint International Information Technology and Artificial Intelligence Conference
6/2010	Session Chair - Energy Awareness and Scheduling in WiMAX Networks (Broadband Symposium) session and Performance Modeling and Analysis & Upper Layer Design session (Mobile Computing Symposium), the 6th Internal Wireless Communications & Mobile Computing
7/2009-12/2011	Founder and Member - Free Computer Clinic Service
6/2009-Present	IT Field Trip initiator/organizer, organizing the annual trip to tour to the IT department and computer servers of the Choctaw Casino at Durant
7/2008	Website Designer, Built advanced web sites for different local organizations (e.g., Wishing-Well Org., Adult-7 Sunday School of FBC church, etc.) in Durant for free
Spring/2004	Internship program initiator, with Choctaw Casino
Spring/2004	Consultant, the Criminal History Database of the Madill Policy Department, Oklahoma
Fall/2003	Coach, the SE programming team for the ACM Regional Programming Contest
Spring/2003	Internship program initiator, with Customer Linx (A large high tech firm in Durant)

OTHER ACTIVITIES/SERVICES

1/2018-Present	Member of the Mission Committee of First Baptist Church – Durant, OK
3/2011-Present	Member and Speaker of the Chinese Worship Service in Durant
2002-Present	Host (Home-Away-From-Home Program) for the SE Chinese Student Fellowship

2002-Present	Interpreter for the local Chinese in Durant
2002-Present	Continue to help people to repair their computers for free
2001-2002	Mission Dept. Co-Worker at Chinese Baptist Church, Norman, OK
1997-1998	Graduate Senator for the School of Computer Science, University of Oklahoma
Fall/1994	Chinese Student Association Sports Team Leader, University of Oklahoma

CURRICULUM VITAE

Lie Qian

Professor

Department of Chemistry, Computer, & Physical Sciences

425 W. University Boulevard, PMB 4081

Durant, OK 74701

Office: Class Building – CB128

580.745.2310

Fax: 580.745.7503

lqian@se.edu

EDUCATION:

2006	Ph.D.	Computer Science	University of Texas at Dallas, USA
2002	M.S.	Computer Science	University of Texas at Dallas, USA
1999	B.E.	Management Engineering	Tongji University, China

ACADEMIC AND RELATED NON- ACADEMIC EXPERIENCE:

2020-Now Professor, Southeastern Oklahoma State University
2011-2020 Associate Professor, Southeastern Oklahoma State University
2006-2011 Assistant Professor, Southeastern Oklahoma State University
2002-2006 Teaching Assistant, University of Texas at Dallas

PROFESSIONAL INTERESTS:

- Multimedia Quality of Service in Network: Quality of Service provision to multimedia traffic in heterogeneous Internet
- Network Multicast: Scalable multicast routing and resource management in Internet
- Software Defined Network (SDN): Architecture, protocol and algorithm design in SDN
- Web application integrated with database
- Cloud computing security and privacy
- Machine Learning, Deep Neural Networks

PROFESSIONAL SERVICE:

- Serve Advisory Committee for Computer Information Systems at Murray State College since 2015 March
- Coordinate with Rose State College about computer science course articulation, since 2011 January
- Serve Bachelor of Liberal and Applied Studies Coordinating Committee, 2016-Now
- Serve Academic Appeals Committee, 2010-2013

- Serve Curriculum Committee, 2014-2017
- Serve Distance Education Council, 2015-2021
- Reviewer of
    - National Conference on Undergraduate Research (NCUR) 2018
    - Journal of Undergraduate Research, 2012
    - Scientific Research and Essays, 2012
    - Journal of High Speed Networks, 2006
    - International Journal of Computers and Applications, 2005
    - IEEE International Conference on Communications (ICC) 2005, 2006
    - Communications, Internet and Information Technology (CIIT) 2004
    - The Ninth IEEE Symposium on Computers and Communications (ISCC) 2004
- Serve in Free Computer Clinic 2009-2010
- Coach of ACM Programming Contest Teams since 2010
- Organize Students to Build Commercial Website for Local Small Business (with Oklahoma Small Business Development Center)
- Supervise Game-On event on Oklahoma Science Olympiad, 2016-Now

PROFESSIONAL MEMBERSHIPS:

- Former member of Institute of Electrical and Electronic Engineers Society (IEEE) (2003-2006)
- The Institute of Electronics, Information and Communication Engineers (IEICE) (2009-2012)

EFFECTIVE TEACHING:

➢ Courses Taught:

Fall 2021
- CS-1613.1 Computer Science I
- CS-2813.1 Data Structures
- CIS-1003.6-7 Computers In Society
- CIS3123 Intermediate Database Analysis

Summer 2021
- CIS-3343.W1 Computer Security

Spring 2021
- CS-1613.1 Computer Science I
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering
- CIS-3323 Advanced Database Analysis

Fall 2020
- CS-1613.1 Computer Science I
- CS-2813.1 Data Structures
- CS-4223.1 Algorithm Analysis
- CIS-1003.7 Computers In Society
- CIS3123 Intermediate Database Analysis

Summer 2020
- CIS-3343.W1 Computer Security

Spring 2020
- CS-1613.1 Computer Science I
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering
- CIS-3323 Advanced Database Analysis

Fall 2019
- CS-2813.1 Data Structures
- CS-4323.1 Programming Languages
- CIS-1003.6/8/W2 Computers In Society
- CIS-2343.1 Web Page Design/Internet Programming
- CIS3123 Intermediate Database Analysis

Summer 2019
- CIS-1003 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2019
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering
- CIS-3323 Advanced Database Analysis

Fall 2018
- CS-2813.1 Data Structures
- CS-4223.1 Algorithm Analysis
- CIS-1003.6/8 Computers In Society
- CIS-2343.1 Web Page Design/Internet Programming

Summer 2018
- CIS-1003 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2018
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering
- CIS-3323 Advanced Database Analysis

Fall 2017
- CS-2813.1 Data Structures
- CS-4323.1 Programming Languages
- CIS-1003.8/W2 Computers In Society
- CIS-2343.1 Web Page Design/Internet Programming

Summer 2017
- CIS-1003 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2017
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering
- CIS-3323 Advanced Database Analysis

Fall 2016
- CS-2813.1 Data Structures
- CIS3123 Intermediate Database Analysis
- CS-4223.1 Algorithm Analysis
- CIS-1003.W2 Computers In Society
- CIS-2343.1 Web Page Design/Internet Programming

- **Summer 2016**
- CIS-1003 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2016
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering
- CIS-1003.W2 Computers In Society

Fall 2015
- CS2813.1 Data Structures
- CS-1623.1 Computer Science II
- CS-4323.1 Programming Languages
- CIS-1003.W1 Computers In Society
- CIS-2343.1 Web Page Design/Internet Programming

Summer 2015
- CIS-1003.1 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2015
- CS-1623.1 Computer Science II
- CIS-1003.5 Computer In Society
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-4423.1 Software Engineering

Fall 2014
- CS2813.1 Data Structures
- CS-1623.1 Computer Science II
- CS-4223.1/5313.1 Algorithm Analysis
- CIS-4613/HIS5613 Health Information Systems
- MATH-2013.1 Introduction to Discrete Math
- CIS-2343.1 Web Page Design/Internet Programming

Summer 2014
- CIS-1003.1 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2014
- CS-1623.1 Computer Science II
- CIS-1003.w2 Computer In Society
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS/CIS-4423.1 Software Engineering

Fall 2013
- CS2813.1 Data Structures
- CS-1623.1 Computer Science II
- CS-4323.1/5323.1 Programming Languages
- CS-4973.88/5973.1 Computer Forensic
- MATH-2013.1 Introduction to Discrete Math

Summer 2013
- CIS-1003.2 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2013
- CS-1623.1 Computer Science II
- CS2513.1 Seminar in Programming (C#)
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
  CS/CIS-4423.1 Software Engineering

- **Fall 2012**
- CS2813.1 Data Structures
- CS2513.1 Seminar in Programming (JAVA)
- CS4223.1/5213.1 Algorithm Analysis
- MATH 2013.1 Introduction to Discrete Math

Summer 2012
- CIS-1003.2 Computer In Society
- CIS-3343.W1 Computer Security

Spring 2012
- CS/CIS-4423.1 Software Engineering
- CS-1623.1 Computer Science II
- CS-3143.1 Computer Architecture
- CS-4113.1 Operating Systems
- CS-5003.1 Information Technology

Fall 2011
- CS-1623 Computer Science II
- CS-2813.1 Data Structure
- CS-4313/5313 Compiler Constructs
  CS-2513.1 Seminar in Programming (JAVA)
  MATH2013.1 Introduction to Discrete Math

Summer 2011
- CIS1003 Computer in Society

Spring 2011
- CS/CIS4423 Software Engineering
- CS1623 Computer Science II
- CS3143 Computer Architecture
- CS4113 Operating Systems

Fall 2010
- CS1623 Computer Science II
- CS2813 Data Structures
- CS4223 Algorithm Analysis
- CS4970 Applied Database Analysis Summer 2010
- CIS1003 Computer in Society

Spring 2010
- CS/CIS4423 Software Engineering
- CS1623 Computer Science II
- CS3143 Computer Architecture
- CS4113 Operating Systems

Fall 2009
- CS1623 Computer Science II
- CS2813 Data Structures
- CS4313 Compiler Constructs
- CS4997 Applied Database Analysis

Summer 2009
- CIS1003 Computer in Society

Spring 2009
- CS/CIS4423 Software Engineering
- CS1613 Computer Science I
- CS3143 Computer Architecture
- CS4113 Operating Systems

Fall 2008
- CIS1003 Computer in Society
- CS2813 Data Structures
- CS4223 Algorithm Analysis
- CS5003 Information Technology

Summer 2008
- CIS1003 Computer in Society

Spring 2008
- CS/CIS4423 Software Engineering
- CS1613 Computer Science I
- CS3143 Computer Architecture
- CS4113 Operating Systems

Fall 2007

- CIS1003 Computer in Society
- CIS3323 Database Analysis
- CS4313 Compiler Construction
  CS4323 Programming Languages

Spring 2007

- CS/CIS4423 Software Engineering
- CS2510 Visual Basic
- CS3143 Computer Architecture
- CS4113 Operating Systems

Fall 2006

- CIS1003 Computer in Society
- CIS3323 Database Analysis
- CS2510 Java Programming Language
- CS4223 Algorithm Analysis

- **Teaching Innovations**
  - CS3143 Computer Architecture
    - Since Spring 2009, IA-32 Processor Architecture with its assembly language programming has been introduced in this class. The study of the processor architecture from the most popular processor family (INTEL Pentium) helped our students to understand computer processor design principle better and open the gate of assembly programming, which is the lowest level programming in modern industry.
    - Since Spring 2008, Little Man Computer Simulation is introduced in this class. Little Man Computer is a model created by Dr. Stuart Madnick at MIT in 1965 (revised in 1979). The model operates very similarly to a real computer and is still an accurate representation of the way that computers work 35 years after its introduction. Through simulating the model with any programming language, our students are building a "software computer" and developing their understanding of computer's working mechanism.
  - CS/CIS4423 Software Engineering
    - Since Spring 2012, group projects are introduced into this course. Students are organized into groups with 3-5 members. Each group plays two roles, developer for their own project and customer to another group. Students are required to carry out the design of the product going through multiple stages in software engineering processes, such as, interview, negotiation, requirement analysis, planning, design, etc.
    - Since Spring 2009, we collaborate with Oklahoma Small Business Development Center (OSBDC) to give our students chances to work with real small business owner to build up commercial website for these small business. Through working with real clients on real life projects, our students learned how to communicate and negotiate with software product clients efficiently and professionally. Also they learned how to management their scheduling and how to deal with changing requests from clients.

  - CIS3323 Database Analysis
    - Since Spring 2019, MySQL database management system's installation, programming and configuration are added.
    - Since Fall 2007, Microsoft SQL Server is introduced into this class as experiment platform. By using this cutting edge database management system, our students had better chances to practice their database skills such as SQL programming and database management.
  - CS4113 Operating Systems
    - Since Spring 2012, POSIX API is introduced to this class to demonstrate how process management and communication is performed in Linux/Unix based system.
    - Since Spring 2008, WIN32 API is introduced into this class. By using WIN32 API, our students have a chance to practice functionality provided in windows operating systems in their own programs such as process management, thread management, remote procedure call, etc.

- Since Spring 2008, students are required to learn and finish a discreet event driven simulation to simulate different CPU scheduling algorithms. After the study, students not only have better understanding of the difference between these CPU scheduling algorithm, they are also equipped with the capability to build their own discreet event driven simulation from scratch in the future to deal different performance evaluation problem in their study and career.

- CS/CIS2343 Web Page Programming
  - Since Fall 2018 one whole chapter of mobile web design has been added to the course. Topics such as media query, flex layout, response design, etc. are covered to help students build web pages usable on both traditional computer browsers and mobile devices.
  - Since Fall 2008, JavaScript has been expanded into 2 chapters. Relatively advanced programming topics such as functions and arrays now can be covered in addition to basic programming elements.

➢ **New Course**

- Computer Forensics (CS4973.1/5973.1 Fall 2013)
  - This new course provides a foundation in the field of Computer Forensics and Investigation. Students learn how to obtain and analyze digital information for possible use as evidence in civil, criminal, or administrative cases. The topics will include computer forensics law, computer forensics lab, data acquisition, Crime and incident scene processing, file/operating system analysis, evidence analysis and validation, Graphic file recovery, email investigation, mobile device investigation, etc.
- Applied Database Analysis (CS4973.1 Fall 2009)
  - This new course was introduced in Fall 2009 semester. In this course, we combine theoretical database design with practical database operation. In the first half of the semester, students learn theoretical part of database such as SQL programming, database design models, and database normalization. In the second half semester, students follow MCTS SQL Server 2008 Exam 70-433 preparation kit to practice database design and management on Microsoft SQL Server. This course prepares students for database development profession or working environments in which databases are central to their primary job roles.

➢ **Honors Program**

- Mr. Cliff Eddings, CS2510 Java Programming Language, Exception Handling in Java, 2006
- Mr. Justin Davis, CS4113 Operating Systems, Operating System in Handheld Device, 2008
- Mr. Joshua Arrington, CS4223 Algorithm Analysis, String Processing Algorithm, 2010
- Ms. Jessie Batson, CS2813 Data Structures, CS1623 Computer Science II, MATH2013 Discrete Math, 2014 Fall
- Mr. Preston Cosper, CS2510 Seminar in Programing, Exception Handling, 2015 Fall
- Mr. Preston Cosper, CS4223 Algorithm Analysis, Text Pattern Matching Algorithms, 2016 Spring

- Mr. Preston Cosper, CS4423 Software Engineering, Mobile App Testing, 2016 Spring

PUBLICATIONS OR ARTISTIC ACHIEVEMENTS:

- **Refereed Publication**
  - Qian, L., Scalable Multicast Using MPLS in Software Defined Network. Transactions on Networks and Communications (TNC), Vol. 7, No. 3, 2019, pp. 22-34 ISSN: 2054 -7420.
  - Qian, L., Efficient On-Line Traffic Policing in Software Defined Network. Transactions on Networks and Communications (TNC), Vol. 6, No. 5, 2018, pp. 1-15 ISSN: 2054 -7420.
  - Qian, L., Efficient On-Line Traffic Policing for Confidence Level based Traffic Model. Transactions on Networks and Communications (TNC), Vol. 4, No. 5, 2015, pp. 28-41 ISSN: 2054 -7420.
  - Wang, Y., Qian, L., Conte, A., & Song, X. A-Serv: A Novel Architecture Providing Scalable Quality of Service. International Journal of Computer Networks (IJCN), Volume (4) : Issue (1): 2012, pp.263-283 (ISSN 19854129)
  - Qian, L., Liu, X., & Wang, Y. (2010). A New Tree Construction Algorithm for Scalable Multicast in MPLS Networks. Proceedings of International Symposium on Computer Network and Multimedia Technology, 2010, CNMT.
  - Qian, L., Liu, X., & Wang, Y. (2009). Providing End-to-End Guaranteed QoS in A-Serv Architecture. Proceedings of International Symposium on Computer Network and Multimedia Technology, 2009, CNMT. doi: 10.1109/CNMT.2009.5374732
  - Qian, L., Tang, Y., Wang, Y., Bou-Diab, B., & Olensinski, W. (2006). A New Scalable Multicast Solution in MPLS Networks. Proceedings of IEEE Global Telecommunications Conference, 2006, GLOBECOM. doi: 10.1109/GLOCOM.2006.354
  - Tang, Y., Qian, L., & Wang, Y. (2005). Optimized Software Implementation of Full-Rate IEEE 802.11a Compliant Digital Baseband Transmitter on Digital Signal Processor. Proceedings of IEEE Global Telecommunications Conference, 2005, GLOBECOM, pp. 2189. doi: 10.1109/GLOCOM.2005.1578053
  - Qian, L., Tang, Y., Wang, Y., Bou-Diab, B., & Olesinski, W. (2005). A New Fair Bandwidth Allocation Algorithm for Multimedia Multicasting in DiffServ. Proceedings of IEEE Global Telecommunications Conference, 2005, GLOBECOM, pp. 851. doi: 10.1109/GLOCOM.2005.1577758
  - Qian, L., Wang, Y., & Shen, H. (2005). Token Bucket Based Statistical Regulator for S-BIND Modeled On-Line Traffic. Proceedings of IEEE International Conference on Communications,2005, ICC, vol. 1, pp. 125-129. doi: 10.1109/GLOCOM.2005.1577758
  - Krishnamurthy, A., Qian, L., Wang, Y., Dauchy, P., & Conte, A. (2005). A New Coordinated Scheduling Algorithm in Distributed Bandwidth Broker QoS Architecture. Proceedings of IEEE International Conference on Communications, 2005, ICC, vol.1, pp. 384-388. doi: 10.1109/GLOCOM.2005.1577758
  - Tang, Y., Qian, L., Bou-Diab, B., Krishnamurthy, A., Damm, G., & Wang, Y. (2004). High-performance Implementation for Graph-based Packet Classification Algorithm on

Network Processor. Proceedings of IEEE International Conference on Communications, 2004, ICC, vol. 2, pp. 1268-1272.

- Wang, Y., Krishnamurthy, A., Qian, L., Dauchy, P., & Conte, A. (2004). A-Serv: A Novel Architecture Providing Scalable Quality of Service. Proceedings of IEEE Global Telecommunications Conference, 2004, GLOBECOM, vol. 2, pp. 1295-1299. doi: 10.1109/GLOCOM.2005.1577758
- Qian, L., Krishnamurthy, A., Wang, Y., Tang, Y., Dauchy, P., & Conte, A. (2005). A New Traffic Model and Statistical Admission Control Algorithm for Providing QoS Guarantees to On-Line Traffic. Proceedings of IEEE Global Telecommunications Conference, 2004, GLOBECOM, vol. 3, pp. 1401-1405. doi: 10.1109/GLOCOM.2005.1577758
- Tang, Y., Qian, L., Wang, Y., & Savaria, Y. (2003). A New Memory Reference Reduction Method for FFT Implementation on DSP. Proceedings of IEEE the 2003 International Symposium on Circuits and Systems, 2003, ISCAS, vol. 4, pp. IV-496 - IV-499. doi: 10.1109/ISCAS.2003.1205932
- Tang, Y., Qian, L., Wang, Y., & Chung, J. (2003). Twiddle Factor Reduction Method for FFT Implementation on DSP. Proceedings of System on Chip (SOC) Design Conference 2003, Seoul Korea, November 5-6, 2003.
- Qian, L., Tang, Y., Wang, Y., Ahmad, M. O., & Swamy, M. N. S. (2003). Explore Parallelism for Viterbi Decoder Implementation on DSP. Proceedings of System on Chip (SOC) Design Conference 2003, Seoul Korea, November 5-6, 2003.

- **Filed Patents**
  - Qian, L., Tang, Y., Wang, Y., Bou-Diab, B., & Olensinski, W. (2004) Forwarding State Sharing Between Multiple Traffic Paths in a Communication Network. Filed with Alcatel Canada, November 2004.
  - Qian, L., Krishnamurthy, A., Wang, Y., Tang, Y., Dauchy, P., & Conte, A. (2003). S-BIND Traffic Model and Gamma H-BIND Admission Control Algorithm for On-Line Traffic. Filed with Alcatel France, 20 March 2003.
  - Wang, Y., Zhang, Y., Tang, Y., Krishnamurthy, A., Qian, L., Damm, G., & Bou-Diab, B. (2003). Disjoint Graph based Classification Algorithm for Range-Specified Rules. Filed with Alcatel Canada, 20 August 2003.
- **Research Day Presentation**
  - Qian, L., (2018). Efficient On-Line Traffic Policing in Software Defined Network. Presented on Oklahoma Research Day 2018
  - Qian, L., (2016). Network On-Line Traffic Policing. Presented on Oklahoma Research Day 2016, March 2016.
  - Qian, L. & Pettett, S. Fair Bandwidth Allocation in Multimedia's Multicast Oklahoma Research Day 2013.
  - Qian, L., (2011). A New Tree Construction Algorithm for Scalable Multicast in MPLS Networks. Presented on Oklahoma Research Day 2011, November 2011.
  - Qian, L., & Nathaniel, J. (2009). A Discrete Even Driven Simulator to Evaluate CPU

Scheduling Algorithms. Presented on Oklahoma Research Day 2009, November 2009.

OTHER PROFESSIONAL ACTIVITIES:

- **Industrial Collaboration**
  - Alcatel Canada Jan. 2004-May 2005

    Multicast Bandwidth Allocation and Metering Schemes for Network Processor based Implementation
  - Alcatel Canada April 2003-Dec. 2003

    Evaluating Network Processors and Data Path Techniques for QoS Enabled VPN Applications
  - Alcatel France July 2002-June 2003

    End-to-End QoS Architecture Design

Revised 9/13/2021

CURRICULUM VITAE

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Southeastern Oklahoma State University
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EDUCATION

2013	MTech	Technology	Southeastern Oklahoma State University
2010	BAAS	Applied Arts and Sciences	Southeastern Oklahoma State University

PROFESSIONAL INTERESTS

Social Media When Used to Support Learning
Mobile Technology Usage in Education
Technology-Based Curriculum
Legal Aspects of Technology
Incoming Freshmen Orientation
Technology Education in the Public School System

COURSES TAUGHT

Southeastern Oklahoma State University

CIS 1003	Computers in Society
CIS 1613	Computer Information Systems I
CIS 1623	Computer Information Systems II
CIS 2103	Intermediate Productivity Software
CIS 3103	Advanced Productivity Software
CIS 3533	Advanced Business Solutions
CIS 4413	Systems Analysis
CS 4413	Systems Analysis
CS 5413	Systems Analysis
CIS 4103	Computer Ethics
CIS 5103	Computer Ethics
CIS 4970	Special Studies: Intro to eSports
CIS 4973	Special Studies: Special Topics in Computer Systems

Murray State College

CIS 1113	Computer Application
CIS 1653	Data Communication and Network Fundamentals
CIS 2213	Database Management Systems
CIS 2253	Web Page Design
CS 1313	Programming Fundamentals
CS 1613	Programming I (Python)
CS 1623	Programming II (Java)

Choctaw Nation of Oklahoma, Youth Events & Activities

March 14 & 15, 2022	Tech IKBI Camp, Lead Instructor & Curriculum Director
December 27-29, 2021	NASA Astro Camp Lead Instructor & Curriculum Director
March 15-17, 2021	Tech IKBI Camp, Lead Instructor & Curriculum Director
December 28-30, 2020	NASA Astro Camp Lead Instructor & Curriculum Director

ACADEMIC AND RELATED NON-ACADEMIC EXPERIENCE

2022 -	HLC Quality Initiative Project for Online Teaching
2022 -	J. Price Energy, Software Consultant & Trainer
2020 -	Youth Events & Activities Contract Instructor, Choctaw Nation of Oklahoma
2019 -	Adjunct Instructor, Murray State College
2018 - 2019	Board member, Southeastern Public Library System of Oklahoma
2017 - 2019	Member, Valliant Chamber of Commerce and Agriculture
2017 - 2019	Vice-Mayor, Town of Valliant, Oklahoma
2016 -	Full Time Instructor & Advisor, Southeastern Oklahoma State University's Chemistry, Computer, and Physical Sciences Department
2015 -	Upward Bound Sophomore & Junior Computers, Senior Computer Science Instructor
2015	Independent Improving Your Online Course (IYOC)
2015	Independent Applying the QM Rubric (APPQMR)

2014 - 2016 Adjunct Instructor, Southeastern Oklahoma State University's Chemistry, Computer, and Physical Sciences Department

2008 - 2018 Adult Education Technology Instructor, Kiamichi Technology Centers, Antlers/Hugo/Idabel Campuses 2008 - 2010 IRS Certified VITA Trainer

2006 - 2010	Technical Trainer, LDCAA, Inc.
2006 - 2010	Computer Support Specialist, LDCAA, Inc.
2004 - 2006	IT Clerk, LDCAA, Inc.
2002 - 2004	Data Entry, LDCAA, Inc.

Grants

Presidential Partners Student Recruitment Initiatives by Faculty, "SPRK the Future" NASA Oklahoma Space Grant
Schools and Libraries Program (E-Rate), LDCAA, Inc.

Committees

2021 -	LMS Transition Committee
2021 -	Distance Education Council
2021	Screening Committee
2018 - 2021	Sustainability Committee, Southeastern Oklahoma State University
2017 - 2018	Learning Technology Council, Southeastern Oklahoma State University

Memberships

Computer Science Teachers Association (CSTA)
American Association of University Professors (AAUP)

CURRICULUM VITAE

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Southeastern Oklahoma State University
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Durant, Oklahoma 74701
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Tel: 580.745.2663
nsoundararajan@se.edu

EDUCATION

2021	D.Sc.	Information Technology (Computer Science Track)	Towson University
2002	M.Tech.	Digital Electronics	Visveswaraiah Technological University, India
1990	B.E	Computer Science and Engineering	Karnatak University, India

ACADEMIC AND RELATED NON-ACADEMIC EXPERIENCE

Aug 2021-Present	Assistant Professor, SEOSU
Aug 2017-May 2021	Adjunct Faculty, Towson University
Aug 2016-Aug 2017	Teaching Assistant, Towson University
Aug 1990-July 2016	Technical Officer, DRDO, India

PROFESSIONAL INTERESTS

Bare Machine Computing
Systems Programming
Embedded Systems
Multicore Computing
Hardware and Software Testing

AWARDS AND HONORS

2007	DRDO National Award for Best Performance, India
2002	2nd Rank to the University in M. Tech

COURSES TEACHING/TAUGHT

CS4113	Operating Systems, SEOSU
CS1613	Computer Science 1, SEOSU
CIS 3103	Advanced Productivity Software

CS 4323	Programming Languages, SEOSU
CS 4643	Distributed Networks, SEOSU
CIS 1003	Computers in Society, SEOSU
CIS 2103(online)	Intermediate Productivity Software, SEOSU
ITEC 274	Fundamentals of System Admin, Towson University
COSC175	General Computer Science, Towson University
COSC109	Computers and Creativity, Towson University

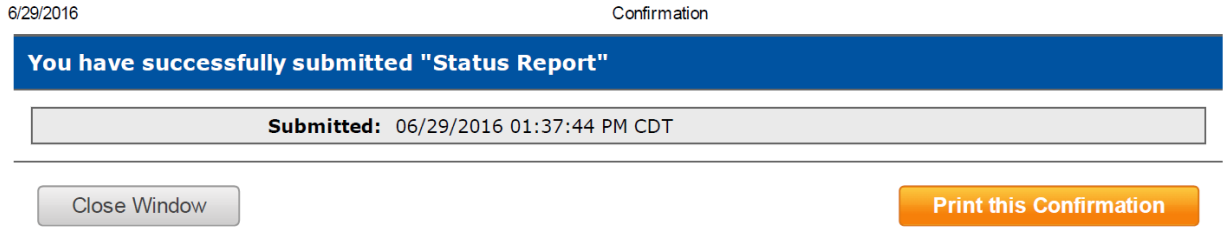
PUBLICATIONS

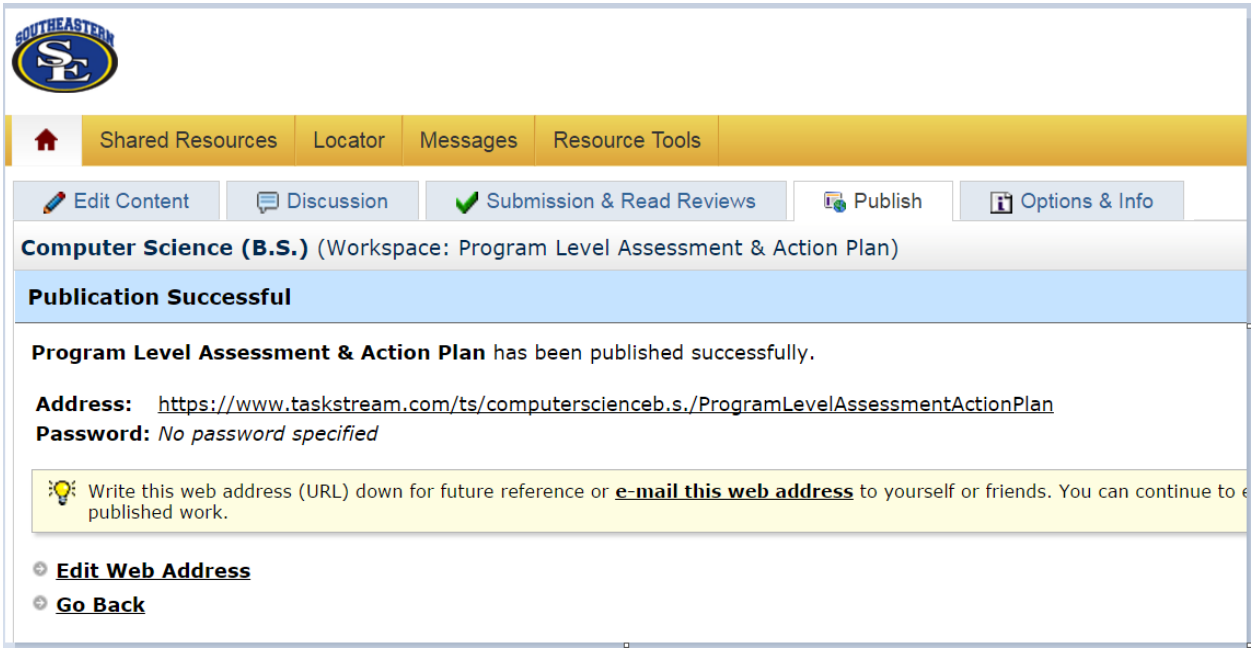
1. N.Soundararajan, H.Chang, R.K.Karne, A.L.Wijesinha, N,Ordouie - "Design Issues in Running a Web Server on Bare PC Multi-core Architecture" – IEEE – COMPSAC 2020 (Computer Software and Applications Conference July 13-17th, Madrid, Spain) - DOI 10.1109/COMPSAC48688.2020.00010
2. N.Soundararajan, R.K.Karne, A.L.Wijesinha, N.Ordouie, B.Rawal – "Adhoc Client/Server Web Server Architecture based on UDP for Bare PC Applications – IEEE SCOReD 2020 27-29th September, Malaysia, DOI 10.1109/SCOReD50371.2020.9251017.
3. N.Soundararajan, J.Weymouth, R.K.Karne, A.L.Wijesinha, N.Ordouie – "Remote Collaboration Potential in STEM Education using Bare Machine Computing Research"– CSCI 2020 December 16-18th 2020,
   DOI 10.1109/CSCI51800.2020.00164
4. N.Ordouie, N.Soundararajan, R.Karne, A.L.Wijesinha – "Developing Computer Applications without any OS or Kernel in a Multicore Architecture – ISNCC 2021, October 31st-Nov 2nd2021, DOI 10.1109/ISNCC52172.2021.9615782
5. N.Ordouie, R.Almajed, R.Karne, A.LWijesinha, J.Weymouth and N.Soundararajan "Transformation Methodology of Binary Executables to Run on Bare Machines", CATA 2020, March 2020
6. A S.Almutairi, R. Karne, A. Wijesinha, H. Chang, R. Almajed, H. Alabsi, W. Thompson, and N. Soundararajan – "An API for Bare Machine Computing Applications", IEEE Southeast Con, April 2019.
7. S.Nirmala, C.M.Ananda - "Metric based communication methodology in BST network for MAV Swarm" (March 2nd -4th 2015) International Conference on Cognitive Computing and Information Processing (CCIP), JSSATE Noida, India.
8. S.Nirmala, C.M.Ananda - "Communication methodology in formation flying of Micro air vehicles" (November 2014) International Conference in Recent Advances in Design and Development of Micro Air vehicles, JNTU Hyderabad, India

II. Program Outcomes Assessment Reports

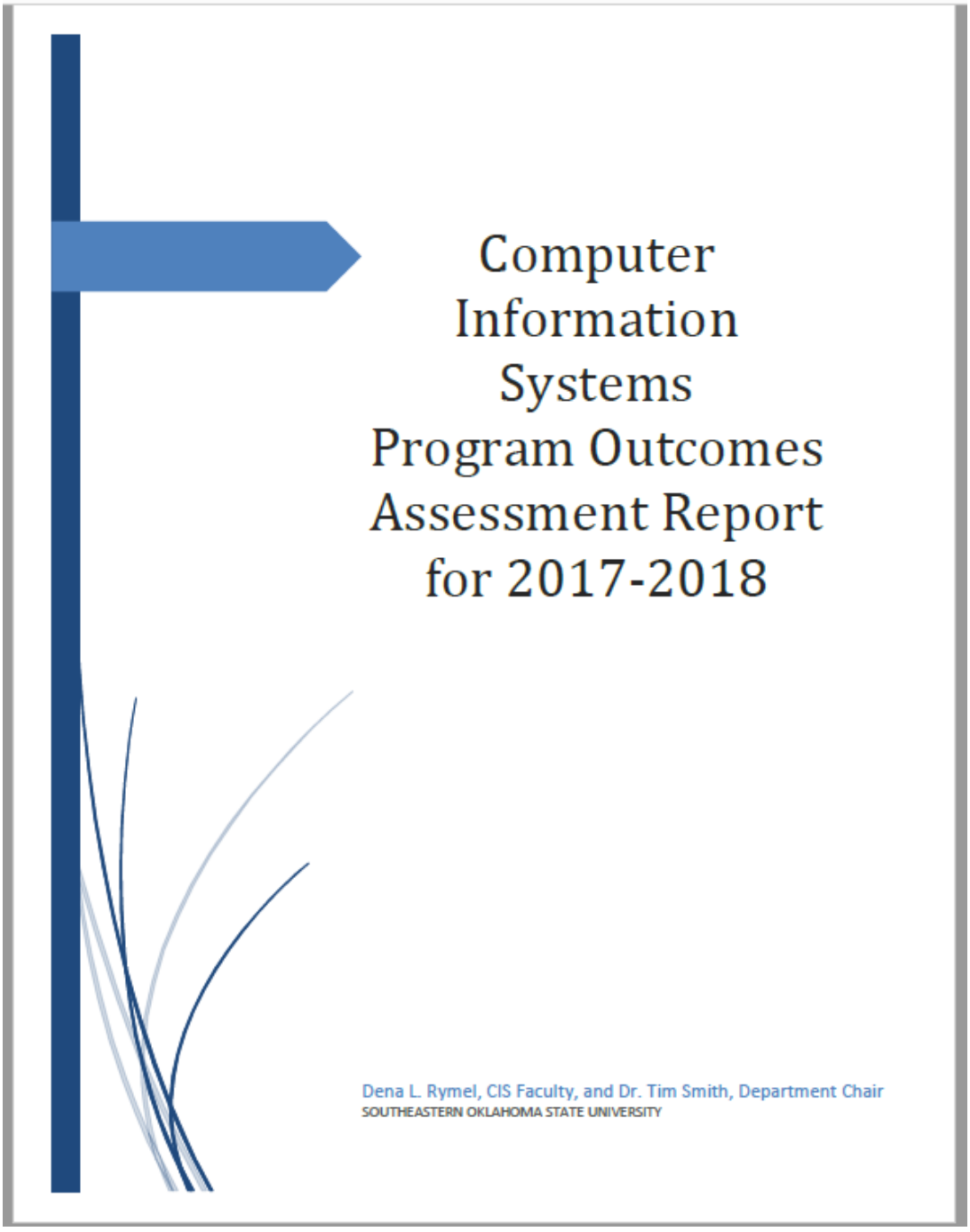
The Computer Information Systems Assessment Reports is listed first and followed by the Computer Science Assessment Reports.

There was no hardcopy of the Computer Information Systems 2016-2017 Assessment Report available from the faculty. Because we were using the Online TaskStream website to upload all our Assessment Data. See the screenshots below. According to the department information, the TaskStream website was only available till September 2017.





After several attempts, the margin set up on the original 2017-2018 cis access report (both in the pdf and Word formats) was still not compatible with this format of this Self-Study report. Therefore, each page of the 2017-2018 report was display as an image.



EXECUTIVE PROGRAM SUMMARY

As stated in the Assessment Report in the document below, the following measures have reached the ideal target of 3.0.

- Outcome 1 Measure 1: understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint (14 students)
- Outcome 1 Measure 2: understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint (13 students)
- Outcome 2 Measure 2: understanding and use of the concepts of computer programming and principles of software development techniques (14 students)
- Outcome 3 Measure 1: understanding and use of database concepts and methods of storing data efficiently (10 students)
- Outcome 6 Measure 1: understanding and practical application of how to solve managerial problems with application software (13 students)
- Outcome 6 Measure 2: understanding and use of software development life cycle techniques, components, and best practices (18 students)
- Outcome 7 Measure 1: understanding of the various components, concepts, and applications of data communications technology (17 students)
- Outcome 8 Measure 1: understanding of the fundamentals of health information management as it relates to electronic patient records (10 students)
- Outcome 8 Measure 2: understanding and practical use of electronic health records (19 students)
- Exit Exam: In the senior year of the program, the Computer Information Systems Departmental Exit Exam is given to each student (13 students)

The following measures have reached an acceptable target of 2.5.

- Outcome 2 Measure 1: understanding and use of the concepts of computer programming (19 students)
- Outcome 3 Measure 2: understanding and use of advanced database concepts (22 students)

No measures were below the acceptable target of 2.5.

Based on the assessment results, we plan to make the following changes to the Computer Information Systems program in the year 2018/19

- All faculty in the CIS program have been teaching overload courses in the past few years. We plan to hire a new faculty member to teach some CIS major courses, which could assist our current faculty in better fulfilling their teaching, advising, and other duties.
- Offer a new course, Python for All, to the entire SE student body, regardless of their declared major. Python will be an exciting new addition to the elective courses for CIS majors. The opportunity to learn additional programming languages greatly enhances our current program.
- Offer a new course, Special Topics in Computer Systems, to students with at least sophomore standing. This is a practicum course where students assemble desktop systems, practice installing, using, and customizing a variety of operating systems, learn good security practices, and acquire tools necessary to locate and resolve the technical issues that are sometimes experienced by personal computers by individuals and small businesses.
- Update textbooks used in courses when necessary to reflect current standards, terminology, and trends.
- Continue to monitor and enhance courses to better serve the needs of our students as they prepare to enter the workforce after graduation.

PROGRAM OUTCOMES ASSESSMENT REPORT

Department: Chemistry, Computer, & Physical Sciences

Degree Program: Computer Information Systems

Report Submitted By: Dena Rymel | **Date of Submission: January 17, 2019**

Program Mission Statement:
The Computer Information Systems (CIS) program of the department of Chemistry, Computer, and Physical Sciences aims to prepare its students to obtain and enjoy successful careers in the dynamic IT (Information Technology) industry. The CIS program strives to understand the needs of local, regional, and national employers and deliver graduates that can adequately fill current IT positions.

Student Learning Outcome 1	Mastery of Microsoft Office – Almost every high school graduate and many others have exposure to and rudimentary knowledge of Microsoft Office, in particular, Word, Excel and PowerPoint. This program takes the student much further in the deployment of productivity software, by delivering a deep, robust knowledge of the vast capabilities of such software. The student is prepared to solve complex problems regularly encountered in real business situations.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Students will complete intermediate course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate mastery of the material and software. At the end of each module (Word, Excel, PowerPoint), in CIS 2103 Intermediate Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 2016 and best practices in document creation and enhancement. CIS 2103 is a required course for all CIS majors. Exams are measured in scale 1-4. 14 were assessed in the 2017/18 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)**

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Measure* AND *Number of Students Assessed
Students will complete and be evaluated by advanced – and at time integrated - course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate advanced, comprehensive mastery of the material and software. At the end of each module (Word, Excel, PowerPoint) in CIS 3103 Advanced Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 2016 and best practices in document creation and enhancement, form design and integration, and web application integration. A comprehensive final exam measures student comprehension of concepts and

<table>
<tr><td></td><td>proper procedures. CIS 3103 is a required course for all CIS majors. Exams are measured in scale 1-4.

13 were assessed in the 2017/18 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
<tr><td>3</td><td>Good (Competent)</td><td>75 – 89%</td></tr>
<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 14 students were assessed in their understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint: 7 students ranked Excellent, 6 students ranked Good, 0 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.36, which exceeds the ideal target.
• 13 students were assessed in their understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint: 5 students ranked Excellent, 5 students ranked Good, 2 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.08, which exceeds the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.22; Ideal target is achieved. Students have few issues with the current textbook, and the textbook/software versions integrate well. One course's average dropped slightly from the previous year, but still reached the ideal target.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Student Learning Outcome 2</td><td>Basic Computer Programming Skills – The student understands the fundamentals of producing custom computer programs written in an object-oriented language such as Visual Basic. Issues that are not possible to solve with standard productivity software are given solutions that are accomplished by programs created for specific problems. Website development is one of many examples of the need for computer programming. Students also know when it is appropriate to activate custom programming instead of existing software to fill various IT needs.</td></tr>
<tr><td>Method(s) of Assessment</td><td>Measure AND Number of Students Assessed (Required)
Measure the student's basic understanding and proper use of visual object oriented language(s) and basic IO (Input/Output) on data. Students acquire knowledge through guided tutorials, then apply their subject comprehension to create and/or debug computer programs that employ a variety of expressions and statements, functions and string manipulations. Students will be evaluated by three section exams in In CIS 1613 Computer Information Systems I, and two section exams and a final, comprehensive exam in CIS 1623 Computer Information Systems II that allow them to demonstrate acquired knowledge of creating OOP-based computer programs. CIS 1613 and 1623 are required courses for all CIS majors. Exams are measured in scale 1-4.

33 were assessed for the combination of 1613 and 1623 in the 2017/18 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
</table></td></tr>
</table>

	3 | Good (Competent) | 75 – 89% 2 | Satisfactory (Developing) | 60 – 74% 1 | Unsatisfactory (Unacceptable) | Below 60%
Summary of Assessment Results	• 19 students were assessed in their understanding and use of the concepts of computer programming: 8 students ranked Excellent, 6 students ranked Good, 1 student ranked Developing, and 4 students ranked Unsatisfactory for an average of 2.95, which barely missed the ideal target, but did meet the acceptable target. • 14 students were assessed in their understanding and use of the concepts of computer programming and principles of software development techniques: 11 students ranked Excellent, 2 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.71, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.27; Ideal target is achieved. Students have few issues with the clarity of the current textbook. The course will be updated to reflect the necessity of using Visual Studio 2017 instead of the 2015 version asked for by the current textbook. The online sections perform very well; Zoom has been a major addition that supports coursework and helps bring distance students into F2F contact with the instructor. The instructor will continue to develop instructional content videos and additional instructional methods to enhance the course concepts. Both courses' averages increased over the previous year.
Student Learning Outcome 3	Knowledge of Database Management – The student understands database construction, design, relationships among data tables, data management, querying, and data retrieval methods for popular modern database software. Students know how to design a database instead of writing a custom program, when the situation is appropriate. Database security methods and storage procedures are implemented in a typical application.
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the student's understanding of and ability to create, modify, update, and analyze commercial database software. In CIS 3123 Intermediate Database Analysis, students acquire knowledge through guided tutorials, then apply their subject comprehension to modify existing databases by entering additional records and fields, modifying the structure and relationship of tables, creating properly formatted and functional queries and reports, and analyzing existing data. Students will complete and be evaluated by course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by two exams that require them to describe and identify database components and procedures, research databases' impact upon the business community, plus illustrate and discuss database design. CIS 3123 is a required course for all CIS majors. Exams are measured in scale 1-4. 10 were assessed in the 2017/18 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students.

	Describe rubric criteria and scales (if applicable) **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales** / **Interpretation** / **Percentage of Completion of the Course Requirements** 4 / Excellent (Exemplary) / 90 - 100% 3 / Good (Competent) / 75 – 89% 2 / Satisfactory (Developing) / 60 – 74% 1 / Unsatisfactory (Unacceptable) / Below 60%
	Measure AND Number of Students Assessed CIS 3323 Advanced Database Analysis enhances students' prior database knowledge, adding in the ability to utilize QBE and SQL to query and manipulate data. Students will define and use the various normal forms in table design, they will use triggers and data macros to manipulate data, and they will create ER diagrams as representations of proper database design. Students will complete and be evaluated by course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by exams on their ability to synthesize concepts acquired via textbook concepts and information, research conducted online, and practical knowledge gained through course assignments on database structures and design, database concepts and terminology, and database functions and services. CIS 3323 is a required course for all CIS majors. Exams are measured in scale 1-4. 22 were assessed in the 2017/18 year. *Expected Target* Acceptable 2.5, Ideal 3.0 in average among all assessed students. *Describe rubric criteria and scales (if applicable)* **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales** / **Interpretation** / **Percentage of Completion of the Course Requirements** 4 / Excellent (Exemplary) / 90 - 100% 3 / Good (Competent) / 75 – 89% 2 / Satisfactory (Developing) / 60 – 74% 1 / Unsatisfactory (Unacceptable) / Below 60%
Summary of Assessment Results	• 10 students were assessed in their understanding and use of database concepts and methods of storing data efficiently: 3 students ranked Excellent, 6 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.2, which exceeded the ideal target. • 22 students were assessed in their understanding and use of advanced database concepts: 5 students ranked Excellent, 13 students ranked Good, 2 students ranked Developing, and 2 students ranked Unsatisfactory for an average of 2.95, which slightly missed the ideal target but did meet the acceptable target.
Use of Results and Reflection	The average across all measurements is 3.03; Ideal target is achieved. Students have few issues with the current textbook, and the textbook/software versions integrate well. The instructor(s) will utilize Zoom and other content support tools and information resources to support student efforts. One course's average dropped slightly from the previous year, but still reached the ideal target. The other course's average increased slightly from the previous year.
Student Learning Outcome 4	Knowledge of Working Business Environment – A program has a greater chance of success when it requires a diverse mix of courses and faculty in its makeup. This program accomplishes that feat by calling on other departments to round out its graduates. Students have a good understanding of basic accounting principles by taking the first two entry level classes from our Accounting department. The same can be said of economics understanding from both micro- and macroeconomics classes. Students also understand basic statistics used in business from

	another outside course offered by the Business department. Complementing an understanding of the core ingredients of the business world are additional courses in management and marketing.
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** ACCT 2103 Fundamentals of Financial Accounting ACCT 2203 Fundamentals of Managerial Accounting BUS 2633 Business Statistics ECON 2213 Principles of Microeconomics MKT 3233 Principles of Marketing MNGT 3113 Management and Organizational Behavior Our faculty do not have access to the outcomes of the above courses, as they were offered by other departments. ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
	Measure AND Number of Students Assessed ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	*N/A*
Use of Results and Reflection	*N/A*
Student Learning Outcome 5	Enhanced Personal Communication Skills – Basic communication skills, both written and oral, are assumed to exist due to proper environmental factors and general education requirements. This program is of a technical nature and students achieve the ability to comprehend and produce technical documents, including professional-grade operating manuals for software systems and problem resolution documents. In addition to oral and written communications, present society now demands electronic communication skills, which are enabled through student interaction with commercial and custom software.
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** ENG 3903 Technical and Professional Writing Our faculty do not have access to the outcomes of the above course, as it was offered by another department. ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
	Measure AND Number of Students Assessed ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	*N/A*
Use of Results and Reflection	*N/A*
Student Learning Outcome 6	Solving Business Information Technology Problems – Businesses of all sizes have developed strong dependencies on software for employee productivity and for solutions to all kinds of problems. Students have a variety of IT skills that allows an effective attack at any problem that avails itself to an electronic solution. Students are acquainted with problems in the financial and accounting areas as well as scientific, security, ethical and technical fields.
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' understanding of and ability to use Microsoft Excel and Microsoft Access to solve real-world business problems. Students will utilize

spreadsheets and database software to analyze case studies, then apply their analysis of those cases to design and create solutions. Students will complete cases involving stand-alone software products, as well as cases that involve integration of spreadsheets, databases, and web-based information. Students will complete and be evaluated by course assignments and case studies that introduce and reinforce course and textbook concepts. Students will be evaluated by a final, integrated case study project that asks them to apply concepts and best practices to create and present their solution(s) to the situation. CIS 3533 Advanced Business Solutions is a required course for all CIS majors. Case studies are measured in scale 1-4.

13 were assessed in the 2017/18 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Measure AND Number of Students Assessed
Measure the students' understanding of how to organize and access information strategically to produce a quality software package using a variety of standard lifecycle techniques. Students will complete and be evaluated by course assignments and cases that introduce and reinforce course and textbook concepts such as the phases and objectives of the systems development life cycle, systems design and implementation, and user interface design. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics that include analyzing the business case, requirements and enterprise modeling, and contrast of the top-down and modular design methods. In the Semester Project, students are asked to apply skills and concepts acquired to create a project from beginning to end, covering all steps of the SDLC and incorporating all major steps and components. CIS 4413 Systems Analysis is a required course for all CIS majors. Exams and the Semester Project are measured in scale 1-4.

18 were assessed in the 2017/18 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

<table>
<tr><td>Summary of Assessment Results</td><td>• 13 students were assessed in their understanding and practical application of how to solve managerial problems with application software: 7 students ranked Excellent, 6 students ranked Good, 0 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.54, which exceeded the ideal target.
• 18 students were assessed in their understanding and use of software development life cycle techniques, components, and best practices: 6 students ranked Excellent, 10 students ranked Good, 2 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.22, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.35; Ideal target is achieved. To keep current with trends, the instructor will choose an appropriate and current textbook for each course. The instructor will also update the subject base of the Semester Project in 4413, finding a common theme to which all students can relate, as the course is utilized by other majors as an upper level elective. The instructor(s) will utilize Zoom and other content support tools and information resources to support student efforts. One course's average dropped slightly from the previous year, but still easily reached the ideal target. The other course's average increased from the previous year.</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Student Learning Outcome 7</td><td>Knowledge of Networking and Communications – Students will know how data is transmitted and received in a variety of networking and communication protocols, including early efforts to the most current systems. Basic troubleshooting skills aid in design, construction and implementation of networks, including local and wide-area installations. Connectivity issues and throughput speed are well understood. Network security issues are understood for basic operations.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' understanding of the principles of data communications and their associated protocols and topologies, current software designs, signal theory, and new technologies. Students will complete and be evaluated by course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research, covering daily technology use through more technical aspects of data communication, including leading edge technology trends. CIS 4113 Data Communications Technology is a required course for all CIS majors. Exams are measured in scale 1-4.

17 were assessed in the 2017/18 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
<u>Evaluation Method(s) are based on the final average grades of the course(s)</u>
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
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<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>
<u>Measure AND Number of Students Assessed</u>

<u>Expected Target</u>

<u>Describe rubric criteria and scales (if applicable)</u></td></tr>
</table>

<table>
<tr><td>Summary of Assessment Results</td><td>• 17 students were assessed in their understanding of the various components, concepts, and applications of data communications technology; 13 students ranked Excellent, 3 students ranked Good, 1 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.71, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.71; Ideal target is achieved. The instructor(s) will utilize Zoom when necessary, as well as other content support tools and information resources to support student efforts. The course's average increased slightly from the previous year.</td></tr>
<tr><td>Student Learning Outcome 8</td><td>Health Information Technology – If a student pursues a minor with this emphasis or completes the courses currently offered in this field, then a basic knowledge of the fundamentals of electronic health records implementation, as mandated by the federal government, will be enjoyed by the student. Medical office management skills are introduced including proficiency of usage of electronic medical records software that simulates real-world activities of patients and practitioners.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' understanding of the fundamentals of health information management as it relates to computer-based patient records, including professionalism and ethical issues, critical issues for implementation of electronic medical records (EMR), how an EMR affects service provider processes, and how to recognize and control risks associated with electronic data. In CIS 4613 Health Information Systems, students will complete and be evaluated by course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research. Exams are measured in scale 1-4.

10 were assessed in the 2017/18 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
<tr><td>3</td><td>Good (Competent)</td><td>75 – 89%</td></tr>
<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>

<u>Measure AND Number of Students Assessed</u>
Measure the students' understanding of the fundamentals of electronic health records, including core functions and capabilities of electronic records, primary sources for standards and guidelines, and the major phases of work and activities involving those records. In CIS 4623 Electronic Health Records, students will complete and be evaluated by course assignments that introduce and reinforce course and textbook concepts, as well as hands-on exercises using actual EHR software. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook that include planning, setting procedures for proper storage and access, maintenance and usage. Exams are measured in scale 1-4.

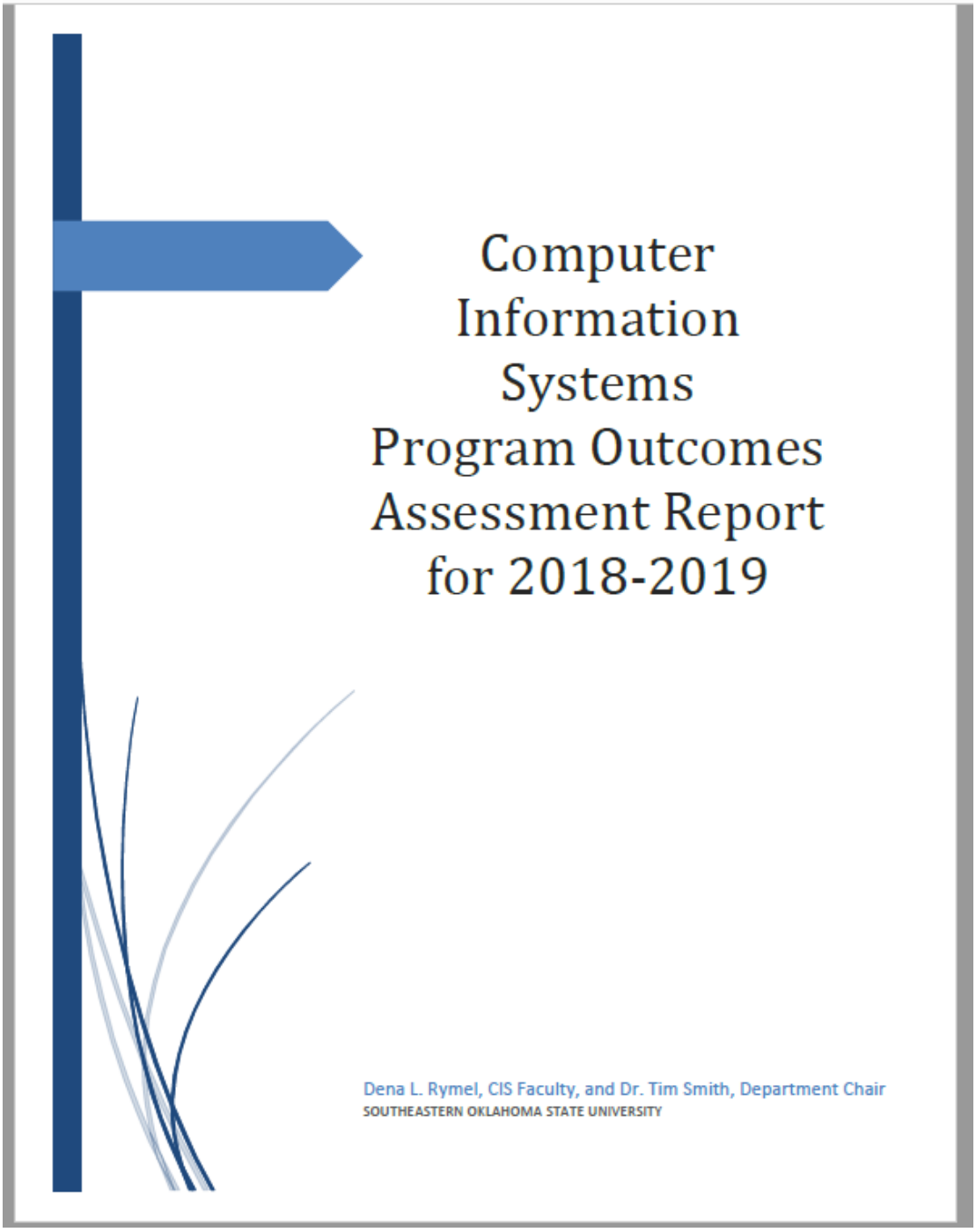
19 were assessed in the 2017/18 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
</table></td></tr>
</table>

	4 | Excellent (Exemplary) | 90 - 100% 3 | Good (Competent) | 75 – 89% 2 | Satisfactory (Developing) | 60 – 74% 1 | Unsatisfactory (Unacceptable) | Below 60%
Summary of Assessment Results	• 10 students were assessed in their understanding of the fundamentals of health information management as it relates to electronic patient records: 5 students ranked Excellent, 5 students ranked Good, 0 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.5, which exceeded the ideal target. • 19 students were assessed in their understanding and practical use of electronic health records: 13 students ranked Excellent, 2 students ranked Good, 1 student ranked Developing, and 3 students ranked Unsatisfactory for an average of 3.32, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.38; Ideal target is achieved. Both courses increased their averages from the previous year.
Exit Exam	In the senior year of the program, the Computer Information Systems Departmental Exit Exam is given to each student. This gives the program an acceptable tool to evaluate all outcomes listed above. A cumulative score of 50% or better is considered to be Practitioner Proficiency and a score of 70% or better is considered Master/Expert Proficiency.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the students' overall understanding of the concepts covered in the various courses. Exams are measured in scale 1-4. 13 were assessed in the 2017/18 year. ***Expected Target*** Goal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** Scales | Interpretation | Percentage of Completion of the Course Requirements 4 | Excellent (Exemplary) | 90 - 100% 3 | Good (Competent) | 75 – 89% 2 | Satisfactory (Developing) | 60 – 74% 1 | Unsatisfactory (Unacceptable) | Below 60%
	Measure AND Number of Students Assessed ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	• 13 students were given the Exit Exam: 11 students ranked Exemplary, 2 students ranked Competent, 1 student ranked Developing, and 0 students ranked Unacceptable for an average of 3.85, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.85; Ideal target for student scores is achieved. Average student score increased significantly from the previous year.

After several attempts, the margin set up on the original 2018-2019 cis access report (both in the pdf and Word formats) was still not compatible with this format of this Self-Study report. Therefore, each page of the 2018-2019 report was display as an image.



EXECUTIVE PROGRAM SUMMARY

As stated in the Assessment Report in the document below, the following measures have reached the ideal target of 3.0.

- Outcome 1 Measure 1: understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint (21 students)
- Outcome 1 Measure 2: understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint (15 students)
- Outcome 2 Measure 1: understanding and use of the concepts of computer programming (23 students)
- Outcome 2 Measure 2: understanding and use of the concepts of computer programming and principles of software development techniques (15 students)
- Outcome 3 Measure 1: understanding and use of database concepts and methods of storing data efficiently (20 students)
- Outcome 6 Measure 1: understanding and practical application of how to solve managerial problems with application software (10 students)
- Outcome 6 Measure 2: understanding and use of software development life cycle techniques, components, and best practices (20 students)
- Outcome 7 Measure 1: understanding of the various components, concepts, and applications of data communications technology (10 students)
- Outcome 8 Measure 1: understanding of the fundamentals of health information management as it relates to electronic patient records (3 students)

The following measures have reached an acceptable target of 2.5.

- Outcome 3 Measure 2: understanding and use of advanced database concepts (25 students)
- Exit Exam: In the senior year of the program, the Computer Information Systems Departmental Exit Exam is given to each student (12 students) *note* Refer to the Use of Results and Reflection section for this Outcome.

The following measure reported no scores.

- Outcome 8 Measure 2: understanding and practical use of electronic health records (0 students)

No measures were below the acceptable target of 2.5.

Based on the assessment results, we plan to make the following changes to the Computer Information Systems program in the year 2020/21.

- All faculty in the CIS program have been teaching overload courses in the past few years. In the fall of 2019 the program lost an instructor, which increased the overload on the three full-time faculty. The program's ultimate goal is to hire a new faculty member, which could assist our current faculty in better fulfilling their teaching, advising, and other duties. Until that goal is reached, or if that goal is unattainable in the current budget situation, the program will use strategically-placed adjuncts both inside and outside the Southeastern family.
- Continue to offer app-development courses, such as Python for All, to the entire SE student body, regardless of their declared major. These courses continue to be an exciting and popular addition to the elective courses for CIS majors. The opportunity to learn additional programming languages greatly enhances our current program, plus gives students from other degree plans the opportunity to gain experience and exposure to programming.
- Continue to offer the yearly course, Special Topics in Computer Systems, to students. This is a practicum course in which students assemble desktop systems, practice installing, using, and customizing a variety of operating systems, learn good security practices, and acquire tools necessary to

locate and resolve the technical issues that are sometimes experienced by personal computers by individuals and small businesses.

- Update textbooks used in courses when necessary to reflect current standards, terminology, and trends.
- Continue to monitor and enhance courses to better serve the needs of our students as they prepare to enter the workforce after graduation
- Attend as many recruitment opportunities as possible, both on the Southeastern campus and off.
- Continue to work with the Choctaw Nation's technology departments as potential internship and job placement opportunities for students.

PROGRAM OUTCOMES ASSESSMENT REPORT

Department: Chemistry, Computer, & Physical Sciences

Degree Program: Computer Information Systems

Report Submitted By: Dena Rymel | **Date of Submission: January 1, 2020**

Program Mission Statement:
The Computer Information Systems (CIS) program of the department of Chemistry, Computer, and Physical Sciences aims to prepare its students to obtain and enjoy successful careers in the dynamic IT (Information Technology) industry. The CIS program strives to understand the needs of local, regional, and national employers and deliver graduates that can adequately fill current IT positions.

Student Learning Outcome 1

Mastery of Microsoft Office – Almost every high school graduate and many others have exposure to and rudimentary knowledge of Microsoft Office, in particular, Word, Excel and PowerPoint. This program takes the student much further in the deployment of productivity software, by delivering a deep, robust knowledge of the vast capabilities of such software. The student is prepared to solve complex problems regularly encountered in real business situations.

Method(s) of Assessment

***Measure AND Number of Students Assessed* (Required)**
Students will complete weekly intermediate course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate mastery of the material and software. At the end of each module (Word, Excel, PowerPoint), in CIS 2103 Intermediate Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 2016 & 2019 and best practices in document creation and enhancement. CIS 2103 is a required course for all CIS majors. Exams are measured in scale 1-4.

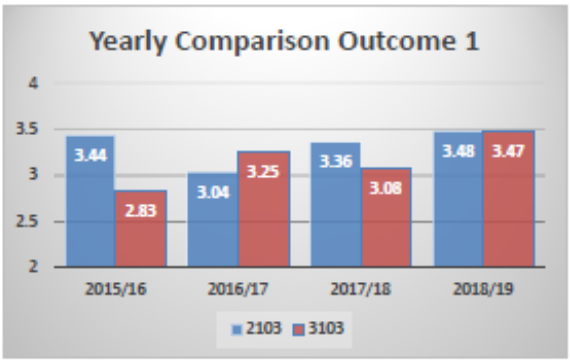
21 were assessed in the 2018/19 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Measure* AND *Number of Students Assessed
Students will complete and be evaluated weekly by advanced – and at times integrated - course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate advanced, comprehensive mastery of the material and software. At the end of each module (Word, Excel, PowerPoint) in CIS 3103 Advanced Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 2016 & 2019 and best practices in document creation and enhancement, form design and integration, and web application integration. A comprehensive final exam measures student

	comprehension of concepts and proper procedures. CIS 3103 is a required course for all CIS majors. Exams are measured in scale 1-4. 15 were assessed in the 2017/18 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales** / **Interpretation** / **Percentage of Completion of the Course Requirements** 4 / Excellent (Exemplary) / 90 - 100% 3 / Good (Competent) / 75 – 89% 2 / Satisfactory (Developing) / 60 – 74% 1 / Unsatisfactory (Unacceptable) / Below 60%
Summary of Assessment Results	• In 2103, 21 students were assessed in their understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint: 15 students ranked Excellent, 3 students ranked Good, 1 student ranked Developing, and 2 students ranked Unsatisfactory for an average of 3.48, which exceeds the ideal target. • In 3103, 15 students were assessed in their understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint: 11 students ranked Excellent, 1 student ranked Good, 2 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.47, which exceeds the ideal target.
Use of Results and Reflection	The average across all measurements is 3.47; Ideal target is achieved. Students have few issues with the current textbooks, and the textbook/software versions integrate well. As evident in the chart below, averages in both courses have increased over the past year, and have generally increased in the past four assessment periods. 
Student Learning Outcome 2	Basic Computer Programming Skills – The student understands the fundamentals of producing custom computer programs written in an object-oriented language such as Visual Basic. Issues that are not possible to solve with standard productivity software are given solutions that are accomplished by programs created for specific problems. Website development is one of many examples of the need for computer programming. Students also know when it is appropriate to activate custom programming instead of existing software to fill various IT needs.

Method(s) of Assessment

***Measure AND Number of Students Assessed* (Required)**
Measure the student's basic understanding and proper use of visual object oriented language(s) and basic IO (Input/Output) on data. Students acquire knowledge through guided tutorials, then apply their subject comprehension to create and/or debug computer programs that employ a variety of expressions and statements, functions and string manipulations. Students will be evaluated by section assignments in each course, three section exams in CIS 1613 Computer Information Systems I, and two section exams and a final, comprehensive exam in CIS 1623 Computer Information Systems II that allow them to demonstrate acquired knowledge of creating OOP-based computer programs. CIS 1613 and 1623 are required courses for all CIS majors. Exams are measured in scale 1-4.

38 were assessed for the combination of 1613 and 1623 in the 2018/19 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

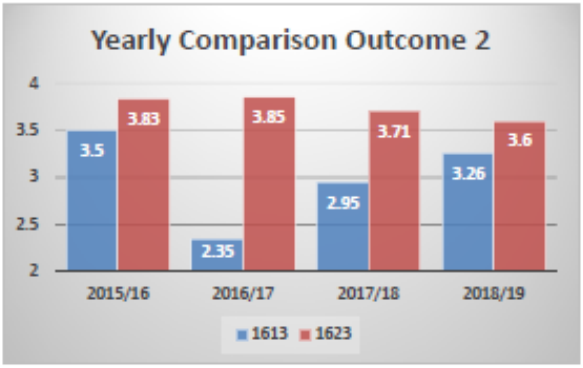
Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Summary of Assessment Results

- 23 students were assessed in 1613 for their understanding and use of the concepts of computer programming: 14 students ranked Excellent, 4 students ranked Good, 2 students ranked Developing, and 3 students ranked Unsatisfactory for an average of 3.26, which exceeded the ideal target.
- 15 students were assessed in 1623 for their understanding and use of the concepts of computer programming and principles of software development techniques: 11 students ranked Excellent, 3 students ranked Good, 0 student ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.60, which exceeded the ideal target.

Use of Results and Reflection

The average across all measurements is 3.39; Ideal target is achieved. Students have few issues with the clarity of the current textbook. The course has been updated with a new textbook that is more concise and easier to understand. The 1613 course is one of the two that students find most difficult, so the increasing averages the past three assessment periods is especially heartening. The online sections of each course each semester perform very well; Zoom continues to be a major addition that supports coursework and helps bring distance students into F2F contact with the instructor. The instructor will continue to develop instructional content videos and additional instructional methods to enhance the course concepts.



<table>
<tr><td>Student Learning Outcome 3</td><td>Knowledge of Database Management – The student understands database construction, design, relationships among data tables, data management, querying, and data retrieval methods for popular modern database software. Students know how to design a database instead of writing a custom program, when the situation is appropriate. Database security methods and storage procedures are implemented in a typical application.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the student's understanding of and ability to create, modify, update, and analyze commercial database software. In CIS 3123 Intermediate Database Analysis, students acquire knowledge through guided tutorials, then apply their subject comprehension to modify existing databases by entering additional records and fields, modifying the structure and relationship of tables, creating properly formatted and functional queries and reports, and analyzing existing data. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by two exams that require them to describe and identify database components and procedures, research databases' impact upon the business community, plus illustrate and discuss database design. CIS 3123 is a required course for all CIS majors. Exams are measured in scale 1-4.

20 were assessed in the 2018/19 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
<u>Evaluation Method(s) are based on the final average grades of the course(s)</u>
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
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<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>
<u>Measure AND Number of Students Assessed</u>
CIS 3323 Advanced Database Analysis enhances students' prior database knowledge, adding in the ability to utilize QBE and SQL to query and manipulate data. Students will define and use the various normal forms in table design, they will use triggers and data macros to manipulate data, and they will create ER diagrams as representations of proper database design. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by section exams on their ability to synthesize concepts acquired via textbook concepts and information, research conducted online, and practical knowledge gained through course assignments on database structures and design, database concepts and terminology, and database functions and services. CIS 3323 is a required course for all CIS majors. Exams are measured in scale 1-4.

25 were assessed in the 2018/19 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
<u>Evaluation Method(s) are based on the final average grades of the course(s)</u>
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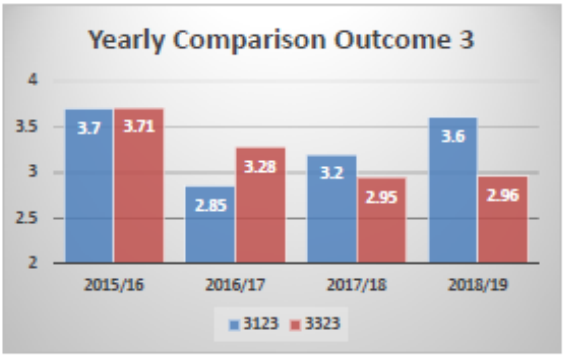
</table></td></tr>
</table>

Summary of Assessment Results	• In 3123, 20 students were assessed in their understanding and use of database concepts and methods of storing data efficiently: 14 students ranked Excellent, 5 students ranked Good, 0 student ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.6, which exceeded the ideal target. • In 3323, 25 students were assessed in their understanding and use of advanced database concepts: 7 students ranked Excellent, 14 students ranked Good, 0 students ranked Developing, and 4 students ranked Unsatisfactory for an average of 2.96, which slightly missed the ideal target but did meet the acceptable target. However, if the scores are removed for the two students who stopped attending but did not withdraw, the average increases to 3.13.
Use of Results and Reflection	The average across all measurements is 3.24; Ideal target is achieved. Students have few issues with the current textbook, and the textbook/software versions integrate well. The instructor(s) will utilize Zoom and other content support tools and information resources to support student efforts. 3323's course average increased slightly from the previous year, although it still missed the ideal mark by .04, while 3123's averages have increased for the past three assessment periods. 
Student Learning Outcome 4	Knowledge of Working Business Environment – A program has a greater chance of success when it requires a diverse mix of courses and faculty in its makeup. This program accomplishes that feat by calling on other departments to round out its graduates. Students have a good understanding of basic accounting principles by taking the first two entry level classes from our Accounting department. The same can be said of economics understanding from both micro- and macroeconomics classes. Students also understand basic statistics used in business from another outside course offered by the Business department. Complementing an understanding of the core ingredients of the business world are additional courses in management and marketing.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** ACCT 2103 Fundamentals of Financial Accounting ACCT 2203 Fundamentals of Managerial Accounting BUS 2633 Business Statistics ECON 2213 Principles of Microeconomics MKT 3233 Principles of Marketing MNGT 3113 Management and Organizational Behavior Our faculty do not have access to the outcomes of the above courses, as they were offered by other departments.
Summary of Assessment Results	*N/A*
Use of Results and Reflection	*N/A*

<table>
<tr><td>Student Learning Outcome 5</td><td>Enhanced Personal Communication Skills – Basic communication skills, both written and oral, are assumed to exist due to proper environmental factors and general education requirements. This program is of a technical nature and students achieve the ability to comprehend and produce technical documents, including professional-grade operating manuals for software systems and problem resolution documents. In addition to oral and written communications, present society now demands electronic communication skills, which are enabled through student interaction with commercial and custom software.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
ENG 3903 Technical and Professional Writing

Our faculty do not have access to the outcomes of the above course, as it was offered by another department.</td></tr>
<tr><td>Summary of Assessment Results</td><td>N/A</td></tr>
<tr><td>Use of Results and Reflection</td><td>N/A</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Student Learning Outcome 6</td><td>Solving Business Information Technology Problems – Businesses of all sizes have developed strong dependencies on software for employee productivity and for solutions to all kinds of problems. Students have a variety of IT skills that allows an effective attack at any problem that avails itself to an electronic solution. Students are acquainted with problems in the financial and accounting areas as well as scientific, security, ethical and technical fields.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' understanding of and ability to use Microsoft Excel and Microsoft Access to solve real-world business problems. Students will utilize spreadsheets and database software to analyze case studies, then apply their analysis of those cases to design and create solutions. Students will complete cases involving stand-alone software products, as well as cases that involve integration of spreadsheets, databases, and web-based information. Students will complete and be evaluated by course assignments and case studies that introduce and reinforce course and textbook concepts. Students will be evaluated by a final, integrated case study project that asks them to apply concepts and best practices to create and present their solution(s) to the situation. CIS 3533 Advanced Business Solutions is a required course for all CIS majors. Case studies are measured in scale 1-4.

10 were assessed in the 2018/19 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
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<tr><th>Scale:</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
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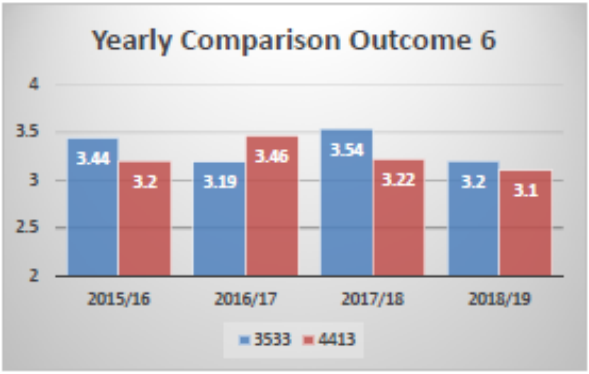
</table>

<u>Measure AND Number of Students Assessed</u>
Measure the students' understanding of how to organize and access information strategically to produce a quality software package using a variety of standard lifecycle techniques. Students will complete and be evaluated by weekly course assignments, interactive Discussion Board forums, and cases that introduce and reinforce course and textbook concepts such as the phases and objectives of the systems development life cycle, systems design and implementation, and user interface design. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics that include analyzing the</td></tr>
</table>

	business case, requirements and enterprise modeling, and contrast of the top-down and modular design methods. In the Semester Project, students are asked to apply skills and concepts acquired to create a project from beginning to end, covering all steps of the SDLC and incorporating all major steps and components. CIS 4413 Systems Analysis is a required course for all CIS majors. Exams and the Semester Project are measured in scale 1-4. 20 were assessed in the 2018/19 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales** / **Interpretation** / **Percentage of Completion of the Course Requirements** 4 / Excellent (Exemplary) / 90 - 100% 3 / Good (Competent) / 75 – 89% 2 / Satisfactory (Developing) / 60 – 74% 1 / Unsatisfactory (Unacceptable) / Below 60%

Summary of Assessment Results	• In 3533, 10 students were assessed in their understanding and practical application of how to solve managerial problems with application software: 3 students ranked Excellent, 6 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.20, which exceeded the ideal target. • In 4413, 20 students were assessed in their understanding and use of software development life cycle techniques, components, and best practices: 7 students ranked Excellent, 9 students ranked Good, 3 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.10, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.13; Ideal target is achieved. To keep current with trends, the instructor will choose an appropriate and current textbook for each course. The instructor will also update the subject base of the Semester Project in 4413, finding a common theme to which all students can relate, as the course is utilized by other majors as an upper level elective. The instructor(s) will utilize Zoom and other content support tools and information resources to support student efforts. In the chart below, both courses consistently stay above the Ideal target. 

<table>
<tr><td>Student Learning Outcome 7</td><td>Knowledge of Networking and Communications – Students will know how data is transmitted and received in a variety of networking and communication protocols, including early efforts to the most current systems. Basic troubleshooting skills aid in design, construction and implementation of networks, including local and wide-area installations. Connectivity issues and throughput speed are well understood. Network security issues are understood for basic operations.</td></tr>
<tr><td>Method(s) of Assessment</td><td>Measure AND Number of Students Assessed (Required)
Measure the students' understanding of the principles of data communications and their associated protocols and topologies, current software designs, signal theory, and new technologies. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research, covering daily technology use through more technical aspects of data communication, including leading edge technology trends. CIS 4113 Data Communications Technology is a required course for all CIS majors. Exams are measured in scale 1-4.

10 were assessed in the 2018/19 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
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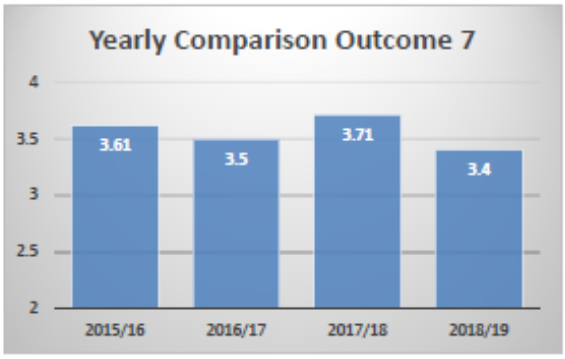
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 10 students were assessed in their understanding of the various components, concepts, and applications of data communications technology: 7 students ranked Excellent, 1 student ranked Good, 1 student ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.40, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.40; Ideal target is achieved. The instructor will utilize Zoom when necessary, as well as other content support tools and information resources to support student efforts. The course's average decreased slightly from the previous year, but it still well above the Ideal target.
 
</td></tr>
</table>

<table>
<tr><td>Student Learning Outcome 8</td><td>Health Information Technology – If a student pursues a minor with this emphasis or completes the courses currently offered in this field, then a basic knowledge of the fundamentals of electronic health records implementation, as mandated by the federal government, will be enjoyed by the student. Medical office management skills are introduced including proficiency of usage of electronic medical records software that simulates real-world activities of patients and practitioners.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' understanding of the fundamentals of health information management as it relates to computer-based patient records, including professionalism and ethical issues, critical issues for implementation of electronic medical records (EMR), how an EMR affects service provider processes, and how to recognize and control risks associated with electronic data. In CIS 4613 Health Information Systems, students will complete and be evaluated by regular course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research. Exams are measured in scale 1-4.

3 were assessed in the 2018/19 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
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</table>
<u>Measure AND Number of Students Assessed</u>
Measure the students' understanding of the fundamentals of electronic health records, including core functions and capabilities of electronic records, primary sources for standards and guidelines, and the major phases of work and activities involving those records. In CIS 4623 Electronic Health Records, students will complete and be evaluated by regular course assignments that introduce and reinforce course and textbook concepts, as well as hands-on exercises using actual EHR software. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook that include planning, setting procedures for proper storage and access, maintenance and usage. Exams are measured in scale 1-4.

0 were assessed in the 2018/19 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
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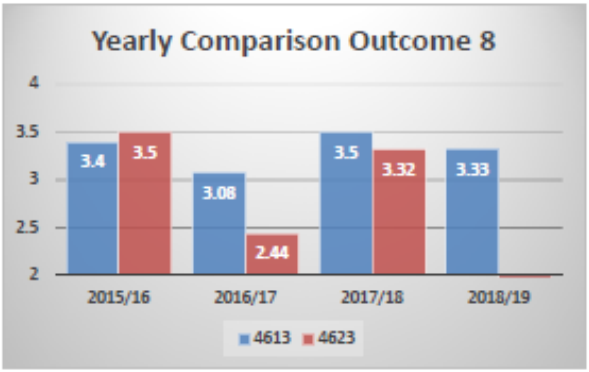
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 10 students were assessed in 4613 for their understanding of the fundamentals of health information management as it relates to electronic patient records: 2 students ranked Excellent, 0 students ranked Good, 1 student ranked</td></tr>
</table>

<table>
<tr><td></td><td>Developing, and 0 students ranked Unsatisfactory for an average of 3.33, which exceeded the ideal target.
• 0 students were assessed in 4623.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.33; Ideal target is achieved. Both courses perform well as a whole. Students will be encouraged to enroll in CIS 4623, as it is a useful and interesting course.
 
</td></tr>
<tr><td>Exit Exam</td><td>In the senior year of the program, the Computer Information Systems Departmental Exit Exam is given to each student. This gives the program an acceptable tool to evaluate all outcomes listed above. A cumulative score of 50% or better is considered to be Practitioner Proficiency and a score of 70% or better is considered Master/Expert Proficiency.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' overall understanding of the concepts covered in the various courses. Exams are measured in scale 1-4.

12 were assessed in the 2018/19 year.

<u>Expected Target</u>
Goal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
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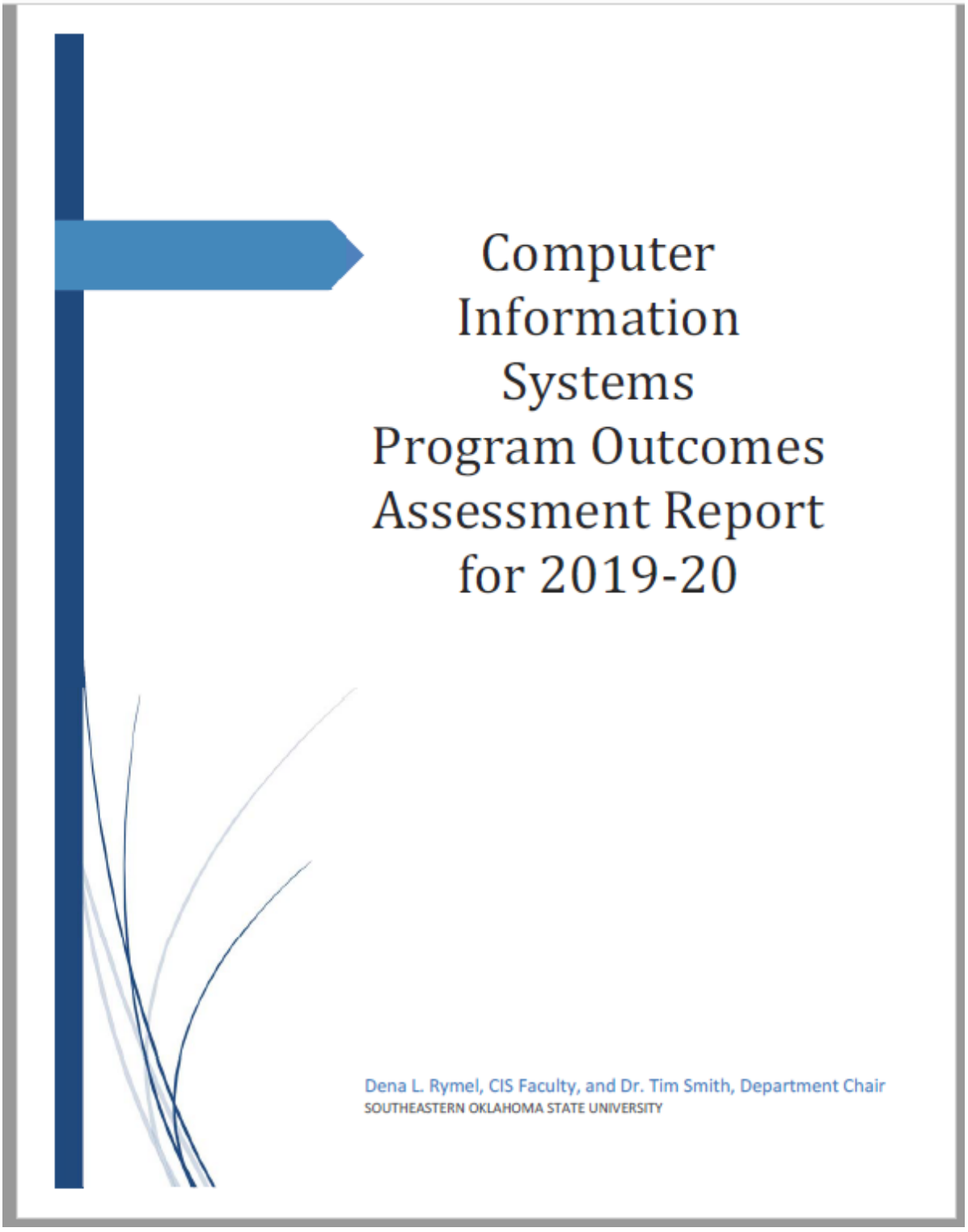
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 12 students were given the Exit Exam: 0 students ranked Exemplary, 11 students ranked Competent, 1 student ranked Developing, and 0 students ranked Unacceptable for an average of 2.92, which slightly missed the ideal target but did meet the acceptable target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 2.92; Ideal target for student scores was not achieved. This Exam consists of 120 questions that cover all the core courses for the CIS degree. These courses are taken over (usually) at least a four-year period. Students can have quite a gap between when they took/completed the courses and when they take the Exit Exam. Although the Ideal target for the Program Assessment Report has not been met for this Outcome, the scores all fall within the 70% or better range, which is considered to be Master/Expert Proficiency.</td></tr>
</table>

After several attempts, the margin set up on the original 2019-2020 cis access report (both in the pdf and Word formats) was still not compatible with this format of this Self-Study report. Therefore, each page of the 2019-2020 report was display as an image.



EXECUTIVE PROGRAM SUMMARY

As stated in the Assessment Report in the document below, the following measures have reached the ideal target of 3.0.

- Outcome 1 Measure 1: understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint (16 students)
- Outcome 1 Measure 2: understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint (14 students)
- Outcome 2 Measure 1: understanding and use of the concepts of computer programming (12 students)
- Outcome 2 Measure 2: understanding and use of the concepts of computer programming and principles of software development techniques (11 students)
- Outcome 3 Measure 1: understanding and use of database concepts and methods of storing data efficiently (19 students)
- Outcome 3 Measure 2: understanding and use of advanced database concepts (27 students)
- Outcome 6 Measure 1: understanding and practical application of how to solve managerial problems with application software (16 students)
- Outcome 6 Measure 2: understanding and use of software development life cycle techniques, components, and best practices (16 students)
- Outcome 7 Measure 1: understanding of the various components, concepts, and applications of data communications technology (18 students)
- Outcome 8 Measure 1: understanding of the fundamentals of health information management as it relates to electronic patient records (9 students)
- Outcome 8 Measure 2: understanding and practical use of electronic health records (4 students)

The following measures have reached an acceptable target of 2.5.

- N/A

The following measure reported no scores.

- N/A

No scored measures were below the ideal target of 3.0.

Based on the assessment results, we plan to make the following changes to the Computer Information Systems program in the year 2020/21.

- All faculty in the CIS program have been teaching overload courses in the past few years. In the fall of 2019 the program lost an instructor, which increased the overload on the three full-time faculty. The program's ultimate goal is to hire a new faculty member, which could assist our current faculty in better fulfilling their teaching, advising, and other duties. Until that goal is reached, or if that goal is unattainable in the current budget situation, the program plans to hire a TFT Instructor and will continue to use strategically-placed adjuncts from inside and outside the Southeastern family.
- Continue to offer app-development courses, such as Python for All, to the entire SE student body, regardless of their declared major. These courses continue to be an exciting and popular addition to the elective courses for CIS majors. The opportunity to learn additional programming languages greatly enhances our current program, plus gives students from other degree plans the opportunity to gain experience and exposure to programming.
- Offer a new course, Intro to eSports, to all SE students. This is a practicum course that will discuss the beginnings of eSports in general, including the rules and regulations of competitive and organizational teams and the legal/ethical issues that accompany those. It will also include setting up the peripheral parts of a league, such as Discord servers, and will include actual game play.
- Update textbooks used in courses when necessary to reflect current standards, terminology, and trends.

- Continue to monitor and enhance courses to better serve the needs of our students as they prepare to enter the workforce after graduation
- Attend as many recruitment opportunities as possible, both on the Southeastern campus and off.
- Continue to work with the Choctaw Nation's technology departments as potential internship and job placement opportunities for students.
- Participate in the new SEsports initiative, including utilizing the Intro to eSports course as an academic addition to the program.

PROGRAM OUTCOMES ASSESSMENT REPORT

Department: Chemistry, Computer, & Physical Sciences

Degree Program: Computer Information Systems

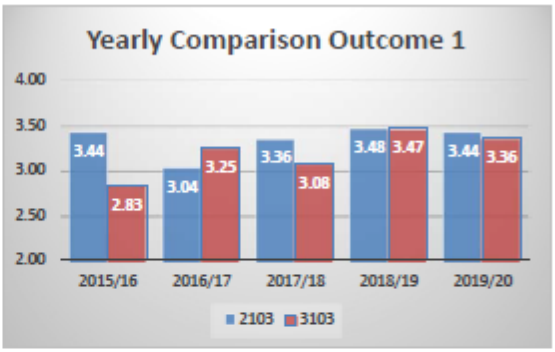
Report Submitted By: Dena Rymel | **Date of Submission: January 4, 2021**

Program Mission Statement:
The Computer Information Systems (CIS) program of the department of Chemistry, Computer, and Physical Sciences aims to prepare its students to obtain and enjoy successful careers in the dynamic IT (Information Technology) industry. The CIS program strives to understand the needs of local, regional, and national employers and deliver graduates that can adequately fill current IT positions.

Student Learning Outcome 1	Mastery of Microsoft Office – Almost every high school graduate and many others have exposure to and rudimentary knowledge of Microsoft Office, in particular, Word, Excel and PowerPoint. This program takes the student much further in the deployment of productivity software, by delivering a deep, robust knowledge of the vast capabilities of such software. The student is prepared to solve complex problems regularly encountered in real business situations.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Students will complete weekly intermediate course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate mastery of the material and software. At the end of each module (Word, Excel, PowerPoint), in CIS 2103 Intermediate Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 365 & 2019 and best practices in document creation and enhancement. CIS 2103 is a required course for all CIS majors. Exams are measured in scale 1-4. 16 were assessed in the 2019/20 year; one student enrolled but never attended. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)**

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Measure* AND *Number of Students Assessed
Students will complete and be evaluated weekly by advanced – and at times integrated - course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate advanced, comprehensive mastery of the material and software. At the end of each module (Word, Excel, PowerPoint) in CIS 3103 Advanced Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 365 & 2019 and best practices in document creation and enhancement, form design and integration, and web application integration. A comprehensive final exam measures student

	comprehension of concepts and proper procedures. CIS 3103 is a required course for all CIS majors. Exams are measured in scale 1-4. 14 were assessed in the 2019/20 year; one student enrolled but stopped attending. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales** / **Interpretation** / **Percentage of Completion of the Course Requirements** 4 / Excellent (Exemplary) / 90 - 100% 3 / Good (Competent) / 75 – 89% 2 / Satisfactory (Developing) / 60 – 74% 1 / Unsatisfactory (Unacceptable) / Below 60%
Summary of Assessment Results	• In 2103, 16 students were assessed in their understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint: 9 students ranked Excellent, 5 students ranked Good, 2 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.44, which exceeds the ideal target. • In 3103, 14 students were assessed in their understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint: 6 students ranked Excellent, 7 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.36, which exceeds the ideal target.
Use of Results and Reflection	The average across all measurements is 3.40; Ideal target is achieved. Students have few issues with the current textbooks, and the textbook/software versions integrate well. As evident in the chart below, averages in both courses have decreased slightly over the past year, but have generally increased in the past two assessment periods. 
Student Learning Outcome 2	Basic Computer Programming Skills – The student understands the fundamentals of producing custom computer programs written in an object-oriented language such as Visual Basic. Issues that are not possible to solve with standard productivity software are given solutions that are accomplished by programs created for specific problems. Website development is one of many examples of the need for computer programming. Students also know when it is appropriate to activate custom programming instead of existing software to fill various IT needs.

<table>
<tr>
<td>Method(s) of Assessment</td>
<td>
Measure AND Number of Students Assessed (Required)
Measure the student's basic understanding and proper use of visual object oriented language(s) and basic IO (Input/Output) on data. Students acquire knowledge through guided tutorials, then apply their subject comprehension to create and/or debug computer programs that employ a variety of expressions and statements, functions and string manipulations. Students will be evaluated by section assignments in each course, three section exams in CIS 1613 Computer Information Systems I, and two section exams and a final, comprehensive exam in CIS 1623 Computer Information Systems II that allow them to demonstrate acquired knowledge of creating OOP-based computer programs. CIS 1613 and 1623 are required courses for all CIS majors. Exams are measured in scale 1-4.

23 were assessed for the combination of 1613 and 1623 in the 2019/20 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
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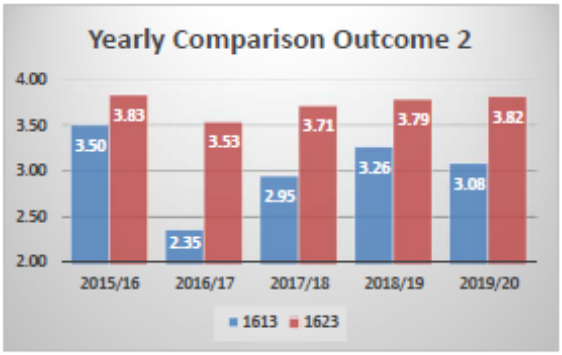
<tr><td>3</td><td>Good (Competent)</td><td>75 – 89%</td></tr>
<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>
</td>
</tr>
<tr>
<td>Summary of Assessment Results</td>
<td>

12 students were assessed in 1613 for their understanding and use of the concepts of computer programming: 6 students ranked Excellent, 2 students ranked Good, 3 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.08, which exceeded the ideal target.
11 students were assessed in 1623 for their understanding and use of the concepts of computer programming and principles of software development techniques: 9 students ranked Excellent, 2 students ranked Good, 0 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.82, which exceeded the ideal target.

</td>
</tr>
<tr>
<td>Use of Results and Reflection</td>
<td>
The average across all measurements is 3.43; Ideal target is achieved. Students have few issues with the clarity of the current textbook. The course continues to be updated with a textbook that is concise, easy to understand, and relevant to current times. The 1613 course is one of the two that students find most difficult, so the increasing averages the past three assessment periods is especially heartening. The online sections of each course each semester perform very well; Zoom continues to be a major addition that supports coursework and helps bring distance students into F2F contact with the instructor, which is especially helpful during the 2020 pandemic. The instructor will continue to develop instructional content videos and additional instructional methods to enhance the course concepts.



</td>
</tr>
</table>

<table>
<tr><td>Student Learning Outcome 3</td><td>Knowledge of Database Management – The student understands database construction, design, relationships among data tables, data management, querying, and data retrieval methods for popular modern database software. Students know how to design a database instead of writing a custom program, when the situation is appropriate. Database security methods and storage procedures are implemented in a typical application.</td></tr>
<tr><td>Method(s) of Assessment</td><td>
<u>Measure AND Number of Students Assessed</u> (Required)
Measure the student's understanding of and ability to create, modify, update, and analyze commercial database software. In CIS 3123 Intermediate Database Analysis, students acquire knowledge through guided tutorials, then apply their subject comprehension to modify existing databases by entering additional records and fields, modifying the structure and relationship of tables, creating properly formatted and functional queries and reports, and analyzing existing data. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by two exams that require them to describe and identify database components and procedures, research databases' impact upon the business community, plus illustrate and discuss database design. CIS 3123 is a required course for all CIS majors. Exams are measured in scale 1-4.

19 were assessed in the 2019/20 year; one student stopped participating during the semester, but their score is included in the data.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
<tr><td>3</td><td>Good (Competent)</td><td>75 – 89%</td></tr>
<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>

<u>Measure AND Number of Students Assessed</u>
CIS 3323 Advanced Database Analysis enhances students' prior database knowledge, adding in the ability to utilize QBE and SQL to query and manipulate data. Students will define and use the various normal forms in table design, they will use triggers and data macros to manipulate data, and they will create ER diagrams as representations of proper database design. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by section exams on their ability to synthesize concepts acquired via textbook concepts and information, research conducted online, and practical knowledge gained through course assignments on database structures and design, database concepts and terminology, and database functions and services. CIS 3323 is a required course for all CIS majors. Exams are measured in scale 1-4.

27 were assessed in the 2019/20 year; two students enrolled but never attended .

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
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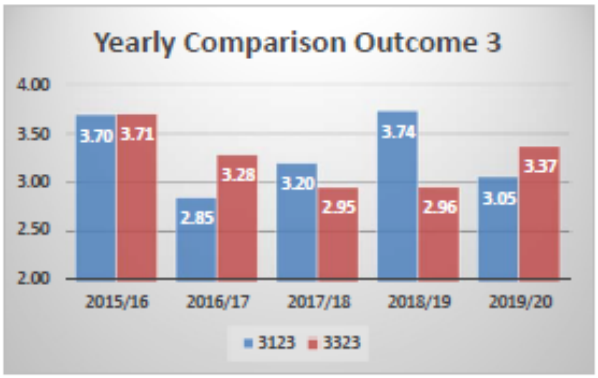
<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>
</td></tr>
</table>

Summary of Assessment Results	• In 3123, 19 students were assessed in their understanding and use of database concepts and methods of storing data efficiently; 6 students ranked Excellent, 9 students ranked Good, 3 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.05, which exceeded the ideal target. • In 3323, 27 students were assessed in their understanding and use of advanced database concepts: 14 students ranked Excellent, 10 students ranked Good, 2 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.37, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.24; Ideal target is achieved. Students have few issues with the current textbook, and the textbook/software versions integrate well. The instructor(s) will utilize Zoom and other content support tools and information resources to support student efforts. 3323's course average showed an increase from the previous year, while 3123's showed a decrease while still meeting the ideal target. 
Student Learning Outcome 4	Knowledge of Working Business Environment – A program has a greater chance of success when it requires a diverse mix of courses and faculty in its makeup. This program accomplishes that feat by calling on other departments to round out its graduates. Students have a good understanding of basic accounting principles by taking the first two entry level classes from our Accounting department. The same can be said of economics understanding from both micro- and macroeconomics classes. Students also understand basic statistics used in business from another outside course offered by the Business department. Complementing an understanding of the core ingredients of the business world are additional courses in management and marketing.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** ACCT 2103 Fundamentals of Financial Accounting ACCT 2203 Fundamentals of Managerial Accounting BUS 2633 Business Statistics ECON 2213 Principles of Microeconomics MKT 3233 Principles of Marketing MNGT 3113 Management and Organizational Behavior Our faculty do not have access to the outcomes of the above courses, as they were offered by other departments.
Summary of Assessment Results	*N/A*
Use of Results and Reflection	*N/A*
Student Learning Outcome 5	Enhanced Personal Communication Skills – Basic communication skills, both written and oral, are assumed to exist due to proper environmental factors and general education requirements. This program is of a technical nature and students achieve the ability to comprehend and produce technical documents, including professional-grade operating

<table>
<tr><td></td><td>manuals for software systems and problem resolution documents. In addition to oral and written communications, present society now demands electronic communication skills, which are enabled through student interaction with commercial and custom software.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
ENG 3903 Technical and Professional Writing

Our faculty do not have access to the outcomes of the above course, as it was offered by another department.</td></tr>
<tr><td>Summary of Assessment Results</td><td>N/A</td></tr>
<tr><td>Use of Results and Reflection</td><td>N/A</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Student Learning Outcome 6</td><td>Solving Business Information Technology Problems – Businesses of all sizes have developed strong dependencies on software for employee productivity and for solutions to all kinds of problems. Students have a variety of IT skills that allows an effective attack at any problem that avails itself to an electronic solution. Students are acquainted with problems in the financial and accounting areas as well as scientific, security, ethical and technical fields.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' understanding of and ability to use Microsoft Excel and Microsoft Access to solve real-world business problems. Students will utilize spreadsheets and database software to analyze case studies, then apply their analysis of those cases to design and create solutions. Students will complete cases involving stand-alone software products, as well as cases that involve integration of spreadsheets, databases, and web-based information. Students will complete and be evaluated by course assignments and case studies that introduce and reinforce course and textbook concepts. Students will be evaluated by a final, integrated case study project that asks them to apply concepts and best practices to create and present their solution(s) to the situation. CIS 3533 Advanced Business Solutions is a required course for all CIS majors. Case studies are measured in scale 1-4.

16 were assessed in the 2019/20 year; one student stopped participating during the semester, but their score is included in the data.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
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<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>

<u>Measure AND Number of Students Assessed</u>
Measure the students' understanding of how to organize and access information strategically to produce a quality software package using a variety of standard lifecycle techniques. Students will complete and be evaluated by weekly course assignments, interactive Discussion Board forums, and cases that introduce and reinforce course and textbook concepts such as the phases and objectives of the systems development life cycle, systems design and implementation, and user interface design. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics that include analyzing the business case, requirements and enterprise modeling, and contrast of the top-down and modular design methods. In the Semester Project, students are asked to apply skills and concepts acquired to create a project from beginning to end, covering all steps of the SDLC and incorporating all major steps and</td></tr>
</table>

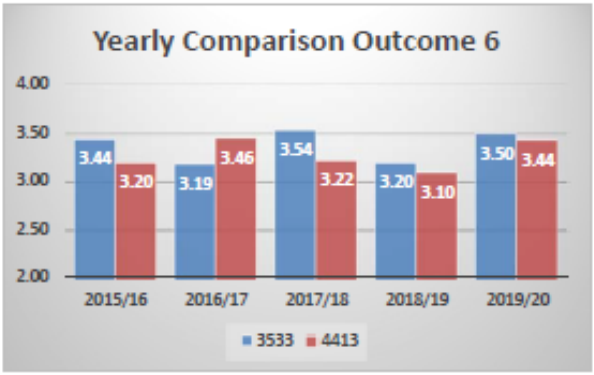
components. CIS 4413 Systems Analysis is a required course for all CIS majors. Exams and the Semester Project are measured in scale 1-4.

16 were assessed in the 2019/20 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

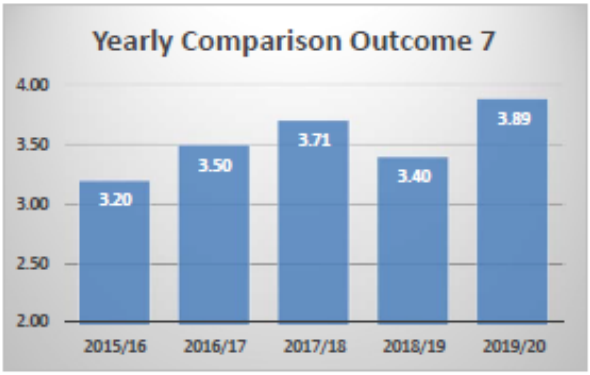
Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Summary of Assessment Results	• In 3533, 16 students were assessed in their understanding and practical application of how to solve managerial problems with application software: 12 students ranked Excellent, 1 student ranked Good, 2 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.50, which exceeded the ideal target. • In 4413, 16 students were assessed in their understanding and use of software development life cycle techniques, components, and best practices: 8 students ranked Excellent, 7 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.44, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.47; Ideal target is achieved. To keep current with trends, the instructor will choose an appropriate and current textbook for each course. The instructor will also update the subject base of the Semester Project in 4413, finding a common theme to which all students can relate, as the course is utilized by other majors as an upper level elective. The instructor(s) will utilize Zoom and other content support tools and information resources to support student efforts. In the chart below, both courses consistently stay above the Ideal target. Both courses also show an increase from the previous assessment period. 
Student Learning Outcome 7	Knowledge of Networking and Communications – Students will know how data is transmitted and received in a variety of networking and communication protocols, including early efforts to the most current systems. Basic troubleshooting skills aid in design, construction and implementation of networks, including local and wide-area installations.

	Connectivity issues and throughput speed are well understood. Network security issues are understood for basic operations.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the students' understanding of the principles of data communications and their associated protocols and topologies, current software designs, signal theory, and new technologies. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research, covering daily technology use through more technical aspects of data communication, including leading edge technology trends. CIS 4113 Data Communications Technology is a required course for all CIS majors. Exams are measured in scale 1-4. 18 were assessed in the 2019/20 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)**

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Summary of Assessment Results	• 18 students were assessed in their understanding of the various components, concepts, and applications of data communications technology: 16 students ranked Excellent, 2 students ranked Good, 0 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.89 which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.40; Ideal target is achieved. The instructor will utilize Zoom when necessary, as well as other content support tools and information resources to support student efforts. The course's average increased markedly from the previous year; past assessment periods were all well above the Ideal target. 
Student Learning Outcome 8	Health Information Technology – If a student pursues a minor with this emphasis or completes the courses currently offered in this field, then a basic knowledge of the fundamentals of electronic health records implementation, as mandated by the federal government, will be enjoyed by the student. Medical office management skills are introduced

<table>
<tr><td></td><td>including proficiency of usage of electronic medical records software that simulates real-world activities of patients and practitioners.</td></tr>
<tr><td>Method(s) of Assessment</td><td>Measure AND Number of Students Assessed (Required)
Measure the students' understanding of the fundamentals of health information management as it relates to computer-based patient records, including professionalism and ethical issues, critical issues for implementation of electronic medical records (EMR), how an EMR affects service provider processes, and how to recognize and control risks associated with electronic data. In CIS 4613 Health Information Systems, students will complete and be evaluated by regular course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research. Exams are measured in scale 1-4.

9 were assessed in the 2019/20 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
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<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>
Measure AND Number of Students Assessed
Measure the students' understanding of the fundamentals of electronic health records, including core functions and capabilities of electronic records, primary sources for standards and guidelines, and the major phases of work and activities involving those records. In CIS 4623 Electronic Health Records, students will complete and be evaluated by regular course assignments that introduce and reinforce course and textbook concepts, as well as hands-on exercises using actual EHR software. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook that include planning, setting procedures for proper storage and access, maintenance and usage. Exams are measured in scale 1-4.

4 were assessed in the 2019/20 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
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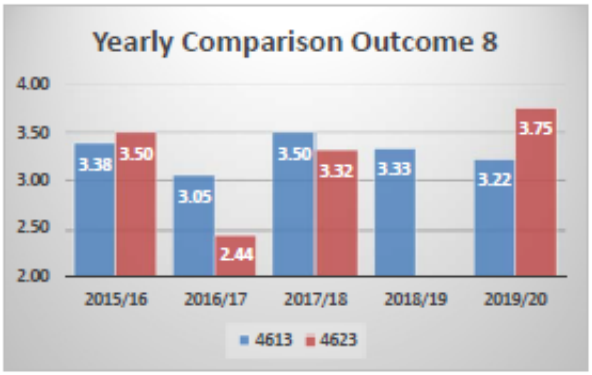
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 9 students were assessed in two sections of 4613 for their understanding of the fundamentals of health information management as it relates to electronic patient records: 4 students ranked Excellent, 4 students ranked Good, 0 students ranked Developing, and 1 student ranked Unsatisfactory for an average of 3.22, which exceeded the ideal target.
• 4 students were assessed in 4623 for their understanding of the fundamentals of health information management as it relates to electronic patient records: 3 students ranked Excellent, 1 student ranked Good, 0 students ranked</td></tr>
</table>

<table>
<tr><td></td><td>Developing, and 0 students ranked Unsatisfactory for an average of 3.75, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.38; Ideal target is achieved. Both courses perform well as a whole. Students will continue to be encouraged to enroll in both courses.
 
</td></tr>
<tr><td>Exit Exam</td><td>In the senior year of the program, the Computer Information Systems Departmental Exit Exam is given to each student. This gives the program an acceptable tool to evaluate all outcomes listed above. A cumulative score of 50% or better is considered to be Practitioner Proficiency and a score of 70% or better is considered Master/Expert Proficiency.</td></tr>
<tr><td>Method(s) of Assessment</td><td>Measure AND Number of Students Assessed (Required)
Measure the students' overall understanding of the concepts covered in the various courses. Exams are measured in scale 1-4.

5 were assessed in the 2019/20 year.

Expected Target
Goal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
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<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
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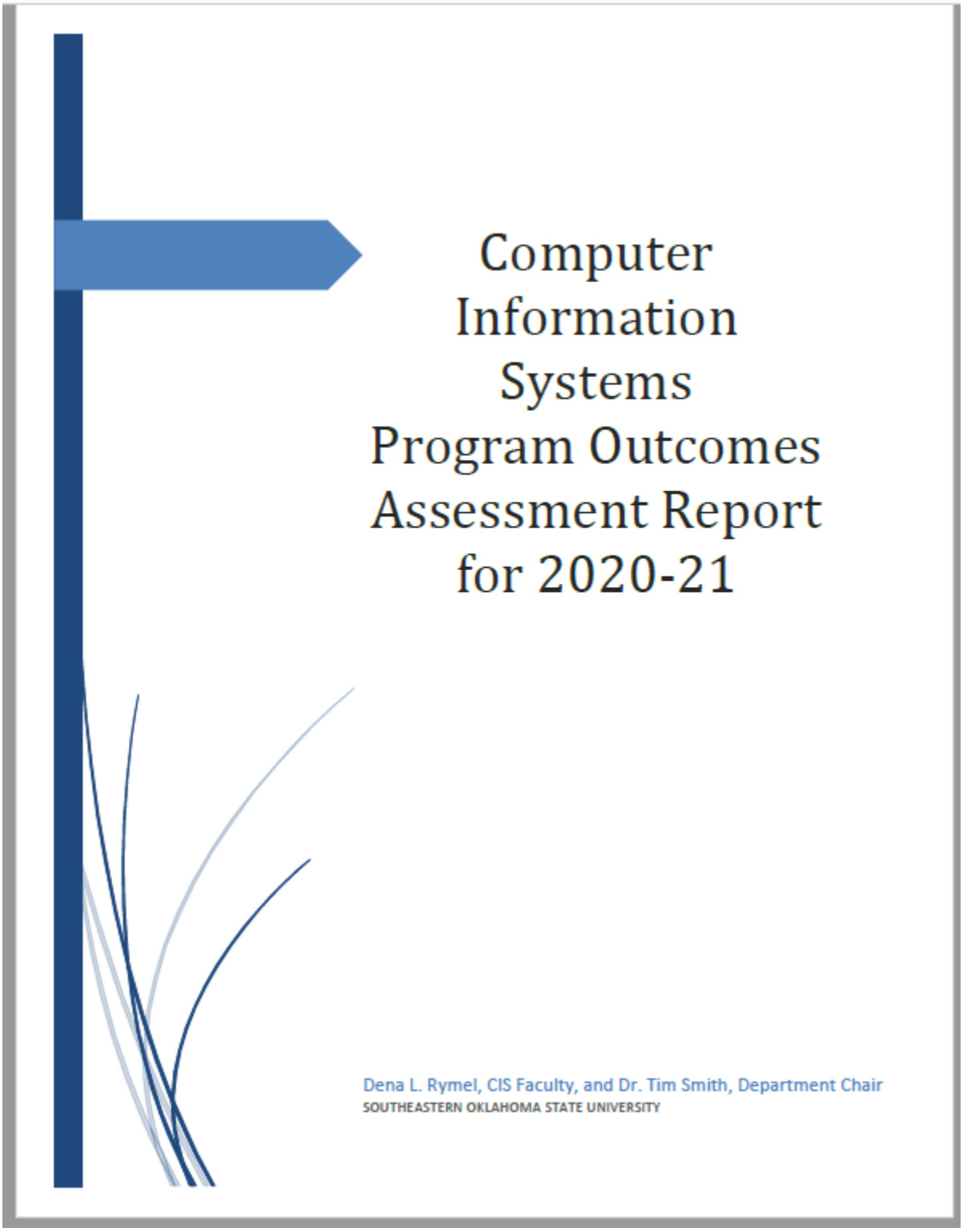
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 5 students were given the Exit Exam: 5 students ranked Exemplary, 0 students ranked Competent, 0 students ranked Developing, and 0 students ranked Unacceptable for an average of 4.0, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 4.0; Ideal target for student scores was achieved. This Exam consists of 120 questions that cover all the core courses for the CIS degree. These courses are taken over (usually) at least a four-year period. Students can have quite a gap between when they took/completed the courses and when they take the Exit Exam. The Ideal target for the Program Assessment Report has been met for this Outcome; the scores are considered to be Master/Expert Proficiency.</td></tr>
</table>

After several attempts, the margin set up on the original 2020-2021 cis access report (both in the pdf and Word formats) was still not compatible with this format of this Self-Study report. Therefore, each page of the 2020-2021 report was display as an image.



EXECUTIVE PROGRAM SUMMARY

As stated in the Assessment Report in the document below, the following measures have reached the ideal target of 3.0.

- Outcome 1 Measure 1: understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint (24 students)
- Outcome 1 Measure 2: understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint (16 students)
- Outcome 2 Measure 1: understanding and use of the concepts of computer programming (21 students)
- Outcome 2 Measure 2: understanding and use of the concepts of computer programming and principles of software development techniques (17 students)
- Outcome 3 Measure 1: understanding and use of database concepts and methods of storing data efficiently (20 students)
- Outcome 3 Measure 2: understanding and use of advanced database concepts (26 students)
- Outcome 6 Measure 1: understanding and practical application of how to solve managerial problems with application software (10 students)
- Outcome 6 Measure 2: understanding and use of software development life cycle techniques, components, and best practices (13 students)
- Outcome 7 Measure 1: understanding of the various components, concepts, and applications of data communications technology (22 students)
- Outcome 8 Measure 1: understanding of the fundamentals of health information management as it relates to electronic patient records (15 students)
- Outcome 8 Measure 2: understanding and practical use of electronic health records (15 students)

The following measures have reached an acceptable target of 2.5.

- N/A

The following measure reported no scores.

- N/A

No scored measures were below the ideal target of 3.0.

Based on the assessment results, we plan to make the following changes to the Computer Information Systems program in the year 2021/22.

- All faculty in the CIS program have been teaching overload courses in the past few years. In the fall of 2019 the program lost an instructor, which increased the overload on the three full-time faculty. The program's ultimate goal was to hire a new faculty member, which was achieved with the addition of Dr. Nirmala Soundararajan. Dr. Soundararajan will assist our current faculty in their ability to fulfill their teaching, advising, service, and other duties. The program will continue to use strategically-placed adjuncts from inside and outside the Southeastern family.
- Continue to offer app-development courses, such as Python for All, to the entire SE student body, regardless of their declared major. These courses continue to be an exciting and popular addition to the elective courses for CIS majors. The opportunity to learn additional programming languages greatly enhances our current program, plus gives students from other degree plans the opportunity to gain experience and exposure to programming.
- Support the SEsports initiative: The purpose of the organization is to provide a fun, open environment that fosters growth in gamers and spectators from absolute beginners to experts and helps them to build relationships, increase skills, and participate in competitions.
- Update textbooks used in courses when necessary to reflect current standards, terminology, and trends.

- Continue to monitor and enhance courses to better serve the needs of our students as they prepare to enter the workforce after graduation
- Attend as many recruitment opportunities as possible, both on the Southeastern campus and off.
- Continue to work with the Choctaw Nation's technology departments as potential internship and job placement opportunities for students.
- Work with the Choctaw Nation by providing qualified student applicants for their Co-Op Program.

PROGRAM OUTCOMES ASSESSMENT REPORT

Department: Chemistry, Computer, & Physical Sciences

Degree Program: Computer Information Systems

Report Submitted By: Dena Rymel | **Date of Submission: September 15, 2021**

Program Mission Statement:
The Computer Information Systems (CIS) program of the department of Chemistry, Computer, and Physical Sciences aims to prepare its students to obtain and enjoy successful careers in the dynamic IT (Information Technology) industry. The CIS program strives to understand the needs of local, regional, and national employers and deliver graduates that can adequately fill current IT positions.

Student Learning Outcome 1	Mastery of Microsoft Office – Almost every high school graduate and many others have exposure to and rudimentary knowledge of Microsoft Office, in particular, Word, Excel and PowerPoint. This program takes the student much further in the deployment of productivity software by delivering a deep, robust knowledge of the vast capabilities of such software. The student is prepared to solve complex problems regularly encountered in real business situations.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Students will complete weekly intermediate course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate mastery of the material and software. At the end of each module (Word, Excel, PowerPoint), in CIS 2103 Intermediate Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 365 & 2019 and best practices in document creation and enhancement. CIS 2103 is a required course for all CIS majors. Exams are measured in scale 1-4. 24 were assessed in the 2020-21 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)**

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Measure* AND *Number of Students Assessed
Students will complete and be evaluated weekly by advanced – and at times integrated - course assignments in Microsoft Word, Excel, and PowerPoint that take the student step-by-step through guided tutorials into assignments where they apply learned concepts and demonstrate advanced, comprehensive mastery of the material and software. At the end of each module (Word, Excel, PowerPoint) in CIS 3103 Advanced Productivity Software, students will be evaluated by an exam that allows them to demonstrate acquired knowledge of the underlying functionality of Office 365 & 2019 and best practices in document creation and enhancement, form design and integration, and web application integration. A comprehensive final exam measures student

comprehension of concepts and proper procedures. CIS 3103 is a required course for all CIS majors. Exams are measured in scale 1-4.

16 were assessed in the 2020-21 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
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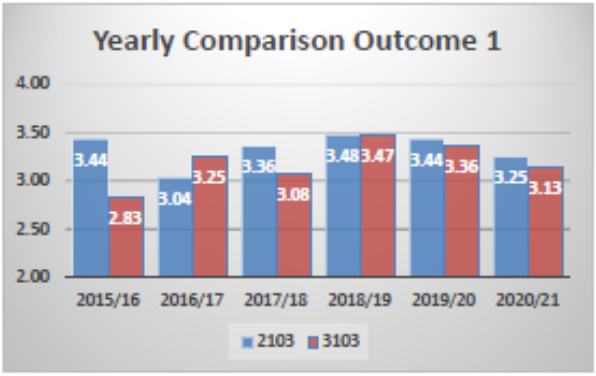
1	Unsatisfactory (Unacceptable)	Below 60%

Summary of Assessment Results

- In 2103, 24 students were assessed in their understanding of the use and application of Microsoft Office Word, Excel, and PowerPoint: 12 students ranked Excellent, 8 students ranked Good, 2 students ranked Developing, and 2 students ranked Unsatisfactory for an average of 3.25, which exceeds the ideal target.
- In 3103, 16 students were assessed in their understanding of the advanced capabilities and use of Microsoft Office Word, Excel, and PowerPoint: 6 students ranked Excellent, 8 students ranked Good, 0 students ranked Developing, and 2 students ranked Unsatisfactory for an average of 3.13, which exceeds the ideal target.

Use of Results and Reflection

The average across all measurements is 3.20; Ideal target is achieved. Students have few issues with the current textbooks, and the textbook/software versions integrate well. As evident in the chart below, averages in both courses have decreased slightly over the past year. However, the 2020/21 semesters were in the midst of a pandemic; quite a few students struggled yet still reached the Ideal target.



Student Learning Outcome 2

Basic Computer Programming Skills – The student understands the fundamentals of producing custom computer programs written in an object-oriented language such as Visual Basic. Issues that are not possible to solve with standard productivity software are given solutions that are accomplished by programs created for specific problems. Website development is one of many examples of the need for computer programming. Students also know when it is appropriate to activate custom programming instead of existing software to fill various IT needs.

Method(s) of Assessment

***Measure AND Number of Students Assessed* (Required)**

Measure the student's basic understanding and proper use of visual object oriented language(s) and basic IO (Input/Output) on data. Students acquire knowledge through guided tutorials, then apply their subject comprehension to create and/or debug computer programs that employ a variety of expressions and statements, functions and string manipulations. Students will be evaluated by section assignments in each course, three section exams in CIS 1613 Computer Information Systems I, and two section exams and a final, comprehensive exam in CIS 1623 Computer Information Systems II that allow them to demonstrate acquired knowledge of creating OOP-based computer programs. CIS 1613 and 1623 are required courses for all CIS majors. Exams are measured in scale 1-4.

38 were assessed for the combination of 1613 and 1623 in the 2020-21 year.

Expected Target

Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)

Evaluation Method(s) are based on the final average grades of the course(s)

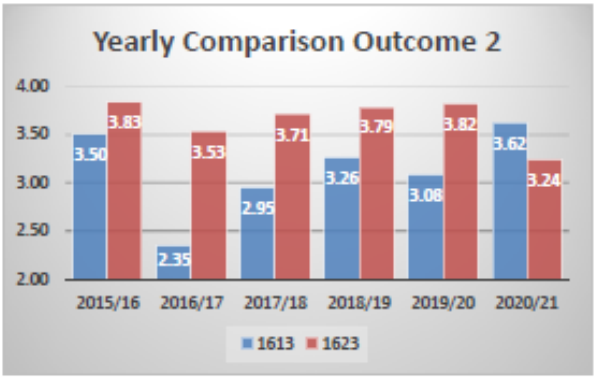
Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Summary of Assessment Results

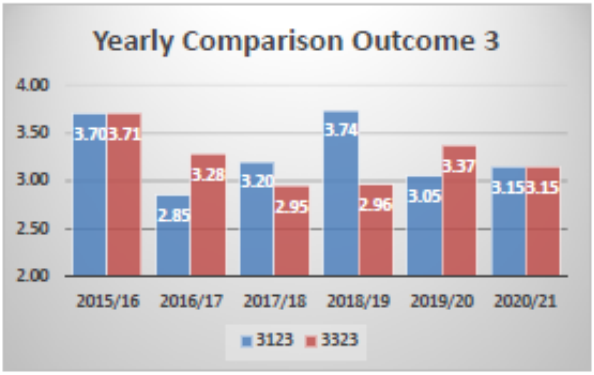
- 21 students were assessed in 1613 for their understanding and use of the concepts of computer programming: 14 students ranked Excellent, 6 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.62, which exceeded the ideal target.
- 17 students were assessed in 1623 for their understanding and use of the concepts of computer programming and principles of software development techniques: 10 students ranked Excellent, 3 students ranked Good, 2 students ranked Developing, and 2 students ranked Unsatisfactory for an average of 3.24, which exceeded the ideal target.

Use of Results and Reflection

The average across all measurements is 3.45; Ideal target is achieved. Students have few issues with the clarity of the current textbook. The course continues to be updated with a textbook that is concise, easy to understand, and relevant to current times. The 1613 course is one of the two that students find most difficult, so the continually high averages over the past few periods is especially heartening. The online sections of each course each semester perform very well. The instructor will continue to develop instructional content videos and additional instructional methods to enhance the course concepts.



Student Learning Outcome 3	Knowledge of Database Management – The student understands database construction, design, relationships among data tables, data management, querying, and data retrieval methods for popular modern database software. Students know how to design a database instead of writing a custom program, when the situation is appropriate. Database security methods and storage procedures are implemented in a typical application.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the student's understanding of and ability to create, modify, update, and analyze commercial database software. In CIS 3123 Intermediate Database Analysis, students acquire knowledge through guided tutorials, then apply their subject comprehension to modify existing databases by entering additional records and fields, modifying the structure and relationship of tables, creating properly formatted and functional queries and reports, and analyzing existing data. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by two exams that require them to describe and identify database components and procedures, research databases' impact upon the business community, plus illustrate and discuss database design. CIS 3123 is a required course for all CIS majors. Exams are measured in scale 1-4. 20 were assessed in the 2020-21 year; two students stopped participating during the semester, but their scores are included in the data. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales: 4 – Excellent (Exemplary) – 90 - 100%; 3 – Good (Competent) – 75 – 89%; 2 – Satisfactory (Developing) – 60 – 74%; 1 – Unsatisfactory (Unacceptable) – Below 60%** ***Measure AND Number of Students Assessed*** CIS 3323 Advanced Database Analysis enhances students' prior database knowledge, adding in the ability to utilize QBE and SQL to query and manipulate data. Students will define and use the various normal forms in table design, they will use triggers and data macros to manipulate data, and they will create ER diagrams as representations of proper database design. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students will be evaluated by section exams on their ability to synthesize concepts acquired via textbook concepts and information, research conducted online, and practical knowledge gained through course assignments on database structures and design, database concepts and terminology, and database functions and services. CIS 3323 is a required course for all CIS majors. Exams are measured in scale 1-4. 26 were assessed in the 2020-21 year; one student stopped participating in the middle of the semester, but their score is included. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** **Scales: 4 – Excellent (Exemplary) – 90 - 100%; 3 – Good (Competent) – 75 – 89%; 2 – Satisfactory (Developing) – 60 – 74%; 1 – Unsatisfactory (Unacceptable) – Below 60%**

Summary of Assessment Results	• In 3123, 20 students were assessed in their understanding and use of database concepts and methods of storing data efficiently: 10 students ranked Excellent, 5 students ranked Good, 3 students ranked Developing, and 2 students ranked Unsatisfactory for an average of 3.15, which exceeded the ideal target. • In 3323, 26 students were assessed in their understanding and use of advanced database concepts: 12 students ranked Excellent, 9 students ranked Good, 2 students ranked Developing, and 3 students ranked Unsatisfactory for an average of 3.15, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.15; Ideal target is achieved. Students have few issues with the current textbook, and the textbook/software versions integrate well. The instructor(s) will utilize various content support tools and information resources to support student efforts. 3123's course average showed an increase from the previous year, 3323's showed a decrease while still meeting the ideal target. 
Student Learning Outcome 4	Knowledge of Working Business Environment – A program has a greater chance of success when it requires a diverse mix of courses and faculty in its makeup. This program accomplishes that feat by calling on other departments to round out its graduates. Students have a good understanding of basic accounting principles by taking the first two entry level classes from our Accounting department. The same can be said of economics understanding from both micro- and macroeconomics classes. Students also understand basic statistics used in business from another outside course offered by the Business department. Complementing an understanding of the core ingredients of the business world are additional courses in management and marketing.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** ACCT 2103 Fundamentals of Financial Accounting ACCT 2203 Fundamentals of Managerial Accounting BUS 2633 Business Statistics ECON 2213 Principles of Microeconomics MKT 3233 Principles of Marketing MNGT 3113 Management and Organizational Behavior Our faculty do not have access to the outcomes of the above courses, as they were offered by other departments and contain students from a variety of majors.
Summary of Assessment Results	*N/A*
Use of Results and Reflection	*N/A*
Student Learning Outcome 5	Enhanced Personal Communication Skills – Basic communication skills, both written and oral, are assumed to exist due to proper environmental factors and general education requirements. This program is of a

<table>
<tr><td></td><td>technical nature and students achieve the ability to comprehend and produce technical documents, including professional-grade operating manuals for software systems and problem resolution documents. In addition to oral and written communications, present society now demands electronic communication skills, which are enabled through student interaction with commercial and custom software.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
ENG 3903 Technical and Professional Writing

Our faculty do not have access to the outcomes of the above course, as it was offered by another department and contain students from a variety of majors.</td></tr>
<tr><td>Summary of Assessment Results</td><td>N/A</td></tr>
<tr><td>Use of Results and Reflection</td><td>N/A</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Student Learning Outcome 6</td><td>Solving Business Information Technology Problems – Businesses of all sizes have developed strong dependencies on software for employee productivity and for solutions to all kinds of problems. Students have a variety of IT skills that allows an effective attack at any problem that avails itself to an electronic solution. Students are acquainted with problems in the financial and accounting areas as well as scientific, security, ethical and technical fields.</td></tr>
<tr><td>Method(s) of Assessment</td><td><u>Measure AND Number of Students Assessed</u> (Required)
Measure the students' understanding of and ability to use Microsoft Excel and Microsoft Access to solve real-world business problems. Students will utilize spreadsheets and database software to analyze case studies, then apply their analysis of those cases to design and create solutions. Students will complete cases involving stand-alone software products, as well as cases that involve integration of spreadsheets, databases, and web-based information. Students will complete and be evaluated by course assignments and case studies that introduce and reinforce course and textbook concepts. Students will be evaluated by a final, integrated case study project that asks them to apply concepts and best practices to create and present their solution(s) to the situation. CIS 3533 Advanced Business Solutions is a required course for all CIS majors. Case studies are measured in scale 1-4.

10 were assessed in the 2020-21 year.

<u>Expected Target</u>
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

<u>Describe rubric criteria and scales (if applicable)</u>
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
<tr><th>Scale</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
<tr><td>4</td><td>Excellent (Exemplary)</td><td>90 - 100%</td></tr>
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<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>

<u>Measure AND Number of Students Assessed</u>
Measure the students' understanding of how to organize and access information strategically to produce a quality software package using a variety of standard lifecycle techniques. Students will complete and be evaluated by weekly course assignments, interactive Discussion Board forums, and cases that introduce and reinforce course and textbook concepts such as the phases and objectives of the systems development life cycle, systems design and implementation, and user interface design. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics that include analyzing the business case, requirements and enterprise modeling, and contrast of the top-down and modular design methods. In the Semester Project, students are asked to apply skills and concepts acquired to create a project from beginning to end, covering all steps of the SDLC and incorporating all major steps and</td></tr>
</table>

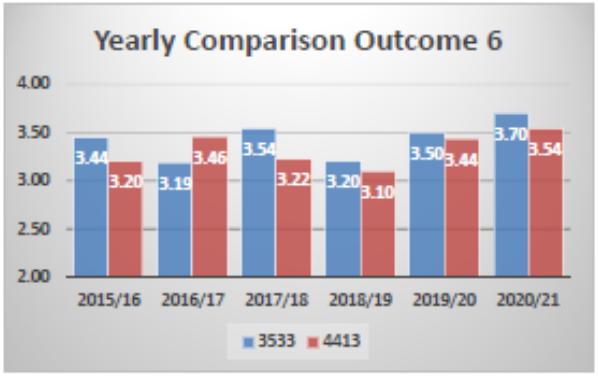
components. CIS 4413 Systems Analysis is a required course for all CIS majors. Exams and the Semester Project are measured in scale 1-4.

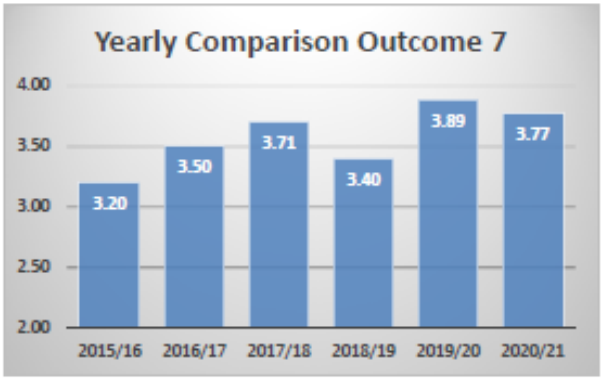
13 were assessed in the 2020-21 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)

Scales	Interpretation	Percentage of Completion of the Course Requirements
4	Excellent (Exemplary)	90 - 100%
3	Good (Competent)	75 – 89%
2	Satisfactory (Developing)	60 – 74%
1	Unsatisfactory (Unacceptable)	Below 60%

Summary of Assessment Results	• In 3533, 10 students were assessed in their understanding and practical application of how to solve managerial problems with application software: 7 students ranked Excellent, 3 students ranked Good, 0 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.70, which exceeded the ideal target. • In 4413, 13 students were assessed in their understanding and use of software development life cycle techniques, components, and best practices: 8 students ranked Excellent, 4 students ranked Good, 1 student ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.54, which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.61; Ideal target is achieved. To keep current with trends, the instructor will choose an appropriate and current textbook for each course. The instructor will also update the subject base of the Semester Project in 4413, finding a common theme to which all students can relate, as the course is utilized by other majors as an upper level elective. The instructor(s) will utilize various content support tools and information resources to support student efforts. In the chart below, both courses consistently stay above the Ideal target. Both courses also show an increase from the previous assessment period. 
Student Learning Outcome 7	Knowledge of Networking and Communications – Students will know how data is transmitted and received in a variety of networking and communication protocols, including early efforts to the most current systems. Basic troubleshooting skills aid in design, construction and implementation of networks, including local and wide-area installations.

	Connectivity issues and throughput speed are well understood. Network security issues are understood for basic operations.
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the students' understanding of the principles of data communications and their associated protocols and topologies, current software designs, signal theory, and new technologies. Students will complete and be evaluated by weekly course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by two exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research, covering daily technology use through more technical aspects of data communication, including leading edge technology trends. CIS 4113 Data Communications Technology is a required course for all CIS majors. Exams are measured in scale 1-4. 22 were assessed in the 2020-21 year. ***Expected Target*** Acceptable 2.5, Ideal 3.0 in average among all assessed students. ***Describe rubric criteria and scales (if applicable)*** **Evaluation Method(s) are based on the final average grades of the course(s)** Scales / Interpretation / Percentage of Completion of the Course Requirements 4 – Excellent (Exemplary) – 90 - 100% 3 – Good (Competent) – 75 – 89% 2 – Satisfactory (Developing) – 60 – 74% 1 – Unsatisfactory (Unacceptable) – Below 60%
Summary of Assessment Results	• 22 students were assessed in their understanding of the various components, concepts, and applications of data communications technology: 19 students ranked Excellent, 1 student ranked Good, 2 students ranked Developing, and 0 students ranked Unsatisfactory for an average of 3.77 which exceeded the ideal target.
Use of Results and Reflection	The average across all measurements is 3.77; Ideal target is achieved. The instructor will utilize various content support tools and information resources to support student efforts. The course's average decreased slightly from the previous year but remained well above the Ideal target. 
Student Learning Outcome 8	Health Information Technology – If a student pursues a minor with this emphasis or completes the courses currently offered in this field, then a basic knowledge of the fundamentals of electronic health records implementation, as mandated by the federal government, will be enjoyed by the student. Medical office management skills are introduced

<table>
<tr><td></td><td>including proficiency of usage of electronic medical records software that simulates real-world activities of patients and practitioners.</td></tr>
<tr><td>Method(s) of Assessment</td><td>
Measure AND Number of Students Assessed (Required)
Measure the students' understanding of the fundamentals of health information management as it relates to computer-based patient records, including professionalism and ethical issues, critical issues for implementation of electronic medical records (EMR), how an EMR affects service provider processes, and how to recognize and control risks associated with electronic data. In CIS 4613 Health Information Systems, students will complete and be evaluated by regular course assignments that introduce and reinforce course and textbook concepts. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook and via personal research. Exams are measured in scale 1-4.

15 were assessed in the 2020-21 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
<table>
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</table>

Measure AND Number of Students Assessed
Measure the students' understanding of the fundamentals of electronic health records, including core functions and capabilities of electronic records, primary sources for standards and guidelines, and the major phases of work and activities involving those records. In CIS 4623 Electronic Health Records, students will complete and be evaluated by regular course assignments that introduce and reinforce course and textbook concepts, as well as hands-on exercises using actual EHR software. Students are evaluated by periodic exams and a final exam that require them to describe and identify aspects of topics introduced in the textbook that include planning, setting procedures for proper storage and access, maintenance and usage. Exams are measured in scale 1-4.

15 were assessed in the 2020-21 year.

Expected Target
Acceptable 2.5, Ideal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
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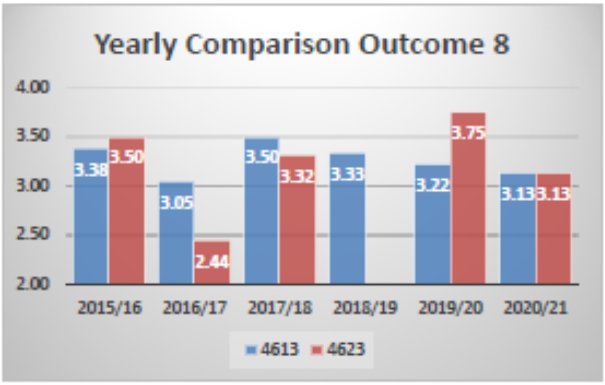
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table>
</td></tr>
<tr><td>Summary of Assessment Results</td><td>

15 students were assessed in two sections of 4613 for their understanding of the fundamentals of health information management as it relates to electronic patient records: 7 students ranked Excellent, 5 students ranked Good, 1 student ranked Developing, and 2 students ranked Unsatisfactory for an average of 3.13, which exceeded the ideal target.
15 students were assessed in 4623 for their understanding of the fundamentals of health information management as it relates to electronic patient records: 7 students ranked Excellent, 5 students ranked Good, 1 student ranked

</td></tr>
</table>

<table>
<tr><td></td><td>Developing, and 2 students ranked Unsatisfactory for an average of 3.13, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.13; Ideal target is achieved. Even though the average show a decrease from last year, both courses perform well as a whole. CIS students will continue to be encouraged to enroll in both courses.
 
</td></tr>
<tr><td>Exit Exam</td><td>In the senior year of the program, the Computer Information Systems Departmental Exit Exam is given to each student. This gives the program an acceptable tool to evaluate all outcomes listed above. A cumulative score of 50% or better is considered to be Practitioner Proficiency and a score of 70% or better is considered Master/Expert Proficiency.</td></tr>
<tr><td>Method(s) of Assessment</td><td>Measure AND Number of Students Assessed (Required)
Measure the students' overall understanding of the concepts covered in the various courses. Exams are measured in scale 1-4.

10 were assessed in the 2020-21 year.

Expected Target
Goal 3.0 in average among all assessed students.

Describe rubric criteria and scales (if applicable)
Evaluation Method(s) are based on the final average grades of the course(s)
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<tr><th>Scales</th><th>Interpretation</th><th>Percentage of Completion of the Course Requirements</th></tr>
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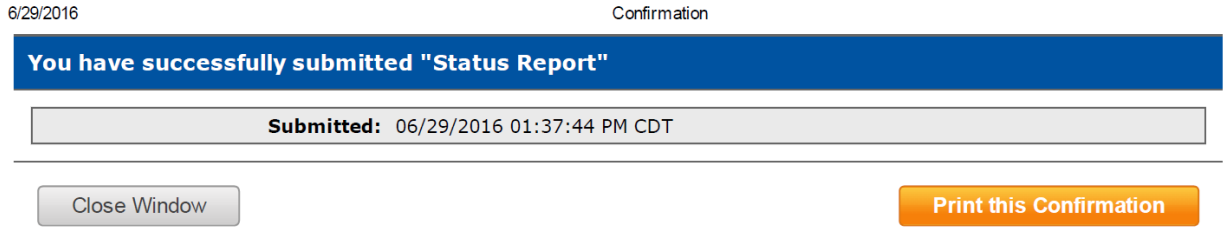
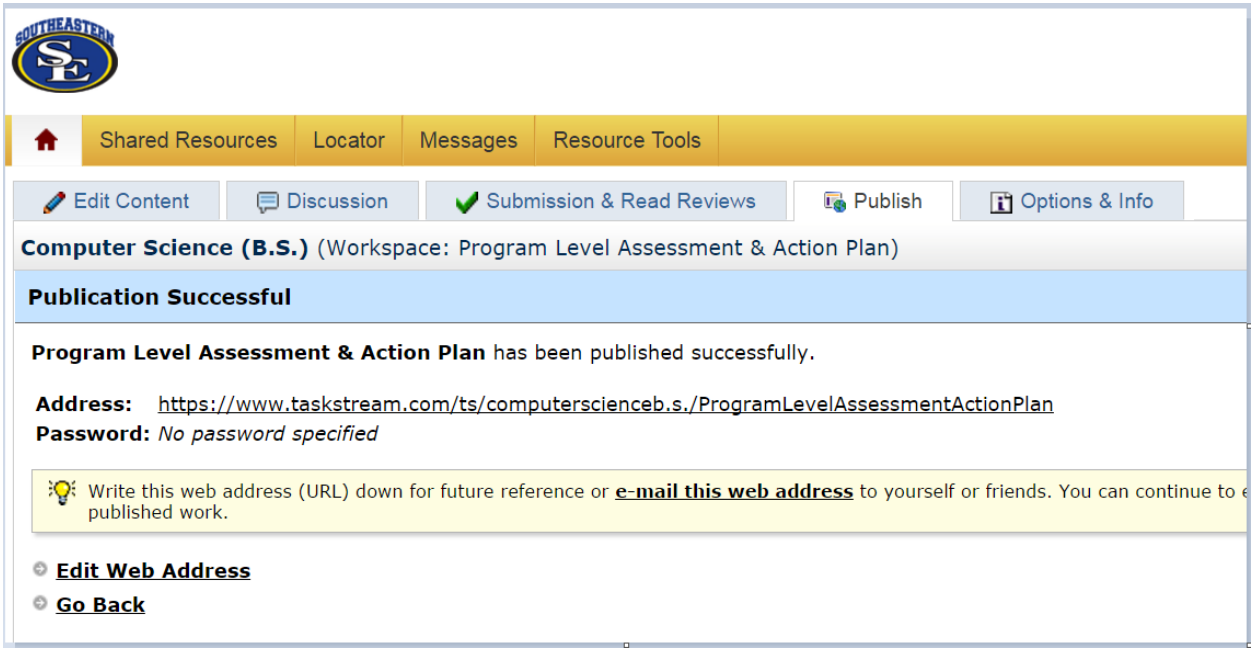
<tr><td>2</td><td>Satisfactory (Developing)</td><td>60 – 74%</td></tr>
<tr><td>1</td><td>Unsatisfactory (Unacceptable)</td><td>Below 60%</td></tr>
</table></td></tr>
<tr><td>Summary of Assessment Results</td><td>• 10 students were given the Exit Exam: 7 students ranked Exemplary, 2 students ranked Competent, 1 student ranked Developing, and 0 students ranked Unacceptable for an average of 3.60, which exceeded the ideal target.</td></tr>
<tr><td>Use of Results and Reflection</td><td>The average across all measurements is 3.60; Ideal target for student scores was achieved. This Exam consists of 120 questions that cover all the core courses for the CIS degree. These courses are taken over (usually) at least a four-year period. Students can have quite a gap between when they took/completed the courses and when they take the Exit Exam. The Ideal target for the Program Assessment Report has been met for this Outcome; the scores are considered to be Master/Expert Proficiency.</td></tr>
</table>

There was no hardcopy of the Computer Science 2016-2017 Assessment Report available from the faculty. Because we were using the Online TaskStream website to upload all our Assessment Data. See the screenshots below. According to the department information, the TaskStream website was only available till September 2017.





COMPUTER SCIENCE PROGRAM OUTCOMES ASSESSMENT REPORT FOR 2017-2018

Dr. Ming-Shan Su and Dr. Lie Qian

SOUTHEASTERN OKLAHOMA STATE UNIVERSITY

EXECUTIVE PROGRAM SUMMARY

As stated in the assessment report below, the following measures have reached ideal target

- Outcome 3 Measure 1: skills in performance analysis which is used to validate correctness in designs to meet given requirements (# of students 12)
- Outcome 3 Measure 3: design and implement programs using appropriate and/or specified data structures and/or algorithms (# of students 12)
- Outcome 4 Measure 1: understanding of computer security fundamental, policy, and process (# of students 12)
- Outcome 6 Measure 1: understanding and proper use of advanced Object Oriented (OO) principles (# of students 11)
- Outcome 6 Measure 2: ability to recognize and use advanced data structures (# of students 14)
- Outcome 7 Measure 1: comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems (# of students 14)

The following measures have reached acceptable target

- Outcome 1 measure 3: ability of converting between binary and decimal signed/unsigned integer/floating point numbers (# of students 11)
- Outcome 2 Measure 1: ability of software model analysis and construction using UML (# of students 18)
- Outcome 6 Measure 3: recognize CPU architecture and instruction sets and program with Assembly (# of students 11)
- Outcome 8 Measure 1: ability to apply inheritance and polymorphism design principle in programming (# of students 10)
- Outcome 8 Measure 2: ability to evaluate advantages and disadvantages in Software Engineering process models (# of students 19)

The following measures are below acceptable target

- Outcome 1 measure 2: ability of parsing tree analysis and construction (# of students 19)
- Outcome 3 Measure 4: can recognize the necessity of process synchronization and evaluate the solutions (# of students 15)

Based on the assessment results, we plan to make following changes to the Computer Science program in year 18/19

- Change the programming language used in CS1, CS2, Data Structure classes from C++ to JAVA. Outcome 6 Measure 1&2, and outcome 8 Measure 1 will be adjusted accordingly.
- All faculty in the CS program are teaching overload courses in the past couple years. Hopefully, we can hire some new faculty member to teach some Computer Science major courses which could help us to better fulfill our teaching and advising duty for Computer Science program.
- As noted in the assessment report, students' performance in parse tree (outcome 1 measure 2) is below acceptable target. We plan to replace Programming Language course with Artificial Intelligent related course such as deep machine learning. Students are usually confused by the Programming language course's compiler part and not very interested in such theoretical topics. Very few students will ever have a chance to apply the compiler or programming language design knowledge into their future work. Machine learning's market, especially deep learning, is growing significantly since 2014. Machine learning requires application of linear algebra, probability theory and information theory to computer science discipline, which makes it a good vehicle to enhance Computer Science program's outcome 1.
- After offering new courses to cover the iOS and Android app developments, we plan to introduce and offer a new course Python for All to the whole SE community regardless of their majors. Python will be a new addition to the elective courses for computer majors and covering many different programming language gives our students more opportunity to get familiar with programming fundamental. Learning multiple languages allow our students to have more tools to get their future job done; have a chance to choose the job they love; increase their salary potential and become a more versatile developer.

PROGRAM OUTCOMES ASSESSMENT REPORT

Department: **Chemistry, Computer and Physical Sciences**	
Degree Program: **Computer Science**	
Report Submitted By: **Dr. Ming-Shan Su and Dr. Lie Qian**	**Date of Submission:** **12/18/2018**

Program Mission Statement:
The Computer Science program in the Department of Chemistry, Computer, and Physical Sciences aims to prepare its majors to obtain the knowledge and skills to succeed in the technological workplace of the 21st century. The CS program strives to build problem solving skills, to provide a firm grasp of the principals of ethical behavior and professional integrity, and to encourage a determination to engage in life-long learning in the theory and applications of computing.

Goal:

- Graduates will have the ability to apply their computer science knowledge and skills to create solutions to problems encountered in industry, government or academia and have a successful, long-lived, computer science-based career.
- Graduates will have the necessary technical knowledge and education to pursue a professional development successfully or a graduate program successfully
- Graduates should actively pursue lifelong learning
- Graduates are aware of their ethical responsibilities as professional

Student Learning Outcome 1	An ability to apply knowledge of computing and mathematics appropriate to the discipline
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure students' comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions. CS4223 Algorithm Analysis's exam 1 Q1-4 are used to evaluate student's understanding of algorithm's growth rate evaluation and comparison. In these questions, students apply their math knowledge to computer science algorithm analysis. Students' answers are evaluated in scale 1-4 0 students are assessed in 17/18. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Q1 one or less item out of order Q2 correct big-oh for both loops Q3 correct big-oh for all expressions Q4 Correctly answer both questions with correct reason refer to big-oh 3-Good: Q1 two items out of order Q2 correct big-oh for one loop Q3 correct big-oh for three expressions Q4 Correctly answer for both questions without correct reason refer to big-oh 2-Satisfactory: Q1 three items out of order Q2 incorrect big-oh for both loops with correct estimation for individual outer and inner loops Q3 correct big-oh for two expressions

	Q4 Correctly answer one question but fail to identify the case when slow algorithm could be useful 1-Unsatisfactory: Q1 four or more items out of order Q2 incorrect big-oh for both loops and fail to identify the outer and inner loop's counting Q3 correct big-oh for one or less expression Q4 Fail to answer both questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability of parsing tree analysis and construction. Students in computer science major are required to take CS4323 Programming Language class. We use the first test to evaluate students' ability to use context free grammar to analyze and build parsing trees for given expressions and code blocks. Students are assessed in scale 1-4. In year 17/18, 19 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 trees are built correctly 3-Good: 4 trees are built correctly 2-Satisfactory: 2-3 trees are built correctly 1-Unsatisfactory: Less than one tree built correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability of converting between binary and decimal signed/unsigned integer/floating point numbers. CS3143 Computer Architectures is a required course for all Computer Science major students. Students are required to understand and be able to convert between signed/unsigned/integer/floating binary and decimal numbers. We are using the corresponding exam (Exam 1, Q1, 2, 3, 6, 8) to measure this outcome. In year 17/18, 11 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 questions are correct 3-Good: 1 question has problem 2-Satisfactory: 2 questions have problem 1-Unsatisfactory: more than 2 questions have problem
Summary of Assessment Results	• 19 students' ability of parsing tree analysis and construction are assessed. 3 students ranked Excellent, 6 students ranked Good, 6 students ranked Satisfactory, and 4 students ranked Unsatisfactory. Average 2.42. Miss the acceptable target • 11 students are assessed in number conversion between binary and decimal signed/unsigned integer/floating point numbers. 3 students ranked Excellent, 3 students ranked Good, 5 students ranked Satisfactory, and 0 students ranked Unsatisfactory. Average 2.818. Meet the acceptable target
Use of Results and Reflection	The average across all measurements is 2.566. Acceptable target is achieved. Moving away from ideal target which was achieved in year 16/17. A different measurement was used in 16/17 (Algorithm analysis class instead of programming language class). Students are doing better in big Oh analysis than parsing tree construction. More class time for parsing tree practice and number conversion need to be arranged in future semester to enhance student's ability to apply math to computer science.
Student Learning Outcome 2	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution

Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' ability of software model analysis and construction using UML. CS4423 Software Engineering's exam 2's Q5 and Q7 ask students to use UML notation to analyze and construct an activity diagram and a sequence diagram for given software requirements. Each diagram is graded using scale 1-4. In year 17/18, 18 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Diagram is correctly constructed 3-There are some minor problems in constructed diagram 2-Diagram has significant problem 1-Construct a diagram of wrong
	Measure* AND *Number of Students Assessed Measure students' ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms. All computer science major students are required to take CS 4223 algorithm analysis. In the second test of the course, students are asked to design 2 algorithms to solve one vote counting problem and one min/max search problem. The algorithms designed need to reach certain performance requirements. In the third test students are asked to demonstrate the understanding of the limit of Dijkstra's algorithm. Each algorithm design is graded using scale 1-4 0 students are assessed in 17/18. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Algorithm correct and meet requirement, give correct analysis 3-Algorithm correct and meet requirement 2-Algorithm correct but not meet requirement 1-Algorithm incorrect or not given
Summary of Assessment Results	• 18 students are assessed in software model analysis and construction. 4 students ranked Excellent, 11students ranked Good, 3 students ranked Satisfactory, and 0 students ranked Unsatisfactory. Average 2.806
Use of Results and Reflection	Acceptable target is achieved but not the ideal target. The measured measurement is a little bit closer to ideal target (from 2.79 to 2.80) but no significant improvement. Need keep monitoring these measurements in future years for assessment.
Student Learning Outcome 3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' skills in performance analysis which is used to validate correctness in designs to meet given requirements. Students in Computer Science Major are required to take CS4223 Algorithm Analysis, and CS4113 Operating Systems. We use two projects in these two courses to evaluation our students' capability of algorithm analysis. In both projects, students need implement different algorithms, gather experiment results and analyze the results in a report. Each project is graded using scale 1-4 In year 17/18, 12 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)***

	4-Excellent: Completed between 90-100% of the requirements with correct input and outputs. Executes without errors. Thorough and organized testing have been completed and results are analyzed in report. 3-Good: Completed between 75-90% of the requirements with correct input and outputs. 2-Satisfactory: Completed between 60-75% of the requirements with correct input and outputs. Executes with some errors. Some tests have been completed and results are analyzed in report. Report gives some analysis with little graphic demonstration 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors. No testing result has been collected. Report missing or gives almost no analysis
	Measure **AND** ***Number of Students Assessed*** Measure students' comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies. CS4223 Algorithm Analysis's exam 2 Q3, 4, exam 3 Q1-4 are used to evaluate student's understanding of divide and conquer, recursive, greedy algorithms' running and design. We give a rank (1-4) to each student's answer to each question and the overall average will be used for measurement. 0 students are assessed in 17/18. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent E2Q3,4 Correct, E3Q1Correct, E3Q2Correct, E3Q3Correct, E3Q4Correct 3-Good E2Q3,4 correct in most steps, E3Q1Some cells of the table incorrect, E3Q2no sorting, E3Q3wrong schedule, E3Q4 not optimal tree 2-Satisfactory E2Q3,4 Correct in some steps, E3Q1Wrong pick in result, E3Q2Wrong pick in result, E3Q3 wrong # of machine, E3Q4not correct tree 1-Unsatisfactory E2 Q3,4 incorrect, E3Q1worng algorithm used, E3Q2wrong algorithm, E3Q3wrong algorithm, E3Q4no tree
	Measure AND Number of Students Assessed **(Required)** The student can design and implement programs using appropriate and/or specified data structures and/or algorithms. CS2813 Data Structures is a required course for every computer science major student. In the term programming project, students are asked to use proper data structure and algorithms to implement a student record database supporting different search and sorting functions. In year 17/18, 12 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct data structure and algorithm implementation. 3-Good: Completed between 75-90% of the requirements with data structure and most functionalities correctly implemented 2-Satisfactory: Completed between 60-75% of the requirements with data structure and some functionalities correctly implemented. Program compiles and runs with input and outputs. 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors
	Measure **AND** ***Number of Students Assessed*** The students can recognize the necessity of process synchronization and evaluate the solutions. CS4113 Operating System Concepts is a required course for all students major in computer science. Students are required to recognize the necessity of process synchronization in an Operating System's design and be able to evaluate the involved solutions. We are measuring

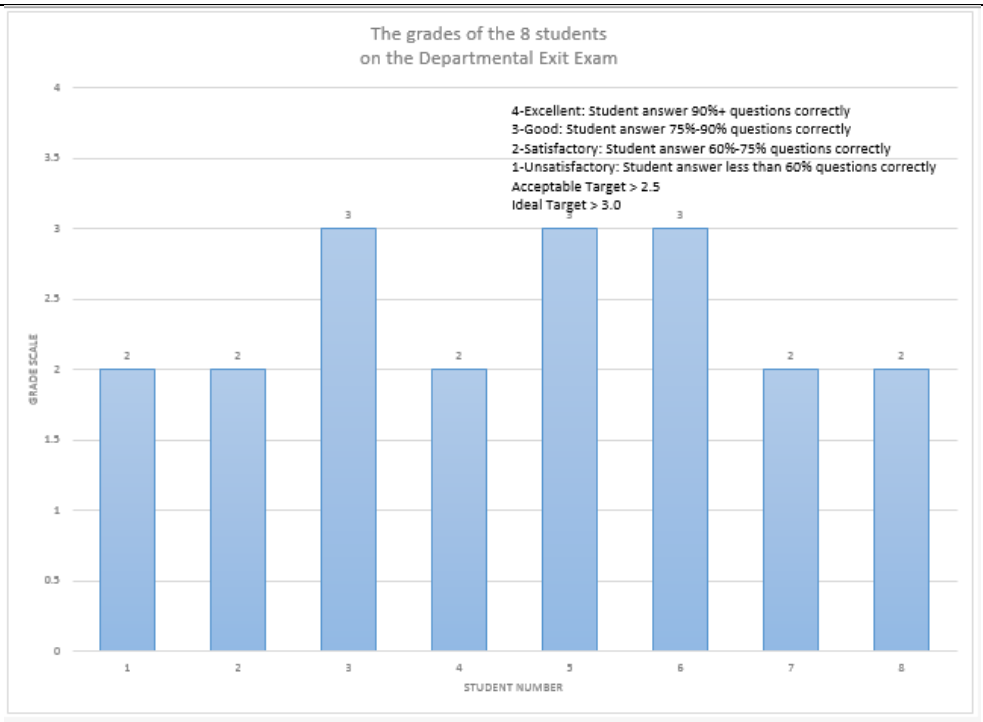
	students' performance in related questions (Q2, Q4 and Q5 in Exam 2) to evaluate this outcome. Each student is given a rank between 1-4. The overall average is used as measurement. In year 17/18, 15 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Achieve all four of following: Correctly identify the race condition, which lead to the need of synchronization. Correctly identify the bounded waiting status in the given solution. Demonstrate correct understanding of busy waiting and its effect on synchronization solutions. 3-Good: Achieve three of the targets listed above. 2-Satisfactory: Achieve two of the targets listed above. 1-Unsatisfactory: Achieve less than 1 of the targets listed above.
Summary of Assessment Results	• 12 students are assessed in performance analysis. 6 students ranked Excellent, 3 students ranked Good, 2 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.167. Meet the ideal target. • 12 students are assessed in program design and implementation using appropriate data structure/algorithms. 6 students ranked Excellent, 3 students ranked Good, 2 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.167. Meet the ideal target. • 15 students are assessed in process synchronization and solution evaluation problems. 1 student ranked Excellent, 3 students ranked Good, 9 students ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.2. Miss the acceptable target
Use of Results and Reflection	2 measurements reach ideal targets and one misses the acceptable target. Across all measurement, the acceptable target is reached (2.795). Moving away from ideal target compared to year 16/17.

Student Learning Outcome 4	An understanding of professional, ethical, legal, security and social issues and responsibilities
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the understanding of computer security fundamental, policy, and process. 4 exams in course CIS3543 are used to measure this outcome. Each student is given a rank between 1 and 4 following the rubric. The average rank among all students are used as measurement. In year 17/18, 12 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure **AND** ***Number of Students Assessed*** ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***

Summary of Assessment Results	• 12 students are assessed in their understanding of computer security fundamental, policy, and process. 5 students ranked Excellent, 3 students ranked Good, 3 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.0. Meet the ideal target.
Use of Results and Reflection	Ideal target is achieved marginally (3.5 in year 16/17). Keep monitoring this measurement in future years to see if the drop is temporary
Student Learning Outcome 5	A recognition of the need for and an ability to engage in continuing professional development
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' ability to create professional software through real-world software development requirements. In the CS623 Advanced Web-based Application Development course, students are required to use all the knowledge learned in computer science to create some advanced web applications. Students' projects are measured using the following Rubric and e average grade is used for this measurement. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure **AND** ***Number of Students Assessed*** ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	• 16 students are assessed in ability to create profession software. 6 students ranked Excellent, 3 students ranked Good, 4 students ranked Satisfactory, and 3 student ranked Unsatisfactory. Average 2.8 Meet the Acceptable target.
Use of Results and Reflection	Ideal target 3.0 was almost achieved. Three of the students didn't complete 40% of the overall work. We will keep encouraging students to complete all their projects in the future.
Student Learning Outcome 6	An ability to use current techniques, skills, and tools necessary for computing practice
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' understanding and proper use of advanced Object Oriented (OO) principles. In course CS1623 Computer Science II, students are required to understand and be able to use Objective Oriented principles in software development. We are using the corresponding exam (Exam 2) to measure this outcome. Students' performance in Exam 2 are ranked between 1 and 4. The average ranking of students is used as measurement. In year 17/18, 11 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly

	1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize and use advanced data structures. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize and use advanced data structures. Selected questions in all three exams (20 questions from Exam 1, 10 questions from Exam 2, and 15 questions from Exam 3) during the semester are used to measure this outcome. Each student's performance is graded between rank 1 and 4. The average ranking of students is used as measurement. In year 17/18, 14 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize CPU architecture and instruction sets and program with Assembly. CS3143 Computer Architectures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize CPU architecture and instruction sets and program with assembly. In the second exam, question 1 requires students to write a short program in assembly. Question 2 asks students to describe an instruction's behavior in CPU in RTL. Each student's answer to these 2 questions is ranked between 1 and 4. The average ranking of students is used as measurement In year 17/18, 11 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Give correct assembly code and describe the instruction correctly. 3-Good: Minor problems in the assembly code or instruction's description 2-Satisfactory: Minor problems in the assembly code and instruction's description 1-Unsatisfactory: Major problems in the assembly code or instruction's description
Summary of Assessment Results	• 11 students are assessed in their understanding and proper use of advanced object-oriented principles. 8 students ranked Excellent, 1 student ranked Good, 2 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.55. Meet the ideal target. • 14 students are assessed in their ability to recognize and use advanced data structures. 8 students ranked Excellent, 6 students ranked Good, 0 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.57. Meet the ideal target • 11 students are assessed in their ability to recognize CPU architecture and instructions sets and program with assembly. 4 students ranked Excellent, 2 students ranked Good, 3 students ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.73. Meet the acceptable target
Use of Results and Reflection	The ideal target is reached (3.307). The programming language used in Computer Science 2 and data structure will be changed to JAVA in the next 2 years. Two measurements in this outcome will be modified in next 2 years. JAVA as a pure object-oriented programming language will give students better understanding in OO principle (measurement 1). Higher assessment standard will be designed in next year.

Student Learning Outcome 7	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure students' comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize the tradeoffs between different data structures and be able to select proper data structures under different circumstances. 4 questions from three exams during the semester are used to measure this outcome according to following rubric. The average ranking of all assessed students is used as measurement. In year 17/18, 14 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer all 4 questions correctly 3-Good: Answer 3 of the questions correctly 2-Satisfactory: Answer 2 of the questions correctly. 1-Unsatisfactory: Answer less than 2 of the questions correctly
	Measure **AND** ***Number of Students Assessed*** Use the departmental Exit exam to measure students' comprehension in all the major subject areas of computer science. The exit exam is one of the four required components in the CS 4981 Senior Seminar course. ***Expected Target*** A score of 70% or above is considered acceptable. A score of 85% o above is ideal and considered mastery/expert proficiency. ***Describe rubric criteria and scales (if applicable)*** The exit exam consists of 120 questions from all the major subject areas of computer science. 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
Summary of Assessment Results	• 14 students are assessed in their comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. 6 students ranked Excellent, 5 students ranked Good, 3 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.214. Meet the ideal target • 11 students have signed up to take the Exit exam but only 8 students actually taken the exams. Among the 8 students, 7 of them have scored the acceptable 60-75% of the exam and only one student has scored more than 85% of the exam which is rated good.



Use of Results and Reflection	The results of the exit exam were acceptable. We hope that most of the students can score 85% or higher on the exam. However, some of our courses are only taught once every two years so it is possible that a student transferred from a community college might not have the required subject background to get a high score on the exam. In addition, the average grade is 89.5 out of 120 this year which is better than 67.25 last year so it shows improvement.
Student Learning Outcome 8	An ability to apply design and development principles in the construction of software systems of varying complexity
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' ability to apply inheritance and polymorphism design principle in programming. In course CS1623 Computer Science II, students are required to understand and be able to use Inheritance and Polymorphism design in Objective Oriented programming using C++. Inheritance and Polymorphism in modern software development industry are critical to large scale software's extendibility and reliability. We are using the final programming project to measure this outcome. Student's projects are ranked between 1 and 4. The average ranking is used as measurement. In year 17/18, 10 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Implement both inheritance and polymorphism correctly 3-Good: Implement inheritance correctly only 2-Satisfactory: Implement inheritance with problem 1-Unsatisfactory: No inheritance implemented at all
	Measure **AND** ***Number of Students Assessed*** Measure the students' ability to evaluate advantages and disadvantages in Software Engineering process models. In course CS4423 Software Engineering, students are required to understand different software development processes, their differences, and their application to different

	kind of software projects. We are using the first Exam's Question 5, 6, and 7 to measure this outcome. All three questions are about software process description, comparison, and tradeoffs. In our measurement, each question is ranked based on following rubric. Each student's rank is determined by his/her average rank among the three questions. Average rank among all assessed students is used as measurement. In year 17/18, 19 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Correct answer 3-Good: Mostly correct, with minor problems 2-Satisfactory: Has problems but No major mistake 1-Unsatisfactory: Major mistakes exist or not answering the question
Summary of Assessment Results	• 10 students are assessed in their ability to apply inheritance and polymorphism design principle in programming. 1 student ranked Excellent, 5 students ranked Good, 3 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 2.6. Meet the acceptable target • 19 students are assessed in their ability to evaluate advantages and disadvantages in Software Engineering process models. 7 students ranked Excellent, 10 students ranked Good, 2 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.88. Meet the acceptable target
Use of Results and Reflection	Acceptable target is reached. Miss ideal target (2.78). Moving away from ideal target compare to year 16/17 (2.96). The outcome is dragged down by Computer Science II project measurement this year. In year 18/19, JAVA will be used in computer science II to replace C++. We need change the measurement and monitor the outcome to observe the change brought by the language change.

COMPUTER SCIENCE PROGRAM OUTCOMES ASSESSMENT REPORT FOR 2018-2019

Dr. M. Su, Dr. L. Qian
SOUTHEASTERN OKLAHOMA STATE UNIVERSITY

EXECUTIVE PROGRAM SUMMARY

Outcomes	Measurements	# Students	Result
1	1 Comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions	29	Ideal
	2 Ability of parsing tree analysis and construction	0	N/A
	3 Ability of converting between binary and decimal signed/unsigned integer/floating point numbers	15	Not Acceptable
2	1 Ability of software model analysis and construction using UML	12	Acceptable
	2 Ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms	29	Acceptable
3	1 Skills in performance analysis which is used to validate correctness in designs to meet given requirements	39	Ideal
	2 Comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies.	29	Ideal
	3 Design and implement programs using appropriate and/or specified data structures and/or algorithms	10	Ideal
	4 Recognition of the necessity of process synchronization and evaluate the solutions	18	Acceptable
4	1 Understanding of computer security fundamental, policy, and process	15	Ideal
5	1 Ability to create professional software through real-world software development requirements	12	Acceptable
6	1 Understanding and proper use of advanced Object Oriented (OO) principles	20	Ideal
	2 Ability to recognize and use advanced data structures	12	Ideal
	3 Recognize CPU architecture and instruction sets and program with Assembly	13	Acceptable
7	1 Comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems	12	Acceptable
	2 An ability to apply mathematical foundations, algorithmic principles, and computer science theory that demonstrates comprehension of all subjects.	18	Acceptable
8	1 Ability to apply inheritance and interface design principle in programming	19	Ideal
	2 Ability to evaluate advantages and disadvantages in Software Engineering process models	12	Ideal

Based on the assessment result, we plan to make following change to the Computer Science program in year 19/20

- Change programming language used in Data Structure class from C++ to JAVA. Measurements 3.3, 6.2, 7.1 will be adjusted accordingly.
- All faculty in CS program are teaching overload courses in the past couple years. Hire new faculty member to teach some Computer Science major courses could help us to better fulfill our teaching and advising duty for Computer Science program.
- Machine learning's market, especially deep learning, is growing significantly since 2014. Machine learning requires application of linear algebra, probability theory and information theory to computer science discipline, which makes it a good vehicle to enhance Computer Science program's outcome 1. After faculty's teaching loads are reduced to reasonable level, introductory course for machine learning need be added into curriculum and assessment
- Students' comments on the new course Python for All offered in Spring 2019 were very positive so we will offer the Python course again in Fall 2019 semester.

PROGRAM OUTCOMES ASSESSMENT REPORT TEMPLATE	
Department: Chemistry, Computer and Physical Sciences	
Degree Program: Computer Science	
Report Submitted By:	**Date of Submission:**
Program Mission Statement: The Computer Science program in the Department of Chemistry, Computer, and Physical Sciences aims to prepare its majors to obtain the knowledge and skills to succeed in the technological workplace of the 21st century. The CS program strives to build problem solving skills, to provide a firm grasp of the principals of ethical behavior and professional integrity, and to encourage a determination to engage in life-long learning in the theory and applications of computing.	

Goal: Graduates will have the necessary technical knowledge and education to pursue a professional development successfully or a graduate program successfully

Student Learning Outcome 1	An ability to apply knowledge of computing and mathematics appropriate to the discipline
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions. CS4223 Algorithm Analysis's exam 1 Q1-4 are used to evaluate student's understanding of algorithm's growth rate evaluation and comparison. In these questions, students apply their math knowledge to computer science algorithm analysis. Students' answers are evaluated in scale 1-4 29 students are assessed in 18/19. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Q1 one or less item out of order Q2 correct big-oh for both loops Q3 correct big-oh for all expressions Q4 Correctly answer both questions with correct reason refer to big-oh 3-Good: Q1 two items out of order Q2 correct big-oh for one loop Q3 correct big-oh for three expressions Q4 Correctly answer for both questions without correct reason refer to big-oh 2-Satisfactory: Q1 three items out of order Q2 incorrect big-oh for both loops with correct estimation for individual outer and inner loops Q3 correct big-oh for two expressions Q4 Correctly answer one question but fail to identify the case when slow algorithm could be useful 1-Unsatisfactory: Q1 four or more items out of order Q2 incorrect big-oh for both loops and fail to identify the outer and inner loop's counting Q3 correct big-oh for one or less expression Q4 Fail to answer both questions correctly
	Measure* AND *Number of Students Assessed Measure students' ability of parsing tree analysis and construction. Students in computer science major are required to take CS4323 Programming Language class. We use the first test to evaluate

	students' ability to use context free grammar to analyze and build parsing trees for given expressions and code blocks. Students are assessed in scale 1-4. In year 18/19, 0 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 trees are built correctly 3-Good: 4 trees are built correctly 2-Satisfactory: 2-3 trees are built correctly 1-Unsatisfactory: Less than one tree built correctly
	Measure* AND *Number of Students Assessed Measure students' ability of converting between binary and decimal signed/unsigned integer/floating point numbers. CS3143 Computer Architectures is a required course for all Computer Science major students. Students are required to understand and be able to convert between signed/unsigned/integer/floating binary and decimal numbers. We are using the corresponding exam (Exam 1, Q1, 2, 3, 6, 8) to measure this outcome. In year 18/19, 15 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 questions are correct 3-Good: 1 question has problem 2-Satisfactory: 2 questions have problem 1-Unsatisfactory: more than 2 questions have problem
Summary of Assessment Results	• 29 students' understanding of algorithm's growth rate evaluation and comparison are assessed. 17 students ranked Excellent, 10 students ranked Good, 2 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.33. Meet the ideal target • 15 students are assessed in number conversion between binary and decimal signed/unsigned integer/floating point numbers. 1 student ranked Excellent, 8 students ranked Good, 3 students ranked Satisfactory, and 3 students ranked Unsatisfactory. Average 2.47. Not meet the acceptable target
Use of Results and Reflection	The average across all measurements is 3.04 reach ideal target and improve from last year's 2.566. A different measurement was used in 17/18 (Programming languages class instead of Algorithm analysis class). Students are doing better in big Oh analysis than parsing tree construction. Need keep monitoring programming language measure to see if it can catch up with Algorithm analysis measure in next year.
Student Learning Outcome 2	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' ability of software model analysis and construction using UML. CS4423 Software Engineering's exam 2's Q5 and Q7 ask students to use UML notation to analyze and construct an activity diagram and a sequence diagram for given software requirements. Each diagram is graded using scale 1-4. In year 18/191, 12 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Diagram is correctly constructed 3-There are some minor problems in constructed diagram 2-Diagram has significant problem 1-Construct a diagram of wrong
	Measure* AND *Number of Students Assessed Measure students' ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms. All computer science major students are required to take CS 4223 algorithm analysis. In the second test of the course, students are asked to design 2 algorithms to solve one vote counting problem and one min/max search problem. The algorithms designed need to reach certain performance requirements. In the third test students are asked to demonstrate the understanding of the limit of Dijkstra's algorithm. Each algorithm design is graded using scale 1-4 29 students are assessed in 18/19. CS4223 is offered in even year's Fall semester

	Expected Target Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Algorithm correct and meet requirement, give correct analysis 3-Algorithm correct and meet requirement 2-Algorithm correct but not meet requirement 1-Algorithm incorrect or not given
Summary of Assessment Results	• 12 students are assessed in software model analysis and construction. 2 students ranked Excellent, 6 students ranked Good, 3 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 2.92. Meet acceptable target • 29 students are assessed in algorithm design and analysis. 2 students ranked Excellent, 13 students ranked Good, 14 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.55. Meet acceptable target
Use of Results and Reflection	Acceptable target is achieved but not the ideal target. The measured measurement is a little bit closer to ideal target (from 2.8 to 2.92) but no significant improvement. Algorithm design measurement is similar to 2 years ago (from 2.58 to 2.53). Need keep monitoring these measurements in future years for assessment.
Student Learning Outcome 3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure students' skills in performance analysis which is used to validate correctness in designs to meet given requirements. Students in Computer Science Major are required to take CS4223 Algorithm Analysis, and CS4113 Operating Systems. We use two projects in these two courses to evaluation our students' capability of algorithm analysis. In both projects, students need implement different algorithms, gather experiment results and analyze the results in a report. Each project is graded using scale 1-4 In year 18/19, 39 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct input and outputs. Executes without errors. Thorough and organized testing have been completed and results are analyzed in report. 3-Good: Completed between 75-90% of the requirements with correct input and outputs. 2-Satisfactory: Completed between 60-75% of the requirements with correct input and outputs. Executes with some errors. Some testings have been completed and results are analyzed in report. Report gives some analysis with little graphic demonstration 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors. No testing result has been collected. Report missing or gives almost no analysis
	Measure **AND** ***Number of Students Assessed*** Measure students' comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies. CS4223 Algorithm Analysis's exam 2 Q3, 4, exam 3 Q1-4 are used to evaluate student's understanding of divide and conquer, recursive, greedy algorithms' running and design. We give a rank (1-4) to each student's answer to each question and the overall average will be used for measurement. 29 students are assessed in 18/19. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent E2Q3,4 Correct, E3Q1Correct, E3Q2Correct, E3Q3Correct, E3Q4Correct 3-Good E2Q3,4 correct in most steps, E3Q1Some cells of the table incorrect, E3Q2no sorting, E3Q3wrong schedule, E3Q4 not optimal tree 2-Satisfactory

	E2Q3,4 Correct in some steps, E3Q1Wrong pick in result, E3Q2Wrong pick in result, E3Q3 wrong # of machine, E3Q4not correct tree 1-Unsatisfactory E2 Q3,4 incorrect, E3Q1worng algorithm used, E3Q2wrong algorithm, E3Q3wrong algorithm, E3Q4no tree
	Measure AND Number of Students Assessed **(Required)** The student can design and implement programs using appropriate and/or specified data structures and/or algorithms. CS2813 Data Structures is a required course for every computer science major student. In the term programming project, students are asked to use proper data structure and algorithms to implement a student record database supporting different search and sorting functions. In year 18/19, 10 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct data structure and algorithm implementation. 3-Good: Completed between 75-90% of the requirements with data structure and most functionalities correctly implemented 2-Satisfactory: Completed between 60-75% of the requirements with data structure and some functionalities correctly implemented. Program compiles and runs with input and outputs. 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors
	Measure **AND** ***Number of Students Assessed*** The students can recognize the necessity of process synchronization and evaluate the solutions. CS4113 Operating System Concepts is a required course for all students major in computer science. Students are required to recognize the necessity of process synchronization in an Operating System's design and be able to evaluate the involved solutions. We are measuring students' performance in related questions (Q2, Q4 and Q5 in Exam 2) to evaluate this outcome. Each student is given a rank between 1-4. The overall average is used as measurement. In year 18/19, 18 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Achieve all four of following: Correctly identify the race condition, which lead to the need of synchronization. Correctly identify the bounded waiting status in the given solution. Demonstrate correct understanding of busy waiting and its effect on synchronization solutions. 3-Good: Achieve three of the targets listed above. 2-Satisfactory: Achieve two of the targets listed above. 1-Unsatisfactory: Achieve less than 1 of the targets listed above.
Summary of Assessment Results	• 39 students are assessed in performance analysis. 23 students ranked Excellent, 4 students ranked Good, 9 students ranked Satisfactory, and 3 student ranked Unsatisfactory. Average 3.205. Meet the ideal target. • 29 students are assessed in algorithm design. 17 students ranked Excellent, 12 students ranked Good, 0 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.51. Meet the ideal target. • 10 students are assessed in program design and implementation using appropriate data structure/algorithms. 5 students ranked Excellent, 1 students ranked Good, 3 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.0. Meet the ideal target. • 18 students are assessed in process synchronization and solution evaluation problems. 4 student ranked Excellent, 4 students ranked Good, 9 students ranked Satisfactory, and 1 students ranked Unsatisfactory. Average 2.58. Meet the acceptable target
Use of Results and Reflection	3 measurements reach ideal targets and one meet the acceptable target. The measure 4 meet acceptable target from last year's miss (2.2 in 17/18).

Goal: Graduates are aware of their ethical responsibilities as professional

Student Learning Outcome 4	An understanding of professional, ethical, legal, security and social issues and responsibilities
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the understanding of computer security fundamental, policy, and process. 4 exams in course CIS3543 are used to measure this outcome. Each student is given a rank between 1 and 4 following the rubric. The average rank among all students are used as measurement. In year 18/19, 15 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure* AND *Number of Students Assessed ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	• 15 students are assessed in their understanding of computer security fundamental, policy, and process. 11 students ranked Excellent, 3 students ranked Good, 0 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.6. Meet the ideal target.
Use of Results and Reflection	Ideal target is achieved (3 in year 17/18). Textbook and tests are different from previous years. Keep monitoring this measurement in future years to see the trend

Goal: Graduates should actively pursue lifelong learning

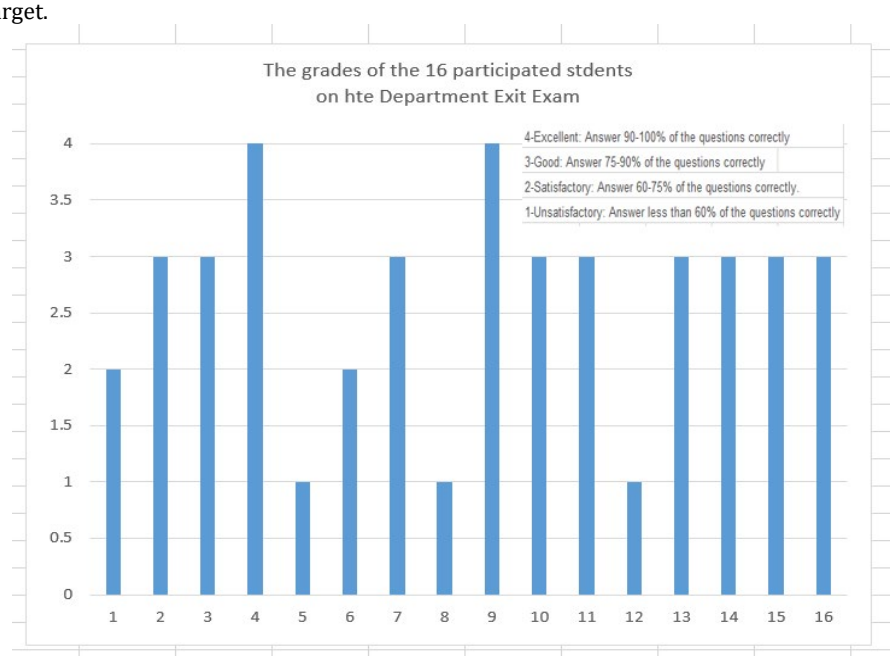
Student Learning Outcome 5	A recognition of the need for and an ability to engage in continuing professional development
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the students' ability to create professional software through real-world software development requirements. In the CS623 Advanced Web-based Application Development course, students are required to use all the knowledge learned in computer science to create some advanced web applications. Students' projects are measured using the following Rubric and e average grade is used for this measurement. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure* AND *Number of Students Assessed ***Expected Target***

	Describe rubric criteria and scales (if applicable)
Summary of Assessment Results	• 12 students are assessed in ability to create profession software. 1 student ranked Excellent, 3 students ranked Good, 7 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 2.33 Meet the Acceptable target.
Use of Results and Reflection	Ideal target 3.0 was not met this semester. For some unknown reasons this semester, three of the students had shown Doctor's note to me that they were under medical treatments of depression and/or anxiety issues so it is hard for them to fully dedicated to their school work. One student didn't complete 80% of the overall work. We will keep encouraging students to complete all their projects in the future.

Goal: Graduates should apply their computer science knowledge and skills to create solutions to problems path in industry, government or academia and have a successful, long-lived, computer science-based career.

Student Learning Outcome 6	An ability to use current techniques, skills, and tools necessary for computing practice
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' understanding and proper use of advanced Object Oriented (OO) principles. In course CS1623 Computer Science II, students are required to understand and be able to use Objective Oriented principles in software development. We are using the corresponding exam (Exam 1, 2) to measure this outcome. Students' performance in Exam 1, 2 are ranked between 1 and 4. The average ranking of students is used as measurement. In year 18/19, 20 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize and use advanced data structures. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize and use advanced data structures. Selected questions in all three exams (20 questions from Exam 1, 10 questions from Exam 2, and 15 questions from Exam 3) during the semester are used to measure this outcome. Each student's performance is graded between rank 1 and 4. The average ranking of students is used as measurement. In year 18/19, 12 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize CPU architecture and instruction sets and program with Assembly. CS3143 Computer Architectures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize CPU architecture and

	instruction sets and program with assembly. In the second exam, question 1 requires students to write a short program in assembly. Question 2 asks students to describe an instruction's behavior in CPU in RTL. Each student's answer to these 2 questions is ranked between 1 and 4. The average ranking of students is used as measurement In year 18/19, 13 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Give correct assembly code and describe the instruction correctly. 3-Good: Minor problems in the assembly code or instruction's description 2-Satisfactory: Minor problems in the assembly code and instruction's description 1-Unsatisfactory: Major problems in the assembly code or instruction's description
Summary of Assessment Results	• 20 students are assessed in their understanding and proper use of advanced object-oriented principles. 8 students ranked Excellent, 10 students ranked Good, 2 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.3. Meet the ideal target. • 12 students are assessed in their ability to recognize and use advanced data structures. 8 students ranked Excellent, 2 students ranked Good, 2 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.5. Meet the ideal target • 13 students are assessed in their ability to recognize CPU architecture and instructions sets and program with assembly. 2 students ranked Excellent, 5 students ranked Good, 4 students ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.54. Meet the acceptable target
Use of Results and Reflection	The ideal target is reached (3.13). Need improve the architecture CPU instruction set part practice (lower than last year's result 2.73).
Student Learning Outcome 7	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize the tradeoffs between different data structures and be able to select proper data structures under different circumstances. 4 questions from three exams during the semester are used to measure this outcome according to following rubric. The average ranking of all assessed students is used as measurement. In year 18/19, 12 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer all 4 questions correctly 3-Good: Answer 3 of the questions correctly 2-Satisfactory: Answer 2 of the questions correctly. 1-Unsatisfactory: Answer less than 2 of the questions correctly
	Measure* AND *Number of Students Assessed Use the departmental Exit exam to measure students' comprehension in all the major subject areas of computer science. The exit exam is one of the four required components in the CS 4981 Senior Seminar course. ***Expected Target*** A score of 70% or above is considered acceptable. A score of 85% o above is ideal and considered mastery/expert proficiency. ***Describe rubric criteria and scales (if applicable)***

	The exit exam consists of 120 questions from all the major subject areas of computer science. 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
Summary of Assessment Results	• 12 students are assessed in their comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. 2 students ranked Excellent, 4 students ranked Good, 6 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.67. Meet the acceptable target • 18 students have signed up to take the Exit exam but only 16 students actually taken the exams because the other two students didn't complete any of the work due to health reasons. Among the 16 participated students, 2 of them have scored the Excellent 90-100% of the exam, 9 of them have scored the Good 75-90% of the exam, 2 of them have scored the acceptable 60-75% of the exam and 4 students have scored in the Unsatisfactory less than 60% the exam. The overall average 74.48 met the acceptable target. 
Use of Results and Reflection	• Last year this measurement reached ideal target, the first time in 5 years. This year the measurement drops back to acceptable target similar to the results prior to last year. • The results of the exit exam were acceptable. We hope that most of the students can score 75% or higher on the exam. However, some of our courses are only taught once every two years so it is possible that a student transferred from a community college might not have the required subject background to get a high score on the exam. The average grade is 74.5 out of 120 this year which is lower than 89.5 last year and the reasons could be that many of our students were having the depression or anxiety issues which we faculty might consider to change our teaching methods (e.g., open book exams) in the future.
Student Learning Outcome 8	• An ability to apply design and development principles in the construction of software systems of varying complexity
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)**

	Measure the students' ability to apply inheritance and interface design principle in programming. In course CS1623 Computer Science II, students are required to understand and be able to use Inheritance and Polymorphism design in Objective Oriented programming using Java. Inheritance and Interface design in modern software development industry are critical to software's extendibility, usability and reliability. We are using the final programming project to measure this outcome. Student's projects are ranked between 1 and 4. The average ranking is used as measurement. In year 18/19, 19 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: The program run correctly, show proper interface and generate correct results 3-Good: Interface shown properly, cannot generate correct final result 2-Satisfactory: The interface shown properly, but cannot interact with user properly 1-Unsatisfactory: Interface not shown properly
	Measure **AND** ***Number of Students Assessed*** Measure the students' ability to evaluate advantages and disadvantages in Software Engineering process models. In course CS4423 Software Engineering, students are required to understand different software development processes, their differences, and their application to different kind of software projects. We are using the first Exam's Question 5, 6, and 7 to measure this outcome. All three questions are about software process description, comparison, and tradeoffs. In our measurement, each question is ranked based on following rubric. Each student's rank is determined by his/her average rank among the three questions. Average rank among all assessed students is used as measurement. In year 18/19, 12 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Correct answer 3-Good: Mostly correct, with minor problems 2-Satisfactory: Has problems but No major mistake 1-Unsatisfactory: Major mistakes exist or not answering the question
Summary of Assessment Results	• 19 students are assessed in their ability to apply inheritance and polymorphism design principle in programming. 12 students ranked Excellent, 0 student ranked Good, 2 students ranked Satisfactory, and 5 students ranked Unsatisfactory. Average 3. Meet the ideal target • 12 students are assessed in their ability to evaluate advantages and disadvantages in Software Engineering process models. 6 students ranked Excellent, 6 students ranked Good, 0 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.05. Meet the ideal target
Use of Results and Reflection	• Java project is a new measurement starting this year, need more data in next couple years to see the trend. • Software process measurement reach ideal target the first time since 13/14 when this measurement was adopted

COMPUTER SCIENCE PROGRAM OUTCOMES ASSESSMENT REPORT FOR 2019-2020

Dr. M. Su, Dr. L. Qian

SOUTHEASTERN OKLAHOMA STATE UNIVERSITY

EXECUTIVE PROGRAM SUMMARY

Outcomes	Measurements	# Students	Result
1	1 Comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions	0	N/A
	2 Ability of parsing tree analysis and construction	15	Acceptable
	3 Ability of converting between binary and decimal signed/unsigned integer/floating point numbers	10	Acceptable
2	1 Ability of software model analysis and construction using UML	11	Acceptable
	2 Ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms	0	N/A
3	1 Skills in performance analysis which is used to validate correctness in designs to meet given requirements	8	Ideal
	2 Comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies.	0	N/A
	3 Design and implement programs using appropriate and/or specified data structures and/or algorithms	12	Acceptable
	4 Recognition of the necessity of process synchronization and evaluate the solutions	9	Acceptable
4	1 Understanding of computer security fundamental, policy, and process	15	Ideal
5	1 Ability to create professional software through real-world software development requirements	12	Acceptable
6	1 Understanding and proper use of advanced Object Oriented (OO) principles	20	Ideal
	2 Ability to recognize and use advanced data structures	13	Ideal
	3 Recognize CPU architecture and instruction sets and program with Assembly	8	Acceptable
7	1 Comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems	13	Acceptable
	2 An ability to apply mathematical foundations, algorithmic principles, and computer science theory that demonstrates comprehension of all subjects.	18	Acceptable
8	1 Ability to apply inheritance and interface design principle in programming	17	Acceptable
	2 Ability to evaluate advantages and disadvantages in Software Engineering process models	13	Acceptable

Based on the assessment result, we plan to make the following changes to the Computer Science (CS) program in year 20/21:

- While more courses are moved to the online or hybrid delivery format due to COVID 19, we will experiment more computer science advanced course using the online delivery format and observe the measurable results to study the possibility of offering the Computer Science program as an online program.
- Due to the short-staffed situation, all faculty in the CS program have been teaching overload courses for at least the last five years. By hiring a new faculty member to teach some CS major courses, we believe that it can help us to better fulfill our teaching and advising duties for the program.
- Machine learning's market, especially deep learning, is growing significantly since 2014. Machine learning requires the applications of linear algebra, probability theory and information theory on to the computer science discipline, which makes it a good vehicle to enhance CS program's outcome 1. Once the faculty's teaching loads are reduced to a reasonable level, an introductory course for machine learning needs be added to our curriculum and assessment.

PROGRAM OUTCOMES ASSESSMENT REPORT TEMPLATE	
Department: Chemistry, Computer and Physical Sciences	
Degree Program: Computer Science	
Report Submitted By:	**Date of Submission:**
Program Mission Statement: The Computer Science program in the Department of Chemistry, Computer, and Physical Sciences aims to prepare its majors to obtain the knowledge and skills to succeed in the technological workplace of the 21st century. The CS program strives to build problem solving skills, to provide a firm grasp of the principals of ethical behavior and professional integrity, and to encourage a determination to engage in life-long learning in the theory and applications of computing.	
Goal: Graduates will have the necessary technical knowledge and education to pursue a professional development successfully or a graduate program successfully	
Student Learning Outcome 1	An ability to apply knowledge of computing and mathematics appropriate to the discipline
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions. CS4223 Algorithm Analysis's exam 1 Q1-4 are used to evaluate student's understanding of algorithm's growth rate evaluation and comparison. In these questions, students apply their math knowledge to computer science algorithm analysis. Students' answers are evaluated in scale 1-4 0 students are assessed in 19/20. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Q1 one or less item out of order Q2 correct big-oh for both loops Q3 correct big-oh for all expressions Q4 Correctly answer both questions with correct reason refer to big-oh 3-Good: Q1 two items out of order Q2 correct big-oh for one loop Q3 correct big-oh for three expressions Q4 Correctly answer for both questions without correct reason refer to big-oh 2-Satisfactory: Q1 three items out of order Q2 incorrect big-oh for both loops with correct estimation for individual outer and inner loops Q3 correct big-oh for two expressions Q4 Correctly answer one question but fail to identify the case when slow algorithm could be useful 1-Unsatisfactory: Q1 four or more items out of order Q2 incorrect big-oh for both loops and fail to identify the outer and inner loop's counting Q3 correct big-oh for one or less expression Q4 Fail to answer both questions correctly
	Measure* AND *Number of Students Assessed Measure students' ability of parsing tree analysis and construction. Students in computer science major are required to take CS4323 Programming Language class. We use the first test to evaluate

	students' ability to use context free grammar to analyze and build parsing trees for given expressions and code blocks. Students are assessed in scale 1-4. In year 19/20, 15 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 trees are built correctly 3-Good: 4 trees are built correctly 2-Satisfactory: 2-3 trees are built correctly 1-Unsatisfactory: Less than one tree built correctly
	Measure* AND *Number of Students Assessed Measure students' ability of converting between binary and decimal signed/unsigned integer/floating point numbers. CS3143 Computer Architectures is a required course for all Computer Science major students. Students are required to understand and be able to convert between signed/unsigned/integer/floating binary and decimal numbers. We are using the corresponding exam (Exam 1, Q1, 2, 3, 6, 8) to measure this outcome. In year 19/20, 10 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 questions are correct 3-Good: 1 question has problem 2-Satisfactory: 2 questions have problem 1-Unsatisfactory: more than 2 questions have problem
Summary of Assessment Results	• 15 students' ability of parsing tree analysis and construction are assessed. 4 students ranked Excellent, 4 students ranked Good, 5 students ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.67. Meet the acceptable target • 10 students are assessed in number conversion between binary and decimal signed/unsigned integer/floating point numbers. 5 students ranked Excellent, 1 student ranked Good, 1 student ranked Satisfactory, and 3 students ranked Unsatisfactory. Average 2.8. Meet the acceptable target
Use of Results and Reflection	The average across all measurements is 2.722 reach Acceptable target and improve from 17/18 year's 2.566. A different measurement was used in 18/19 (Algorithm analysis class instead of Programming languages class). Students are doing better in big Oh analysis than parsing tree construction. Programming language measure is improved from unacceptable to acceptable compared to 17/18. But still need more improvement to catch up with Algorithm analysis measure (which is ideal). Computer Architecture measurement is also improved from 2.47 to 2.8, which is close to record high. Hopefully can reach ideal targe in near future.
Student Learning Outcome 2	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' ability of software model analysis and construction using UML. CS4423 Software Engineering's exam 2's Q5 and Q7 ask students to use UML notation to analyze and construct an activity diagram and a sequence diagram for given software requirements. Each diagram is graded using scale 1-4. In year 19/20, 11 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Diagram is correctly constructed 3-There are some minor problems in constructed diagram 2-Diagram has significant problem 1-Construct a diagram of wrong
	Measure* AND *Number of Students Assessed Measure students' ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms. All computer science major students are required to take CS 4223 algorithm analysis. In the second test of the course, students are asked to design 2 algorithms to solve one vote counting problem and one min/max search problem. The algorithms designed need to reach certain performance requirements. In the

	third test students are asked to demonstrate the understanding of the limit of Dijkstra's algorithm. Each algorithm design is graded using scale 1-4 0 students are assessed in 19/20. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Algorithm correct and meet requirement, give correct analysis 3-Algorithm correct and meet requirement 2-Algorithm correct but not meet requirement 1-Algorithm incorrect or not given
Summary of Assessment Results	• 11 students are assessed in software model analysis and construction. 3 students ranked Excellent, 4 students ranked Good, 4 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.73. Meet acceptable target
Use of Results and Reflection	Acceptable target is achieved but not the ideal target. The measured measurement is a little bit further from ideal target (from 2.92 to 2.73). Need keep monitoring these measurements in future years for assessment.
Student Learning Outcome 3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure students' skills in performance analysis which is used to validate correctness in designs to meet given requirements. Students in Computer Science Major are required to take CS4223 Algorithm Analysis, and CS4113 Operating Systems. We use two projects in these two courses to evaluation our students' capability of algorithm analysis. In both projects, students need implement different algorithms, gather experiment results and analyze the results in a report. Each project is graded using scale 1-4 In year 19/20, 8 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct input and outputs. Executes without errors. Thorough and organized testing have been completed and results are analyzed in report. 3-Good: Completed between 75-90% of the requirements with correct input and outputs. 2-Satisfactory: Completed between 60-75% of the requirements with correct input and outputs. Executes with some errors. Some testings have been completed and results are analyzed in report. Report gives some analysis with little graphic demonstration 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors. No testing result has been collected. Report missing or gives almost no analysis
	Measure **AND** ***Number of Students Assessed*** Measure students' comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies. CS4223 Algorithm Analysis's exam 2 Q3, 4, exam 3 Q1-4 are used to evaluate student's understanding of divide and conquer, recursive, greedy algorithms' running and design. We give a rank (1-4) to each student's answer to each question and the overall average will be used for measurement. 0 students are assessed in 19/20. CS4223 is offered in even year's Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent E2Q3,4 Correct, E3Q1Correct, E3Q2Correct, E3Q3Correct, E3Q4Correct 3-Good E2Q3,4 correct in most steps, E3Q1Some cells of the table incorrect, E3Q2no sorting, E3Q3wrong schedule, E3Q4 not optimal tree 2-Satisfactory E2Q3,4 Correct in some steps, E3Q1Wrong pick in result, E3Q2Wrong pick in result, E3Q3 wrong # of machine, E3Q4not correct tree

	1-Unsatisfactory E2 Q3,4 incorrect, E3Q1worng algorithm used, E3Q2wrong algorithm, E3Q3wrong algorithm, E3Q4no tree
	Measure AND Number of Students Assessed **(Required)** The student can design and implement programs using appropriate and/or specified data structures and/or algorithms. CS2813 Data Structures is a required course for every computer science major student. In the term programming project, students are asked to use proper data structure and algorithms to implement a student record database supporting different search and sorting functions. In year 19/20, 12 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct data structure and algorithm implementation. 3-Good: Completed between 75-90% of the requirements with data structure and most functionalities correctly implemented 2-Satisfactory: Completed between 60-75% of the requirements with data structure and some functionalities correctly implemented. Program compiles and runs with input and outputs. 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors
	Measure **AND** ***Number of Students Assessed*** The students can recognize the necessity of process synchronization and evaluate the solutions. CS4113 Operating System Concepts is a required course for all students major in computer science. Students are required to recognize the necessity of process synchronization in an Operating System's design and be able to evaluate the involved solutions. We are measuring students' performance in related questions (Q2, Q4 and Q5 in Exam 2) to evaluate this outcome. Each student is given a rank between 1-4. The overall average is used as measurement. In year 19/20, 9 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Achieve all four of following: Correctly identify the race condition, which lead to the need of synchronization. Correctly identify the bounded waiting status in the given solution. Demonstrate correct understanding of busy waiting and its effect on synchronization solutions. 3-Good: Achieve three of the targets listed above. 2-Satisfactory: Achieve two of the targets listed above. 1-Unsatisfactory: Achieve less than 1 of the targets listed above.
Summary of Assessment Results	• 8 students are assessed in performance analysis. 3 students ranked Excellent, 3 students ranked Good, 4 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.125. Meet the ideal target. • 12 students are assessed in program design and implementation using appropriate data structure/algorithms. 4 students ranked Excellent, 5 students ranked Good, 1 student ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.19. Meet the acceptable target. • 9 students are assessed in process synchronization and solution evaluation problems. 1 student ranked Excellent, 2 students ranked Good, 6 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.44. Miss the acceptable target
Use of Results and Reflection	Among 3 measurements, one reach ideal target, one reaches acceptable target, one misses acceptable target. The measure 4 misses acceptable target, but is still pretty close to the target and better than previous years when the targe was missed.

Goal: Graduates are aware of their ethical responsibilities as professional

Student Learning Outcome 4	An understanding of professional, ethical, legal, security and social issues and responsibilities
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the understanding of computer security fundamental, policy, and process. 4 exams in course CIS3543 are used to measure this outcome. Each student is given a rank between 1 and 4 following the rubric. The average rank among all students are used as measurement. In year 19/20, 15 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure* AND *Number of Students Assessed ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	• 15 students are assessed in their understanding of computer security fundamental, policy, and process. 11 students ranked Excellent, 3 students ranked Good, 1 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.67. Meet the ideal target.
Use of Results and Reflection	Ideal target is achieved (3.6 in year 18/19). This is the second year after the adoption of a new Textbook and new tests. The result is pretty stable compare to last year (3.6 to 3.67)

Goal: Graduates should actively pursue lifelong learning

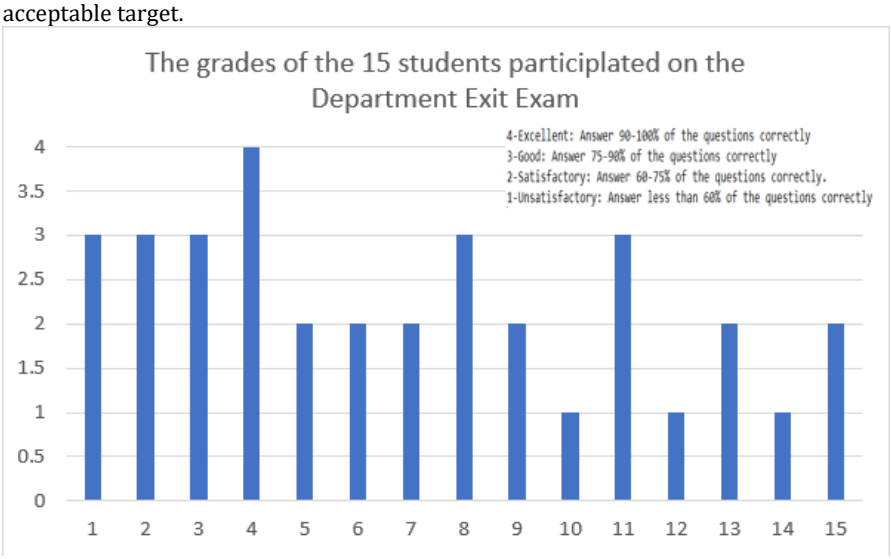
Student Learning Outcome 5	A recognition of the need for and an ability to engage in continuing professional development
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the students' ability to create professional software through real-world software development requirements. In the CS623 Advanced Web-based Application Development course, students are required to use all the knowledge learned in computer science to create some advanced web applications. Students' projects are measured using the following Rubric and e average grade is used for this measurement. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure* AND *Number of Students Assessed ***Expected Target***

	Describe rubric criteria and scales (if applicable)
Summary of Assessment Results	• 16 students are assessed in ability to create profession software. 3 students ranked Excellent, 6 students ranked Good, 3 students ranked Satisfactory, and 4 students ranked Unsatisfactory. Average 2.50 Meet the Acceptable target.
Use of Results and Reflection	Ideal target 3.0 was not met this semester. Due to Covid-19, four of the students ranked Unsatisfactory stopped turning in homework and/or taking the final exam once the Covid-19 started. It seems that some students don't do well once they lost the interaction with the instructor. We will keep encouraging students to complete all their projects if this course has to switch from in-class to online in the future due to special reasons (e.g., Covid-19).

Goal: Graduates should apply their computer science knowledge and skills to create solutions to problems path in industry, government or academia and have a successful, long-lived, computer science-based career.

Student Learning Outcome 6	An ability to use current techniques, skills, and tools necessary for computing practice
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' understanding and proper use of advanced Object Oriented (OO) principles. In course CS1623 Computer Science II, students are required to understand and be able to use Objective Oriented principles in software development. We are using the corresponding exam (Exam 1, 2) to measure this outcome. Students' performance in Exam 1, 2 are ranked between 1 and 4. The average ranking of students is used as measurement. In year 19/20, 20 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize and use advanced data structures. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize and use advanced data structures. Selected questions in all three exams (20 questions from Exam 1, 10 questions from Exam 2, and 15 questions from Exam 3) during the semester are used to measure this outcome. Each student's performance is graded between rank 1 and 4. The average ranking of students is used as measurement. In year 19/20, 13 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize CPU architecture and instruction sets and program with Assembly. CS3143 Computer Architectures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize CPU architecture and

	instruction sets and program with assembly. In the second exam, question 1 requires students to write a short program in assembly. Question 2 asks students to describe an instruction's behavior in CPU in RTL. Each student's answer to these 2 questions is ranked between 1 and 4. The average ranking of students is used as measurement In year 19/20, 8 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Give correct assembly code and describe the instruction correctly. 3-Good: Minor problems in the assembly code or instruction's description 2-Satisfactory: Minor problems in the assembly code and instruction's description 1-Unsatisfactory: Major problems in the assembly code or instruction's description
Summary of Assessment Results	• 20 students are assessed in their understanding and proper use of advanced object-oriented principles. 12 students ranked Excellent, 6 students ranked Good, 2 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.5. Meet the ideal target. • 13 students are assessed in their ability to recognize and use advanced data structures. 7 students ranked Excellent, 5 students ranked Good, 1 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.46. Meet the ideal target • 8 students are assessed in their ability to recognize CPU architecture and instructions sets and program with assembly. 3 students ranked Excellent, 3 students ranked Good, 0 student ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.875. Meet the acceptable target
Use of Results and Reflection	The ideal target is reached (3.365). Architecture CPU instruction set part (Measurement 3) hit a 7 year high (2.875) and getting closer to ideal target.
Student Learning Outcome 7	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize the tradeoffs between different data structures and be able to select proper data structures under different circumstances. 4 questions from three exams during the semester are used to measure this outcome according to following rubric. The average ranking of all assessed students is used as measurement. In year 19/20, 13 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer all 4 questions correctly 3-Good: Answer 3 of the questions correctly 2-Satisfactory: Answer 2 of the questions correctly. 1-Unsatisfactory: Answer less than 2 of the questions correctly
	Measure* AND *Number of Students Assessed Use the departmental Exit exam to measure students' comprehension in all the major subject areas of computer science. The exit exam is one of the four required components in the CS 4981 Senior Seminar course. ***Expected Target*** A score of 70% or above is considered acceptable. A score of 85% o above is ideal and considered mastery/expert proficiency. ***Describe rubric criteria and scales (if applicable)***

	The exit exam consists of 120 questions from all the major subject areas of computer science. 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
Summary of Assessment Results	• 13 students are assessed in their comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. 4 students ranked Excellent, 3 students ranked Good, 4 students ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.69. Meet the acceptable target • 18 students have signed up to take the Exit exam but only 15 students actually taken the exams because the other three students didn't complete any of the work due to unknown reasons. Among the 14 participated students, 1 student has scored the Excellent 90-100% of the exam, 5 of them have scored the Good 75-90% of the exam, 6 of them have scored the acceptable 60-75% of the exam and 3 students have scored in the Unsatisfactory less than 60% the exam. The overall average 71.06% met the acceptable target. 
Use of Results and Reflection	• This year the measurement improves a little bit compared to last year (2.67 ->2.69). Still it is lower than ideal target (which was reached in 17/18) • The results of the exit exam were acceptable. We hope that most of the students can score 75% or higher on the exam. However, some of our courses are only taught once every two years so it is possible that a student transferred from a community college might not have the required subject background to get a higher score on the exam. The average grade of the Exit Exam is 71.06 out of 120 this year which is lower than 74.5 last year and the reasons could be that all the students lost the opportunity to interact with their professors which might cause them to lose the focus on school work. We just hope that this pandemic issue can be resolved soon so students can re-focus on their study in the future.
Student Learning Outcome 8	• An ability to apply design and development principles in the construction of software systems of varying complexity
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' ability to apply inheritance and interface design principle in programming. In course CS1623 Computer Science II, students are required to understand and be able to use Inheritance and Polymorphism design in Objective Oriented programming using Java. Inheritance

	and Interface design in modern software development industry are critical to software's extendibility, usability and reliability. We are using the final programming project to measure this outcome. Student's projects are ranked between 1 and 4. The average ranking is used as measurement. In year 19/20, 17 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: The program run correctly, show proper interface and generate correct results 3-Good: Interface shown properly, cannot generate correct final result 2-Satisfactory: The interface shown properly, but cannot interact with user properly 1-Unsatisfactory: Interface not shown properly
	Measure **AND** ***Number of Students Assessed*** Measure the students' ability to evaluate advantages and disadvantages in Software Engineering process models. In course CS4423 Software Engineering, students are required to understand different software development processes, their differences, and their application to different kind of software projects. We are using the first Exam's Question 5, 6, and 7 to measure this outcome. All three questions are about software process description, comparison, and tradeoffs. In our measurement, each question is ranked based on following rubric. Each student's rank is determined by his/her average rank among the three questions. Average rank among all assessed students is used as measurement. In year 19/20, 13 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Correct answer 3-Good: Mostly correct, with minor problems 2-Satisfactory: Has problems but No major mistake 1-Unsatisfactory: Major mistakes exist or not answering the question
Summary of Assessment Results	• 17 students are assessed in their ability to apply inheritance and polymorphism design principle in programming. 8 students ranked Excellent, 3 students ranked Good, 3 students ranked Satisfactory, and 3 students ranked Unsatisfactory. Average 2.94. Meet the acceptable target • 13 students are assessed in their ability to evaluate advantages and disadvantages in Software Engineering process models. 3 students ranked Excellent, 9 students ranked Good, 1 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.897. Meet the acceptable target
Use of Results and Reflection	• This is the second year Java project used in Measurement 1. The result dropped a little from 3.0 to 2.94. • Software process measurement dropped a little bit and missed ideal target

COMPUTER SCIENCE PROGRAM OUTCOMES ASSESSMENT REPORT FOR 2020-2021

Dr. M. Su, Dr. L. Qian

SOUTHEASTERN OKLAHOMA STATE UNIVERSITY

EXECUTIVE PROGRAM SUMMARY

Outcomes	Measurements	# Students	Result
1	1 Comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions	18	Ideal
	2 Ability of parsing tree analysis and construction	0	N/A
	3 Ability of converting between binary and decimal signed/unsigned integer/floating point numbers	13	Acceptable
2	1 Ability of software model analysis and construction using UML	11	Ideal
	2 Ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms	17	Acceptable
3	1 Skills in performance analysis which is used to validate correctness in designs to meet given requirements	23	Ideal
	2 Comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies.	17	Ideal
	3 Design and implement programs using appropriate and/or specified data structures and/or algorithms	13	Acceptable
	4 Recognition of the necessity of process synchronization and evaluate the solutions	14	Acceptable
4	1 Understanding of computer security fundamental, policy, and process	16	Acceptable
5	1 Ability to create professional software through real-world software development requirements	12	Close to Acceptable
6	1 Understanding and proper use of advanced Object Oriented (OO) principles	14	Ideal
	2 Ability to recognize and use advanced data structures	16	Ideal
	3 Recognize CPU architecture and instruction sets and program with Assembly	13	Acceptable
7	1 Comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems	16	Ideal
	2 An ability to apply mathematical foundations, algorithmic principles, and computer science theory that demonstrates comprehension of all subjects.	18	Acceptable
8	1 Ability to apply inheritance and interface design principle in programming	12	Acceptable
	2 Ability to evaluate advantages and disadvantages in Software Engineering process models	11	Ideal

Based on the assessment result, we plan to make the following changes to the Computer Science (CS) program in year 21/22:

- Some measurements' performance moved from Acceptable to ideal (Outcomes: 2.1, 7.1, 8.2). Courses involved in these measurements were offered in the traditional face-to-face format before pandemic. Since the Pandemic, theses courses are also delivered in ZOOM (with live zoom broadcast and class lecture video recording). These new resources provided students with more opportunity to join the class meeting and review lecture recording, which could lead to performance improvement. We may continue the ZOOM broadcast and lecture recording practice even after the pandemic.
- We are considering adding Standard Field Test into our program assessment, which will allow data comparison to other institutes in US. ETS's Computer Science major field test is in our consideration. We can adopt it into Computer Science's Senior Seminar course.
- Learning outcome 4's measure needs to be adjusted because of the new textbook's focus shift from process management to security technology.

PROGRAM OUTCOMES ASSESSMENT REPORT TEMPLATE	
Department: Chemistry, Computer and Physical Sciences	
Degree Program: Computer Science	
Report Submitted By: Dr. M. Su, Dr. L. Qian	**Date of Submission: 9/15/2021**
Program Mission Statement: The Computer Science program in the Department of Chemistry, Computer, and Physical Sciences aims to prepare its majors to obtain the knowledge and skills to succeed in the technological workplace of the 21st century. The Computer Science program strives to build problem solving skills, to provide a firm grasp of the principals of ethical behavior and professional integrity, and to encourage a determination to engage in life-long learning in the theory and applications of computing.	
Goal: Graduates will have the necessary technical knowledge and education to pursue a professional development successfully or a graduate program successfully	
Student Learning Outcome 1	An ability to apply knowledge of computing and mathematics appropriate to the discipline
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' comprehension of big Oh, big theta, and big Omega notations in algorithm analysis, and being able to establish relative order among functions. CS4223 Algorithm Analysis's exam 1 Q1-4 are used to evaluate student's understanding of algorithm's growth rate evaluation and comparison. In these questions, students apply their math knowledge to computer science algorithm analysis. Students' answers are evaluated in scale 1-4 18 students are assessed in 20/21. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Q1 one or less item out of order Q2 correct big-oh for both loops Q3 correct big-oh for all expressions Q4 Correctly answer both questions with correct reason refer to big-oh 3-Good: Q1 two items out of order Q2 correct big-oh for one loop Q3 correct big-oh for three expressions Q4 Correctly answer for both questions without correct reason refer to big-oh 2-Satisfactory: Q1 three items out of order Q2 incorrect big-oh for both loops with correct estimation for individual outer and inner loops Q3 correct big-oh for two expressions Q4 Correctly answer one question but fail to identify the case when slow algorithm could be useful 1-Unsatisfactory: Q1 four or more items out of order Q2 incorrect big-oh for both loops and fail to identify the outer and inner loop's counting Q3 correct big-oh for one or less expression Q4 Fail to answer both questions correctly
	Measure* AND *Number of Students Assessed Measure students' ability of parsing tree analysis and construction. Students in computer science major are required to take CS4323 Programming Language class. We use the first test to evaluate

	students' ability to use context free grammar to analyze and build parsing trees for given expressions and code blocks. Students are assessed in scale 1-4. In year 20/21, 0 students are assessed. CS4323 is offered in even year Fall semester ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 trees are built correctly 3-Good: 4 trees are built correctly 2-Satisfactory: 2-3 trees are built correctly 1-Unsatisfactory: Less than one tree built correctly
	Measure* AND *Number of Students Assessed Measure students' ability of converting between binary and decimal signed/unsigned integer/floating point numbers. CS3143 Computer Architectures is a required course for all Computer Science major students. Students are required to understand and be able to convert between signed/unsigned/integer/floating binary and decimal numbers. We use the corresponding exam (Exam 1, Q1, 2, 3, 6, 8) to measure this outcome. In year 20/21, 13 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: All 5 questions are correct 3-Good: 1 question has problem 2-Satisfactory: 2 questions have problem 1-Unsatisfactory: more than 2 questions have problem
Summary of Assessment Results	• 18 students' understanding of algorithm's growth rate evaluation and comparison are assessed. 12 students ranked Excellent, 5 students ranked Good, 1 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.47. Meet the ideal target • 13 students are assessed in number conversion between binary and decimal signed/unsigned integer/floating point numbers. 3 students ranked Excellent, 5 students ranked Good, 4 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 2.77. Meet the acceptable target
Use of Results and Reflection	The average across all measurements is 3.176 reach Ideal target and improve from 18/19 year's 3.04. A different measurement was used in 19/20 (Programming languages class instead of Algorithm analysis class). Students are doing better in big Oh analysis than parsing tree construction. Computer Architecture measurement is stable around 2.8, which is close to record high. Hopefully can reach ideal targe in near future.
Student Learning Outcome 2	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' ability of software model analysis and construction using UML. CS4423 Software Engineering's exam 2's Q5 and Q7 ask students to use UML notation to analyze and construct an activity diagram and a sequence diagram for given software requirements. Each diagram is graded using scale 1-4. In year 20/21, 11 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Diagram is correctly constructed 3-There are some minor problems in constructed diagram 2-Diagram has significant problem 1-Construct a diagram of wrong
	Measure* AND *Number of Students Assessed Measure students' ability of computing problem analysis and computing requirement identification through designing/analyzing efficient algorithms. All computer science major students are required to take CS 4223 algorithm analysis. In the second test of the course, students are asked to design 2 algorithms to solve one vote counting problem and one min/max search problem. The algorithms designed need to reach certain performance requirements. In the third test students are asked to demonstrate the understanding of the limit of Dijkstra's algorithm. Each algorithm design is graded using scale 1-4 17 students are assessed in 20/21.

	Expected Target Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Algorithm correct and meet requirement, give correct analysis 3-Algorithm correct and meet requirement 2-Algorithm correct but not meet requirement 1-Algorithm incorrect or not given
Summary of Assessment Results	• 11 students are assessed in software model analysis and construction. 3 students ranked Excellent, 5 students ranked Good, 3 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.14. Meet ideal target • 17 students are assessed in algorithm design and analysis. 5 students ranked Excellent, 8 students ranked Good, 2 students ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 2.94. Meet acceptable target
Use of Results and Reflection	This is the first time measurement 1 (ability of software model analysis and construction using UML) reaches Ideal. Algorithm design measurement is getting closer to ideal (from 2.55 to 2.94)
Student Learning Outcome 3	An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' skills in performance analysis which is used to validate correctness in designs to meet given requirements. Students in Computer Science Major are required to take CS4223 Algorithm Analysis, and CS4113 Operating Systems. We use two projects in these two courses to evaluation our students' capability of algorithm analysis. In both projects, students need implement different algorithms, gather experiment results and analyze the results in a report. Each project is graded using scale 1-4 In year 20/21, 23 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct input and outputs. Executes without errors. Thorough and organized testing have been completed and results are analyzed in report. 3-Good: Completed between 75-90% of the requirements with correct input and outputs. 2-Satisfactory: Completed between 60-75% of the requirements with correct input and outputs. Executes with some errors. Some testings have been completed and results are analyzed in report. Report gives some analysis with little graphic demonstration 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors. No testing result has been collected. Report missing or gives almost no analysis
	Measure* AND *Number of Students Assessed Measure students' comprehension and mastery of algorithm design techniques including recursive, divide and conquer, greedy, and dynamic programming strategies. CS4223 Algorithm Analysis's exam 2 Q3, 4, exam 3 Q1-4 are used to evaluate student's understanding of divide and conquer, recursive, greedy algorithms' running and design. We give a rank (1-4) to each student's answer to each question and the overall average will be used for measurement. 17 students are assessed in 20/21. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent E2Q3,4 Correct, E3Q1Correct, E3Q2Correct, E3Q3Correct, E3Q4Correct 3-Good E2Q3,4 correct in most steps, E3Q1Some cells of the table incorrect, E3Q2no sorting, E3Q3wrong schedule, E3Q4 not optimal tree 2-Satisfactory E2Q3,4 Correct in some steps, E3Q1Wrong pick in result, E3Q2Wrong pick in result, E3Q3 wrong # of machine, E3Q4not correct tree 1-Unsatisfactory

	E2 Q3,4 incorrect, E3Q1worng algorithm used, E3Q2wrong algorithm, E3Q3wrong algorithm, E3Q4no tree
	Measure AND Number of Students Assessed* (Required)** The student can design and implement programs using appropriate and/or specified data structures and/or algorithms. CS2813 Data Structures is a required course for every computer science major student. In the term programming project, students are asked to use proper data structure and algorithms to implement a student record database supporting different search and sorting functions. In year 20/21, 13 students are assessed ***Expected Target Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Completed between 90-100% of the requirements with correct data structure and algorithm implementation. 3-Good: Completed between 75-90% of the requirements with data structure and most functionalities correctly implemented 2-Satisfactory: Completed between 60-75% of the requirements with data structure and some functionalities correctly implemented. Program compiles and runs with input and outputs. 1-Unsatisfactory: Completed less than 60% of the requirements. Does not execute due to errors
	Measure* AND *Number of Students Assessed The students can recognize the necessity of process synchronization and evaluate the solutions. CS4113 Operating System Concepts is a required course for all students major in computer science. Students are required to recognize the necessity of process synchronization in an Operating System's design and be able to evaluate the involved solutions. We are measuring students' performance in related questions (Q2, Q4 and Q5 in Exam 2) to evaluate this outcome. Each student is given a rank between 1-4. The overall average is used as measurement. In year 20/21, 14 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Achieve all four of following: Correctly identify the race condition, which lead to the need of synchronization. Correctly identify the bounded waiting status in the given solution. Demonstrate correct understanding of busy waiting and its effect on synchronization solutions. 3-Good: Achieve three of the targets listed above. 2-Satisfactory: Achieve two of the targets listed above. 1-Unsatisfactory: Achieve less than 1 of the targets listed above.
Summary of Assessment Results	• 23 students are assessed in performance analysis. 14 students ranked Excellent, 6 students ranked Good, 1 student ranked Satisfactory, and 2 students ranked Unsatisfactory. Average 3.39. Meet the ideal target. • 17 students are assessed in algorithm design. 10 students ranked Excellent, 6 students ranked Good, 1 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.52. Meet the ideal target. • 13 students are assessed in program design and implementation using appropriate data structure/algorithms. 4 students ranked Excellent, 3 students ranked Good, 6 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.85. Meet the acceptable target. • 14 students are assessed in process synchronization and solution evaluation problems. 2 students ranked Excellent, 7 students ranked Good, 5 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.79. Meet the acceptable target
Use of Results and Reflection	Among 4 measurements, 2 reach ideal target, 2 reach acceptable target. The measure 4 missed acceptable target in previous year assessment and improved to acceptable.

Goal: Graduates are aware of their ethical responsibilities as professional	
Student Learning Outcome 4	An understanding of professional, ethical, legal, security and social issues and responsibilities
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the understanding of computer security fundamental, policy, and process. 4 exams in course CIS3543 are used to measure this outcome. Each student is given a rank between 1 and 4 following the rubric. The average rank among all students are used as measurement. In year 20/21, 16 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure* AND *Number of Students Assessed ***Expected Target*** ***Describe rubric criteria and scales (if applicable)***
Summary of Assessment Results	• 16 students are assessed in their understanding of computer security fundamental, policy, and process. 3 students ranked Excellent, 8 students ranked Good, 5 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 2.875. Meet the Acceptable target.
Use of Results and Reflection	This measure reached ideal target in previous years. A new textbook was adopted this time. More focus is moved on the computer security technology from process and policy. This measurement needs to be adjusted to only focus on the test involving policy, process and ethic.

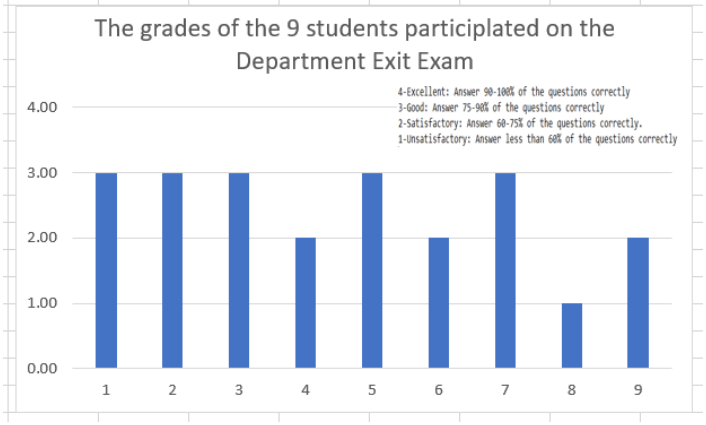
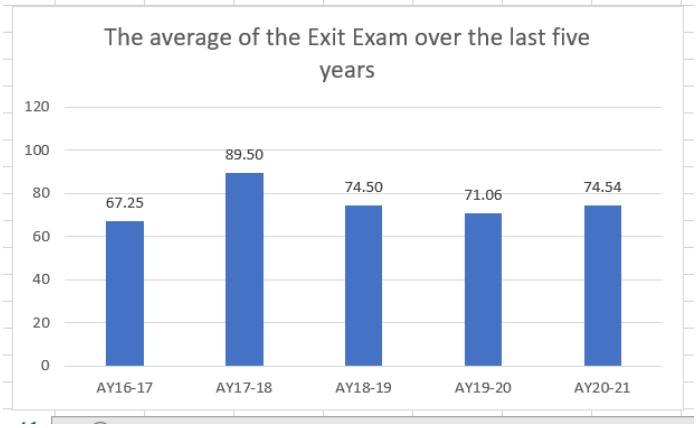
Goal: Graduates should actively pursue lifelong learning	
Student Learning Outcome 5	A recognition of the need for and an ability to engage in continuing professional development
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure the students' ability to create professional software through real-world software development requirements. In the CS4623 Advanced Web-based Application Development course, students are required to use all the knowledge learned in computer science to create some advanced web applications. Students' projects are measured using the following Rubric and e average grade is used for this measurement. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions/exercises correctly 3-Good: Student answer 75%-90% questions/exercises correctly 2-Satisfactory: Student answer 60%-75% questions/exercises correctly 1-Unsatisfactory: Student answer less than 60% questions/exercises correctly
	Measure* AND *Number of Students Assessed ***Expected Target***

	Describe rubric criteria and scales (if applicable)
Summary of Assessment Results	• 14 students have enrolled but 2 students have never submitted any homework or exams. So we only use 12 students to assess their abilities to create profession software. 3 students ranked Excellent, 2 students ranked Good, 4 students ranked Satisfactory, and 3 students ranked Unsatisfactory. Average 2.42: Close to meet the Acceptable target (2.50).
Use of Results and Reflection	Ideal target 3.0 was not met this semester. Due to Covid-19 and the Winter storm effect, three of the students ranked Unsatisfactory stopped turning in homework. For some unknown reasons, it seems that some students stopped participating in class after the Winter storm. We will keep encouraging students to participate in class and complete all their projects in the future.

Goal: Graduates should apply their computer science knowledge and skills to create solutions to problems path in industry, government or academia and have a successful, long-lived, computer science-based career.

Student Learning Outcome 6	An ability to use current techniques, skills, and tools necessary for computing practice
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' understanding and proper use of advanced Object Oriented (OO) principles. In course CS1623 Computer Science II, students are required to understand and be able to use Objective Oriented principles in software development. We are using the corresponding exam (Exam 1, 2) to measure this outcome. Students' performance in Exam 1, 2 are ranked between 1 and 4. The average ranking of students is used as measurement. In year 20/21, 14 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Student answer 90%+ questions correctly 3-Good: Student answer 75%-90% questions correctly 2-Satisfactory: Student answer 60%-75% questions correctly 1-Unsatisfactory: Student answer less than 60% questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize and use advanced data structures. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize and use advanced data structures. Selected questions in all three exams (20 questions from Exam 1, 10 questions from Exam 2, and 15 questions from Exam 3) during the semester are used to measure this outcome. Each student's performance is graded between rank 1 and 4. The average ranking of students is used as measurement. In year 20/21, 16 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
	Measure **AND** ***Number of Students Assessed*** Measure students' ability to recognize CPU architecture and instruction sets and program with Assembly. CS3143 Computer Architectures is a required course for every computer science major

	student. Students are required to demonstrate the ability to recognize CPU architecture and instruction sets and program with assembly. In the second exam, question 1 requires students to write a short program in assembly. Question 2 asks students to describe an instruction's behavior in CPU in RTL. Each student's answer to these 2 questions is ranked between 1 and 4. The average ranking of students is used as measurement In year 20/21, 13 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Give correct assembly code and describe the instruction correctly. 3-Good: Minor problems in the assembly code or instruction's description 2-Satisfactory: Minor problems in the assembly code and instruction's description 1-Unsatisfactory: Major problems in the assembly code or instruction's description
Summary of Assessment Results	• 14 students are assessed in their understanding and proper use of advanced object-oriented principles. 8 students ranked Excellent, 3 students ranked Good, 2 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.29. Meet the ideal target. • 16 students are assessed in their ability to recognize and use advanced data structures. 8 students ranked Excellent, 7 students ranked Good, 1 student ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.43. Meet the ideal target • 13 students are assessed in their ability to recognize CPU architecture and instructions sets and program with assembly. 3 students ranked Excellent, 5 students ranked Good, 1 student ranked Satisfactory, and 4 students ranked Unsatisfactory. Average 2.54. Meet the acceptable target
Use of Results and Reflection	The ideal target is reached (3.115), which is a littler lower than last year (3.365). Architecture CPU instruction set part (Measurement 3) is getting further away from ideal from last year's performance.
Student Learning Outcome 7	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs
Method(s) of Assessment	***Measure AND Number of Students Assessed* (Required)** Measure students' comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. CS2813 Data Structures is a required course for every computer science major student. Students are required to demonstrate the ability to recognize the tradeoffs between different data structures and be able to select proper data structures under different circumstances. 4 questions from three exams during the semester are used to measure this outcome according to following rubric. The average ranking of all assessed students is used as measurement. In year 20/21, 16 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Answer all 4 questions correctly 3-Good: Answer 3 of the questions correctly 2-Satisfactory: Answer 2 of the questions correctly. 1-Unsatisfactory: Answer less than 2 of the questions correctly
	Measure* AND *Number of Students Assessed Use the departmental Exit exam to measure students' comprehension in all the major subject areas of computer science. The exit exam is one of the four required components in the CS 4981 Senior Seminar course. ***Expected Target*** A score of 70% or above is considered acceptable. A score of 85% o above is ideal and considered mastery/expert proficiency.

	Describe rubric criteria and scales (if applicable) The exit exam consists of 120 questions from all the major subject areas of computer science. 4-Excellent: Answer 90-100% of the questions correctly 3-Good: Answer 75-90% of the questions correctly 2-Satisfactory: Answer 60-75% of the questions correctly. 1-Unsatisfactory: Answer less than 60% of the questions correctly
Summary of Assessment Results	• 16 students are assessed in their comprehension of the tradeoffs for algorithms employing different data structures and/or design strategies for given problems. 8 students ranked Excellent, 3 students ranked Good, 4 students ranked Satisfactory, and 1 student ranked Unsatisfactory. Average 3.125. Meet the Ideal target • 14 students have signed up to take the Exit exam but only 9 students actually taken the exams because the other five students didn't complete any of the work due to unknown reasons. Among the 9 participated students, none of the students has scored the Excellent 90-100% of the exam, 5 of them have scored the Good 75-90% of the exam, 3 of them have scored the acceptable 60-75% of the exam and 1 student has scored in the Unsatisfactory less than 60% the exam. The overall average 74.54%, which is slightly better than 71.06% from last year, met the acceptable target.  
Use of Results and Reflection	• This year students' comprehension of tradeoffs between data structures improves and reaches ideal, the first time since 17/18 • The results of the exit exam were acceptable. We hope that most of the students can score 75% or higher on the exam. However, some of our courses are only taught once

	every two years so it is possible that a student transferred from a community college might not have the required subject background to get a higher score on the exam. The average grade of the Exit Exam is 74.54 out of 120 this year which is alight better than 71.06 from last year and the reasons could be that most of the classes have resume to the face-to-face delivery method so it gave students the opportunity to interact with their professors which might help them focus on their school work.
Student Learning Outcome 8	• An ability to apply design and development principles in the construction of software systems of varying complexity
Method(s) of Assessment	***Measure AND Number of Students Assessed*** **(Required)** Measure the students' ability to apply inheritance and interface design principle in programming. In course CS1623 Computer Science II, students are required to understand and be able to use Inheritance and Polymorphism design in Objective Oriented programming using Java. Inheritance and Interface design in modern software development industry are critical to software's extendibility, usability and reliability. We are using the final programming project to measure this outcome. Student's projects are ranked between 1 and 4. The average ranking is used as measurement. In year 20/21, 12 students are assessed ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: The program run correctly, show proper interface and generate correct results 3-Good: Interface shown properly, cannot generate correct final result 2-Satisfactory: The interface shown properly, but cannot interact with user properly 1-Unsatisfactory: Interface not shown properly
	Measure **AND** ***Number of Students Assessed*** Measure the students' ability to evaluate advantages and disadvantages in Software Engineering process models. In course CS4423 Software Engineering, students are required to understand different software development processes, their differences, and their application to different kind of software projects. We are using the first Exam's Question 5, 6, and 7 to measure this outcome. All three questions are about software process description, comparison, and tradeoffs. In our measurement, each question is ranked based on following rubric. Each student's rank is determined by his/her average rank among the three questions. Average rank among all assessed students is used as measurement. In year 20/21, 11 students are assessed. ***Expected Target*** Acceptable 2.5, ideal 3.0 in average among all assessed students ***Describe rubric criteria and scales (if applicable)*** 4-Excellent: Correct answer 3-Good: Mostly correct, with minor problems 2-Satisfactory: Has problems but No major mistake 1-Unsatisfactory: Major mistakes exist or not answering the question
Summary of Assessment Results	• 12 students are assessed in their ability to apply inheritance and polymorphism design principle in programming. 6 students ranked Excellent, 1 student ranked Good, 2 students ranked Satisfactory, and 3 students ranked Unsatisfactory. Average 2.83. Meet the acceptable target • 11 students are assessed in their ability to evaluate advantages and disadvantages in Software Engineering process models. 4 students ranked Excellent, 4 students ranked Good, 3 students ranked Satisfactory, and 0 student ranked Unsatisfactory. Average 3.182. Meet the Ideal target
Use of Results and Reflection	• This is the third year Java project used in Measurement 1. The result is still a bit lower than ideal. • Software process measurement result raised back above ideal after the drop in previous year

III. Program Degree Plans

A. Computer Information Systems Degree Plan

Program: COMPUTER INFORMATION SYSTEMS
Major: Computer Information System
Degree: Bachelor of Sciences (B.S.)

Dept: Chemistry, Computer and Physical Sciences
School: Arts and Sciences
Major Code: 061

GENERAL EDUCATION ..... **44 Hours**

Communications (9 Hours)
1. English (ENG 1113* and ENG 1213**)
2. Speech Communication (COMM 1233 or 2213)

Social and Behavioral Sciences (12 Hours)
1. Political Science (POSC 1513)
2. American History (HIST 1513 or 1523)
3. Social Science (ECON 2113, GEOG 2723, HIST 3513, or SOC 1113)
4. Mental and Physical Health (HPER 1113 or PSY 1113)

Science and Mathematics (14 Hours)
1. Biological Sciences (BIOL 1114 or 1404)
2. Physical Sciences (CHEM 1004, 1114, 1315; PHYS 1114, 2015; PSCI 1114, 1214, or 1414)
3. Mathematics (MATH 1303, 1513, 1543, 1613, 2013, 2113, 2143, 2215, or 2283)
4. Computer Proficiency Requirement (BIM 1513 or CIS 1003)

Humanities (9 Hours)
1. Humanities, Philosophy, and Lit (ENG 2313, 3893; HUM 2113, 2223, 2313; or PHIL 2113, 2223)
2. Fine Arts (ART 1003, 1103, 2103, 3013, 3083; MUS 1113, 1123, 3133; THTR 1143, 1183, 2183, or 3183)
3. Foreign Language (CHTW 1513; FREN1113; GERM1113; SPAN1113, 1223; ASL 1113; NS 1213)

MAJOR REQUIREMENTS: Computer Information Systems (40 Semester Hours Option)
*fa/sp/su: fall/spring/summer semester
Core Courses (28 semester hours)
CIS 1613 * Computer Information Systems I (fall)
CIS 1623 ** Computer Information Systems II (spring)
CIS 2103 Intermediate Productivity Software (fall)
CIS 3103 Advanced Productivity Software (spring)
CIS 3123 Intermediate Database Analysis (fall)
CIS 3323 Advanced Database Analysis (spring)
CIS 3533 Advanced Business Solutions (spring)
CIS 4113 Data Communications Technology (spring)
CIS 4413 Systems Analysis (fall)
CIS 4980 Senior Seminar (one credit hour) (fall/spring)

* CS 1613 may be substituted, ** CS 1623 may be substituted

Electives (12 semester hours)
Twelve hours of CIS electives (with six hours of upper-division) approved by the department to complete the 40 semester hour major.

Minor (18-24 semester hours)
A student can choose any minor (Accounting, Art, Biology, Chemistry, … or Theatre) of his/her interest to fulfill the baccalaureate degree requirement of SE.

Specified General Education Requirement:
ECON 2113 Principles of Macroeconomics (fa/sp/su)
MATH 1513 College Algebra (or higher) (fa/sp/su)

MAJOR/MINOR REQUIREMENTS: Computer Information Systems (58 Semester Hours Option)
*fa/sp/su: fall/spring/summer semester
Core Courses (28 semester hours)
CIS 1613* Computer Information Systems I (fall)
CIS 1623** Computer Information Systems II (spring)
CIS 2103 Intermediate Productivity Software (fall)
CIS 3103 Advanced Productivity Software (spring)
CIS 3123 Intermediate Database Analysis (fall)
CIS 3323 Advanced Database Analysis (spring)
CIS 3533 Advanced Business Solutions (spring)
CIS 4113 Data Communications Technology (spring)
CIS 4413 Systems Analysis (fall)
CIS 4980 Senior Seminar (one credit hour) (fall/spring)

* CS 1613 may be substituted, ** CS 1623 may be substituted

Major-Minor (30 semester hours including the 9 hours of elective below)
ACCT 2103 Fundamentals of Financial Accounting (fa/sp/su)
ACCT 2203 Fundamentals of Managerial Accounting(fa/sp/su)
BUS 2633^ Business Statistics (fa/sp/su)
ECON 2213 Principles of Microeconomics(fa/sp/su)
ENG 3903^^ Technical and Professional Writing (fa/sp)
MKT 3233 Principles of Marketing (fa/sp/su)
MNGT 3113 Management and Organizational Behavior (fa/sp/su)
Electives (9 semester hours of upper-division)
Approved by department to complete the 58 semester hour major-minor

^ STAT 2153 may be substituted, ^^ ENG 4973 may be substituted

Specified General Education Requirement:
ECON 2113 Principles of Macroeconomics (fa/sp/su)
MATH 1513 College Algebra (or higher) (fa/sp/su)

Electives as needed to bring **total hours to 124** with at least 55 hours of liberal arts and 40 hours of upper-division (3000-4000) courses.
Note: The major program is just one component of a baccalaureate degree. For other degree requirements, see pages 56-60 of the SE academic Catalog.

B. Computer Science Degree Plan

Program: COMPUTER SCIENCE
Major: Computer Science
Degree: Bachelor of Sciences (B.S.)

Dept: Chemistry, Computer and Physical Sciences
School: Arts and Sciences
Major Code: 05

GENERAL EDUCATION ..... 44 Hours

Communications (9 Hours)
1. English (ENG 1113* and ENG 1213**)
2. Speech Communication (COMM 1233 or 2213)

Social and Behavioral Sciences (12 Hours)
1. Political Science (POSC 1513)
2. American History (HIST 1513 or 1523)
3. Social Science (ECON 2113, GEOG 2723, HIST 3513, or SOC 1113)
4. Mental and Physical Health (HPER 1113 or PSY 1113)

Science and Mathematics (14 Hours)
1. Biological Sciences (BIOL 1114 or 1404)
2. Physical Sciences (CHEM 1004, 1114, 1315; PHYS 1114, 2015; PSCI 1114, 1214, or 1414)
3. Mathematics (MATH 1303, 1513, 1543, 1613, 2013, 2113, 2143, 2215, or 2283)
4. Computer Proficiency Requirement (BIM 1513 or CIS 1003)

Humanities (9 Hours)
1. Humanities, Philosophy, and Lit (ENG 2313, 3893; HUM 2113, 2223, 2313; or PHIL 2113, 2223)
2. Fine Arts (ART 1003, 1103, 2103, 3013, 3083; MUS 1113, 1123, 3133; THTR 1143, 1183, 2183, or 3183)
3. Foreign Language (CHTW 1513; FREN1113; GERM1113; SPAN1113, 1223; ASL 1113; NS 1213)

MAJOR REQUIREMENTS: Computer Science (40 Semester Hours Option)
*fa/sp/su: fall/spring/summer, fa-e/o-yr: fall-even/odd-year
Core Courses (28 semester hours)
CS 1613 Computer Science I (fa/sp)
CS 1623 Computer Science II (sp)
CS 2513 Seminar in Programming (fa)
CS 2813 Data Structures (fa)
CS 3143 Computer Architecture (sp)
CS 4113 Operating Systems (sp)
CS 4223 Algorithm Analysis (fa-e-yr)
CS 4423 Software Engineering(sp)
CS 4623 Advanced Web-based Application Dev(sp)
CS 4980 Senior Seminar (one credit hour) (fa/sp)

Electives (12 semester hours)
Twelve hours of electives (with nine hours of upper-division) approved by the department to complete the 40 semester hour major.

Minor (18-24 semester hours)
A student can choose any minor (Accounting, Art, Biology, Chemistry, … or Theatre) of his/her interest to fulfill the baccalaureate degree requirement of SE.

Specified General Education Requirement:
MATH 2215 Calculus I

MAJOR/MINOR REQUIREMENTS: Computer Science (58 Semester Hours Option)
*fa/sp/su: fall/spring/summer, fa-e/o-yr: fall-even/odd-year
Core Courses (28 semester hours)
CS 1613 Computer Science I (fa/sp)
CS 1623 Computer Science II (sp)
CS 2513 Seminar in Programming (fa)
CS 2813 Data Structures (fa)
CS 3143 Computer Architecture (sp)
CS 4113 Operating Systems (sp)
CS 4223 Algorithm Analysis (fa-e-yr)
CS 4423 Software Engineering(sp)
CS 4623 Advanced Web-based Application Dev(sp)
CS 4980 Senior Seminar (one credit hour) (fa/sp)

Major-Minor (30 semester hours including the 6 hours of elective below)
CS 4323 Programming Languages(fa-o-yr)
CS 4643 Distributed Networks(fa-o-yr)
CIS 2343 Web Page Design/Internet Programming (fa)
CIS 3223 Net-Centric Computing (fa)
CIS 3323 Advanced Database Analysis (sp)
CIS 4343 Applied Net-Centric Computing (sp)
MATH 2013 Introduction to Discrete Mathematics (fa)
STAT 2153 Statistical Methods(fa/sp)
Electives (6 semester hours of upper-division)
Approved by department to complete the 58 semester hour major-minor

Specified General Education Requirement:
MATH 2215 Calculus I

Electives as needed to bring **total hours to 124** with at least 55 hours of liberal arts and 40 hours of upper-division (3000-4000) courses.
Note: The major program is just one component of a baccalaureate degree. For other degree requirements, see pages 56-60 of the SE academic Catalog.

C. Computer Information Systems program comparisons with two other reginal universities:

Class	SOSU (SE now)	ECU	NSU
Computer Information Systems I	CIS 1613	CMPSC 1113	IS 3023
Computer Information Systems II	CIS 1623		
Intermediate Productivity Software	CIS 2103	MGMT 3023	MIS 1903
Advanced Productivity Software	CIS 3103	MGMT 4013	
Intermediate Database Analysis	CIS 3123		
Advanced Database Analysis	CIS 3323	ITM 4653	IS 4293
Advanced Business Solutions	CIS 3533	MIS 3453	
Data Communications Technology	CIS 4113	ITM 3613	IS 3183
Systems Analysis	CIS 4413	ITM 4753	IS 3213
Senior Seminar	CIS 4980		IS 3320
Fundamentals of Financial Accounting	ACCT 2103	ACCT 2103	ACCT 2103
Fundamentals of Managerial Accounting	ACCT 2203	ACCT 2203	ACCT 2203
Business Statistics	BUS 2633	BSEC 2603	BADM 3933
Principles of Microeconomics	ECON 2213	ECON 2013	ECON 2213
Technical and Professional Writing	ENG 3903	BUCOM 3133	
Principles of Marketing	MKT 3233	MKTG 3313	MKT 3213
Management and Organizational Behavior	MNGT 3113	MGMT 3013	MGMT 3183
		FIN 3113[rq]	BADM 3963[rq]
			BLAW 3003[rq]
Electives (Hours)			
Required Electives	9 hours	6 hours	
			FIN 3213[rq] IS 3063[rq] MGMT 3213[rq] MGMT 4213[rq] IS 3113[rq] IS 4313[rq] IS 4353[rq]
Specified General Education Requirement:			
Principles of Macroeconomics	ECON 2113	ECON 2003	ECON 2313
College Algebra (or higher)	MATH 1513	MATH 1613	MATH 1523

Notes: ECU East Central University, NSU - Northeastern State University

E: elective, rq: required

D. Computer Science program comparisons with two other reginal universities:

Class	SOSU (SE now)	ECU[1]	NSU[1]
Computer Science I	CS 1613	CMPSC 1113	CS 2014
Computer Science II	CS 1623	CMPSC 1133	CS 2163
Seminar in Programming	CS 2513	CMPSC 2213[E]	CS 3033
Data Structures	CS 2813	CPSMA 2923	CS 3403
Computer Architecture	CS 3143	CMPSC 3613	CS 3173
Operating Systems	CS 4113	CMPSC 3113	CS 3343
Algorithm Analysis	CS 4223		
Software Engineering	CS 4423	CMPSC 3943[*]	CS 4203
Advanced Web-based Application Dev	CS 4623	CMPSC 3313[E]	CS 4233
Senior Seminar	CS 4980	CMPSC 4983	
Programming Languages	CS 4323	CMPSC 4473	MATH 3023[E]
Distributed Networks	CS 4643	CMPSC 4273[E]	
Web Page Design/Internet Programming	CIS 2343	CMPSC 2323[E]	CS 4143[E]
Net-Centric Computing	CIS 3223	CPSMA 4373[E]	
Advanced Database Analysis	CIS 3323	CMPSC 4213	CS 4343
Applied Net-Centric Computing	CIS 4343	CMPSC 3233[E] CMPSC 4223[E]	
Introduction to Discrete Mathematics	MATH 2013	CPSMA 3913	MATH 3023
Statistical Methods	STAT 2153	MATH 1223	
		CPSMA 3933 O.R CPSMA 4413	ENGL 3083rq
Electives (Hours)	6	6	
Required Electives (ECU)		CMPSC 3213[E] CMPSC 3543[E]	
Specified General Education Requirement:			
Calculus I	MATH 2215	MATH 2825 or MATH 2613 (Cal-Business)	MATH 1513

Notes: ECU East Central University, NSU - Northeastern State University

E: elective, rq: required

E. Minor options provided by the department

Information Technology Minor ..... 18 Semester Hours

CIS 1613* Computer Information Systems I (fall)
CIS 2103 Intermediate Productivity Software (fall)
CIS 4413 Systems Analysis (fall)
*CS 1613 (fall/spring) may be substituted

Nine (9) elective hours approved by the department, **three (3)** of which must be **upper division credit**.

NOTE: Courses taken for the Major cannot be counted in the Minor.

Health Information Systems Minor..... 18 Semester Hours

CIS 3003 Using Computers in the Medical Office *(*TBD)*
CIS 3123 Intermediate Database Analysis (fall)
CIS 3543 Computer Security (summer)
CIS 4103 Computer Ethics (spring)
CIS 4613 Health Information Systems (spring)
CIS 4623 Electronic Health Records (summer)
**TBD: To Be Determined*

NOTE: Courses taken for the Major cannot be counted in the Minor.

Computer Science Minor ..... 18 Semester Hours

CS 1613 Computer Science I (fall/spring)
CS 1623 Computer Science II (spring)

Twelve (12) elective hours approved by the department, **six (6)** of which must be **upper division credit**.

NOTE: Courses taken for the Major cannot be counted in the Minor.

VII. IT-Camp for Kids and Guardians

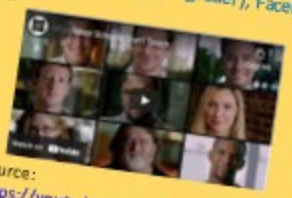
A. The IT-Camp flyer front and back pages

How did they get started? "... I wanted to make something that was fun for myself and my sisters. I wrote this little program ..."
– Mark Zuckerberg (Founder of Facebook)

With the technologies at our fingertips today, it has never been easier for almost anyone to create fun and interesting games and STEM projects, even with just a mobile device. Let's explore the new technologies out there and discover your untapped talents, so that you can enrich your life and anyone around you.

How old were they when they started?

- Bill Gate (age 13), Microsoft
- Jack Dorsey (age 8), Twitter
- Mark Zuckerberg (6th grader), Facebook
- ...



- Source: https://youtu.be/nKly9yen5nc [5m:43s] by Code.org

It is never too late or early to get started!

Summer Hands-on IT-STEM Workshops:

	Workshops (WS)		
Contents* (IoT)	WS-1	WS-2	WS-3
1. Introducing IoT (Internet of Things), Raspberry Pi, and Scratch 3	✓	✓	✓
2. Game Programming - Scratch 3	✓	✓	✓
3. Exploring Scratch Extensions	✓	✓	✓
4. Getting to Know your Raspberry Pi Take a brief guided tour of your new computer	✓	✓	✓
5. Virtual IT Field Trip with Q & A Choctaw Nation – IT Dept.	✓	✓	✓
6. Special Speaker: The IT Professional A day in the life of an IT Professional and Q&A	✓	✓	✓
7. Starting your Raspberry Pi	✓	✓	✓
8. Hands-on with the Sense HAT Use the sensors and LED matrix display of this add-on board	✓	✓	✓
9. Hands-on IoT Devices with Scratch Use the things: LEDs, Sensors (soil moisture, temperature, humidity, distance, ... *), *: depends on the class progress		✓	✓
10. Programming with Python (will be briefly covered).			✓
11. Let's Stargate the Present and the Future	✓	✓	✓

What is IoT?

- Source: https://youtu.be/UhmzVL5bm8 [3m:21s] by Edureka!

Contents* (Webpage)	Workshop-4
1. Using Basic HTML Tags Explore the basic HTML tags, tables, navigation menu	✓
2. Using the CSS (Cascading Style Sheet) Explore the basic CSS style rules, ... etc.	✓
3. Designing for the Mobile Web Use responsive layouts to create mobile friendly webpages	✓
4. Animating your Web Contents Animate the word, images, and scrolling the contents	✓
5. Virtual IT Field Trip with Q&A A virtual IT Field Trip – Gabbart Communications	✓
6. Special Speaker: The IT Professional A day in the life of an IT Professional and Q&A	✓
7. Enhancing the Webpage with Multimedia Add and configure the image, audio, and video data	✓
8. Putting It All Together Apply the design and technological knowledge and skill to create your own webpage.	✓

Why Raspberry Pi?

- This powerful yet low-cost single-board computer opens the doors of new experimental and application creation possibilities.

- The Pi 4 B (1GB) could have been as low as $35 prior to Covid-19
- Source: https://youtu.be/owcZeUrGixM [6m:08s] by European Space Agency, ESA

*: The instructor reserves the right to make any adjustments to the contents and/or hardware as needed to meet the goals of the workshop, due to the global chip shortage.

Acknowledgement: this IT camp would not be possible without the help and support from the Dept. of CCPS, Southeastern Oklahoma State University, and the community.

Prepared by Dr. Ming-Shan Su, 4/26/22

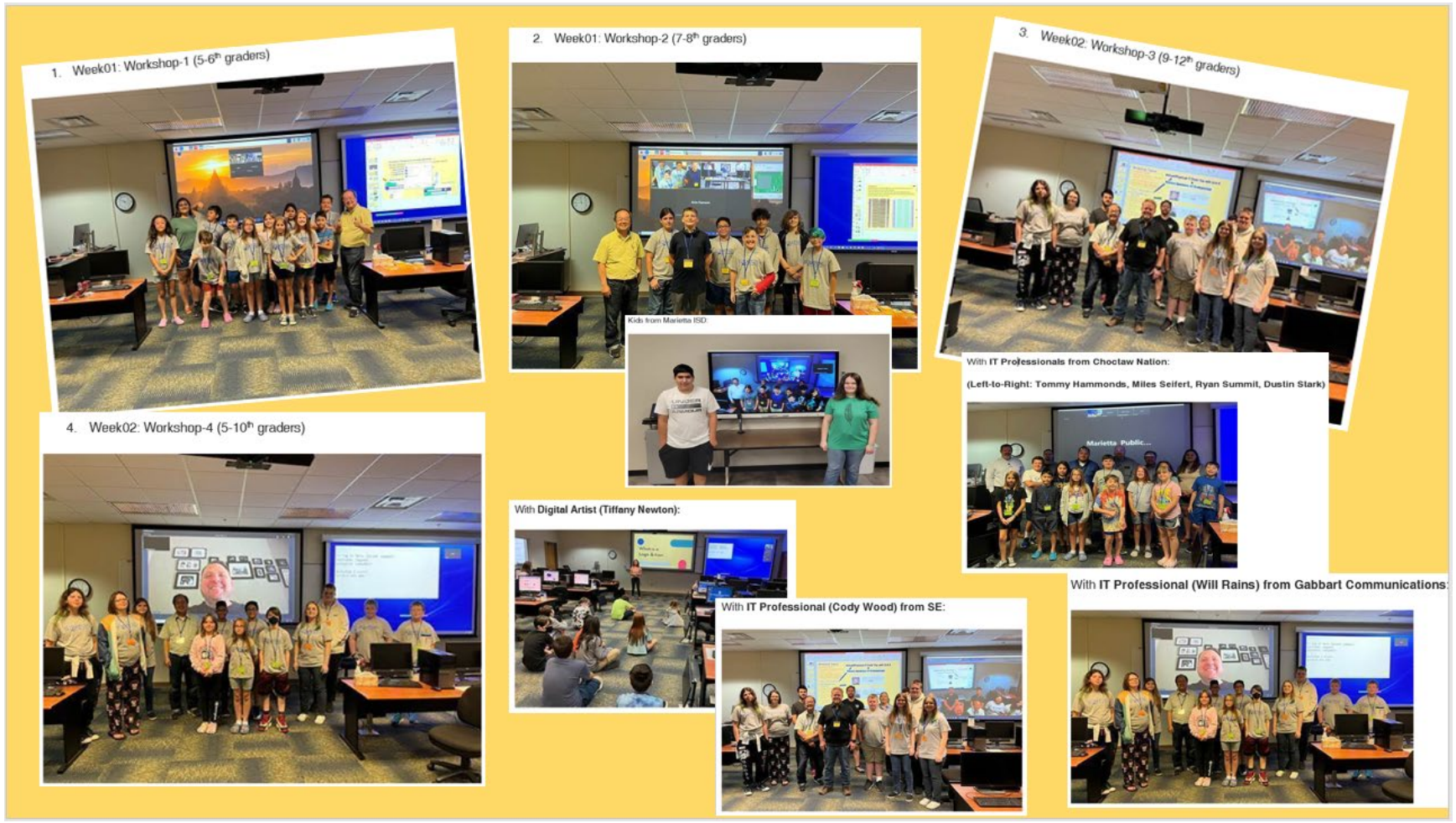
[1]Meet the IT Camp Team

- http://babbage.se.edu/itteam

What is Scratch?

- https://youtu.be/ q2RgQMc96k

B. The IT-Camp participant photos



RECOMMENDATIONS (from the external cis/cs program reviewer)

I have the following recommendations, some of which were collected from the students and faculty.

I. Some students learn better through working together with the faculty to write code in class. Faculty may take different approaches to engage students. It would be better to teach students how to solve the problems than giving them the answers.

Response: we concurred.
We will recommend our faculty/instructors to put more emphasis on helping students develop problem solving skills instead of showing them the answers.

II. If the market demand for professional certificates (like Microsoft, Cisco, Security, etc.) and faculty interest collide, the CS & CIS programs may consider offering courses.

Response: we concurred.
As of now, we don't have enough manpower to offer certificate type courses. However, we will consider incorporating certificate type questions into our homework assignments.

III. Identify more quality and qualified faculty/instructors either internally or externally to teach required courses more regularly to help reduce/maintain the regular teaching load

Response: we concurred.
We will share the recommendation with our school officials.

IV. Generate evaluation metrics and/or quality control of the online courses

Response: we concurred.
We will gather our faculty/instructors to discuss how to generate evaluation metrics for online courses.

V. Look into approaches to proctor the exams/quizzes for the online programs. (The online program currently uses LockDown Browser, but it may not work well for all circumstances.)

Response: we concurred.
We will look into other options (e.g., Pearson professional center) to proctor the exams/quizzes for the online programs.

VI. There are some requests from companies in the region to have advanced networking lab with network simulation, penetration test, etc. When review the curriculum, it can be put into consideration.

Response: we concurred.
As of now, we don't have enough manpower to set up and maintain an advanced networking lab, but we will put that into consideration when we review the curriculum.

VII. Prevent faculty from teaching 5+ courses for consecutive semesters. It is not sustainable and may affect the health of the faculty.

Response: we concurred.
We will share the recommendation with our school officials.

VIII. Review and revise the textbook/materials used more regularly. The computer science fields change rapidly, and the out-of-date materials do not help students in the job market.

Response: we concurred.
We will recommend our faculty/instructors to review and revise the textbook/materials used more regularly.

IX. Discuss in detail regarding the mathematics requirement of the programs. I would personally recommend keeping all the necessary mathematics courses as those are crucial to development of logical and critical thinking.

Response: we concurred.
We will discuss the mathematics requirement of the programs based on the recommended guidelines from ACM (Association for Computing Machinery) and the demands of the job market more frequently in the future.

Report from the External Reviewer for CS & CIS Programs at Southeastern Oklahoma State University (SEOK)

Reviewer: Tachun Lin, Ph.D.

GENERAL COMMENTS & EXECUTIVE SUMMARY

Process. The reviewer crafted some probing questions based on the Academic Program Review Guide of SEOK received in May 2022. The CS & CIS programs coordinator of SEOK, Dr. Ming-Shan Su, work with the reviewer to conduct multiple virtual interviews with all CS/CIS full-time faculty and several current and recently graduated CS/CIS undergraduate students at SEOK from June 10 to July 21, 2022. The reviewer analyzed the information gathered and evaluated the CS/CIS program's self-study report. This report documents the findings and recommendations.

Summary of findings. The reviewer has found the CS & CIS programs to have many strengths and to be able to "do more with less" even in light of soaring online enrollments consistent with national trends. Particular strengths include broad and innovative curricula that incorporate project experience, and reasonably good lab facilities with sufficient capacity. The reviewer observed several weaknesses mostly institutional rather than intrinsic to the department, including insufficient commitment to attract new faculty and staff hires in the face of the extraordinary demand for computer science talent, and a deficit in other resources required to cope with the current enrollment growth. Other weaknesses are minor in comparison and/or intrinsic to the department, including some curricular and scheduling issues.

Summary of recommendations. Above all, senior university administration should have a clear idea of the role of CS & CIS programs at SEOK and, more broadly, nationally, and allocate resources accordingly. Given how competitive the job market is, aggressive and creative hiring will be necessary to handle the continued enrollment growth. Compensated overload teaching is a threat to faculty research productivity and should serve only as an infrequent emergency response. The department needs funds to support professional development for all its faculty and student-facing initiatives, such as an external speaker series, along with robust mentoring for junior faculty. Finally, the department should expand its partnerships with key academic units and information technology, and connect with strategic initiatives in the professional community, including CS4All, NSF Research Experience for Undergraduates (REU), the Grace Hopper and Richard Tapia conferences, and the Computing Research Association (CRA).

1. BRIEF DESCRIPTION OF THE CS & CIS PROGRAMS

The CS and CIS Programs have special options, where students can pursue four possible combinations, namely, CS Major/Minor, CIS Major/Minor, CS Major/CIS Minor, and CIS Major/CS Minor. Both CS and CIS Majors require 40 semester hours of course work, and CS and CIS Minors require 18 semester hours of course work.
The CIS Program aims at preparing students for the careers in the fields of information technologies with courses like Databases Analysis, Systems Analysis, Business Solutions, and Productivity Software. Comparatively, the CS Program includes more fundamental and theoretical courses such as Computer Architecture, Operating Systems, Algorithm Analysis, and Software Engineering.

There are four full-time and some affiliate faculty teaching all the CS/CIS courses, including two tenured professors, one tenure-track assistant professor, and one instructor. Per Academic Policies and Procedures 2020 – 2021 of Southeastern Oklahoma State University, the regular teaching load of each full-time faculty is 12 credit hours per semester.

2. PROGRAM GOALS, OBJECTIVES, AND STUDENT OUTCOMES

On Page 3 of the CS & CIS Programs' self-study report (SSR) dated July, 2022, it writes "The primary goal of the Computer Science and Computer Information Systems programs at Southeastern Oklahoma State University is to prepare students for careers in computer science and information technology in business, industry, and government." This seems entirely consistent with the mission statement for the university, which says "students will develop skills and habits that promote values for career preparation, responsible citizenship, and lifelong learning." The members of the CS & CIS programs are dedicated to high quality teaching, emphasizing both the breadth and the depth of the field, and regard preparing students for their professional careers as their highest priority. All of the core values of the SEOK Experience have a place in one form or another in the CS & CIS programs and curriculum.

On Page 10 of the SSR, it lists the following student outcomes/objectives for the CS & CIS programs:

A student completing a B.S. in Computer Science should be able to:
1. Be fluent in at least two programming languages.
2. Create and describe the programming concepts of arrays.
3. Create and describe functions and recursive programming.
4. Be able to troubleshoot hardware and software problem.
5. Have a firm grasp of the layers of computer architecture.
6. Create and describe the basics of algorithm analysis for problem solving.

A student completing a B.S. in Computer Information Systems should be able to:
1. Demonstrate an ability to identify problems in an information system and to select appropriate hardware and software packages to address the problems in a satisfactory manner.
2. Show competence in basic statistical analysis, the fundamentals of accounting, marketing, and management.
3. Demonstrate an understanding of data architecture, data management, systems integration, and the systems development cycle.
4. Manifest interpersonal communication skills through the preparation and presentation of

reports.

The CS & CIS Degree Plans listed in Appendix III of the SSR seem aligned with the objectives of the programs with some room of improvements, which are discussed in detail in item 4. below.

3. COMPATIBILITY OF THIS PROGRAM WITH THE MISSION OF SE

The CIS program's mission statement on Page 73 of the SSR writes "The Computer Information Systems (CIS) program of the department of Chemistry, Computer, and Physical Sciences aims to prepare its students to obtain and enjoy successful careers in the dynamic IT (Information Technology) industry. The CIS program strives to understand the needs of local, regional, and national employers and deliver graduates that can adequately fill current IT positions."

The CS program's mission statement on Page 147 of the SSR writes "The Computer Science program in the Department of Chemistry, Computer, and Physical Sciences aims to prepare its majors to obtain the knowledge and skills to succeed in the technological workplace of the 21st century. The CS program strives to build problem solving skills, to provide a firm grasp of the principals of ethical behavior and professional integrity, and to encourage a determination to engage in life-long learning in the theory and applications of computing."

These statements seem entirely consistent with the institutional mission statement presented in the website of SEOK writes "provides an environment of academic excellence that enables students to reach their highest potential. By having personal access to excellent teaching, challenging academic programs, and extracurricular experiences, students will develop skills and habits that promote values for career preparation, responsible citizenship, and lifelong learning."

4. CURRICULUM

With respect to the curriculum, it is always recommended to refer to the Curricula Recommendations provided by the Association for Computing Machinery, namely, Computing Curricula 2020: Paradigms for Global Computing Education, Curriculum Guidelines for Undergraduate Programs in Computer Science, Computing Competencies for Undergraduate Data Science Curricula, A Competency Model for Undergraduate Programs in Information Systems, and Curriculum Guidelines for Baccalaureate Degree Programs in Information Technology.

Take the referred CS Curricula as an example, there are 18 Knowledge Areas (KAs), where the CS Major+Minor Program at SEOK covers the following KAs:

- AL – Algorithms and Complexity
- AR – Architecture and Organization
- CN – Computational Science
- DS – Discrete Structures
- OS – Operating Systems
- PL – Programming Languages
- SE – Software Engineering
- NC – Networking and Communications.

Due to the limited number of faculty members in the CS/CIS programs, it is understandable that the faculty would have to tailor the programs so the curricula would be aligned with their teaching/research expertise as well as resources availability.

Some issues were identified while interviewing the faculty and graduated/current students.

I. Some required courses were only offered once every two years such as the theory courses like Algorithm Analysis and Programming Languages, and the reason being that there were either not enough students and/or faculty. I would strongly recommend that the university to provide resources to support the programs, and the members of the programs and/or the department to review the curriculum to make it more flexible.
II. There was still course(s) using Visual Basic as the programming language. I strongly recommend to replace it with a more modern and practical languages, such as Python, C#, Java, C++, etc. Note: I learned from some faculty that the CS & CIS programs will soon adjust the materials and requirement of the aforementioned course(s) with other languages. This serves as a reminder to modernize the programs.
III. There were requests from students to develop more in-depth and hands-on security courses, enterprise architectures and solutions, Cloud, SQL/Databases, etc. as there seemed to be a market in the nearby market/region. While I would recommend to develop the curriculum to be well-balanced among multiple knowledge areas, the department and programs may consider identifying and inviting respective domain experts in the nearby region to teach such courses.
IV. Some students reported that some online programs did not provide the same quality teaching resources compared with its in-person counterparts. For example, the lack of interaction with the faculty throughout the semester, or the courses only had reading materials without faculty's guidance on learning. To sustain and make quality online CS & CIS programs, some effort and/or quality control should be adopted.

5. FACULTY

My impression of the CS/CIS faculty is that they are dedicated and hardworking. They face numerous challenges brought on by the difficulty in recruiting and retaining good faculty in a competitive market. While these are both national trends, I am concerned that the department has been forced into a position of having to hire adjuncts and see them leave for one reason or another. This sort of turnover and uncertainty places stress on the Department and its students. In addition, responsibility for managing the Department's computer lab resources typically falls on a faculty member rather than a professional system administrator who could do a better job keeping key software up to date and secure.

The CS/CIS faculty have been teaching overloads, which undoubtedly has a negative impact on their research and scholarly productivity. An aggressive commitment to successful faculty hiring in CS/CIS coming from the highest levels in the institution, in recognition of the central role that computer science now plays in society, would likely be the most effective step toward addressing these issues. With regard to the competitive hiring landscape, see the technical report by Craig Wills titled "Analysis of Current and Future Computer Science Needs via Advertised Faculty Searches for 2018."

Faculty research productivity seems modest but appropriate given the university's primary

emphasis on teaching, and especially in light of the high teaching load which sap faculty time away from research. Retention needs to be a serious concern. Given the heavy teaching loads, it comes as no surprise that jobs that are left undone because no one has time for them. Increased staffing should help with this. This is a very dynamic time in the field of computing, and direction and support from the administration would be useful. One gets the impression the CS & CIS faculty are eager to be involved, but they need to know where best to apply their energies.

6. OPERATIONAL PROCEDURES AND PROGRAM PROCESSES

There were reports from former/current students that the prior course/enrollment system did not provide necessary information which made it hard for them to know the course and instructor's information. It was greatly improved as the new system is now in place. I strongly recommend gathering students' feedback on the enrollment or other university systems and reporting them to the respective Information Technology department/personnel to improve the learning experience.

The department or university requires faculty to have 10 hours of Office Hours, while faculty in the programs are also required to stay at school on Friday till 3 pm every week. Based on the information acquired from faculty and students, none of the (or not many) students would visit the faculty/campus building on Friday throughout the semester. I would recommend relaxing the requirement or providing more flexibility to faculty so they can spend the time on research or professional development.

7. DEPARTMENTAL COORDINATION AND FACULTY INVOLVEMENT IN THE PROGRAM MANAGEMENT

As a part of the Department of Chemistry, Computer, and Physical Sciences, the CS & CIS programs have their respective program coordinators who helped the department chair to deal with special needs and operations. The marriage of the traditionally standalone programs (CS & CIS, Chemistry, and Physical Sciences) would inevitably incur challenges and competition on resource acquirement, allocation, and management, the chair and the faculty of the CS & CIS programs seem to adapt to the operations model well enough to minimize the conflicts.

While there was strong praise for the leadership of the Chair, Tim Smith, some faculty members voiced concerns regarding poor communication within the department, teaching burdens spread across the faculty, the use of the Drop, Fail, Withdraw (DFW) rate as the evaluation metric for faculty teaching, and lack of resources for research development. Some of these issues seem to be the natural side effects of a faculty under stress and stretched too thin. An aggressive commitment to successful faculty hiring in CS & CIS coming from the highest levels in the institution, in recognition of the central role that computer science now plays in society, would likely be the most effective step toward addressing many of these issues.

8. STUDENTS

Based on the interviews with faculty and students, there seems to be a low ratio of graduated students who went to the Masters and/or Ph.D. programs. While it is understandable that not everyone needs or wants to pursue advanced programs, it may be an important subject for the programs to study. This also correlates to the discussions whether the CS & CIS programs should reduce the number of the required mathematics courses so students in the programs struggling with the requirements can graduate. From

an educator's perspective, I believe our ultimate objective shall be building a solid foundation of our students through rigorous curriculum and courses. The DFW rate shall not be the major metric to evaluate faculty and program outcome. On the contrary, I would recommend the higher administrators to recognize that reasonably low DFW could represent that the faculty was doing their job to make sure that only those students who put the required effort to learn could pass the course. After all, the university's mission, "provides an environment of academic excellence that enables students to reach their highest potential", does not guarantee that every student can pass all the courses in one attempt. On the other hand, the CS & CIS curriculum would need the level of flexibility to accommodate such scenario.

9. ASSESSMENT PLAN DEVELOPED FOR THE PROGRAM

As far as program assessment is concerned, to date, the CS & CIS programs have accumulated only indirect program assessment data: learning outcomes, DFW, course evaluations, etc. These measurements are useful in the absence of a more formalized and systematic approach, but opportunities are being missed to answer specific questions the CS & CIS programs (/the Department) and university may like to answer. These questions should drive the next stage of program assessment, and should be discussed as a unit. Ideally these discussions, and the resulting assessment data, can be used to direct the development of the curriculum, faculty, and identity of the CS & CIS programs. Possible questions include:

I. What knowledge and skills do CS & CIS students need in order to succeed after graduation?

II. Which subfields are strengths and weaknesses in the current curriculum?

III. Does the department wish to specialize in a particular subfield, or provide a broader range of student opportunities?

IV. What qualities and abilities will be preferred when hiring new faculty?

V. What is the current identity of the Department among students, the public, and the faculty, and does this match the goals of the Department?

Another complementary approach would be to conduct a short annual survey of companies who hire SEOK graduates, as well as students a few years after they have completed the program. The Department should also institute a formal process by which the results of these surveys are analyzed and communicated back to all of the faculty, with an eye toward incrementally updating the curriculum based on what is learned.

10. FACILITIES AND RESOURCES

Based on the faculty and student feedback, the university has provided adequate support in terms of facilities. The CS & CIS programs reside in a more modern building, and students have classes in the three computer labs/classrooms. The university installed voice tracker microphone and Wacom tablet in the classrooms and lectures are given in online or in hybrid modes. In addition to the classrooms/labs that serve multiple purposes, two faculty members got the grant to set up an additional computer lab to offer/co-teach the Parallel Computing course. There are lab spaces for student projects, and server rooms hosting Linux machines for hands-on labs. The junior faculty was granted with a new laptop to

carry out their work.

In terms of the financial support and budgets, a pool of funds exists supporting the operations of the whole department. A majority and necessity portion covers the materials/equipment needed for the chemical experiments to support the university missions, which leaves little budget for the department and faculty to grow their professional and research expertise. In scientific fields like CS/CIS, each major conference would charge about a thousand dollars on the registration fee for an author.
I strongly recommend the university to consider offering more budget to support faculty development and department growth, which also helps remain talents and increase morale.

11. ADMINISTRATIVE/INSTITUTIONAL SUPPORT OF THE PROGRAMS

The CS & CIS programs, some of the highly sought-after degrees, seem to have more resources in the sense that they reside in a more modern building and have adequate labs/classrooms/facilities to carry out their missions. Some more resources would be necessary to support the programs and further improve their overall quality, student experience, and faculty development.

Some issues that need immediate attention are listed below.

I. All faculty (12 members) in the Department share a tiny amount of money which is used for research publication and conference attendance. It is crucial to recognize that the major conferences in the CS & CIS fields, such as IEEE GLOBECOM conference, charge $1000+ just for full-conference registration. To retain faculty, improve faculty morale, and eventually improve the program quality, it is essential to provide opportunity and financial support for faculty development.
II. The university should be familiar with the procedures and needs of the international faculty, especially their respective H1B/VISA issues, which can ease their mind and help them focus on their work.
III. The university does not maintain the alumni contact/network and placement information, which I believe is important not only to the CS & CIS programs but every program on campus.

12. OTHER FACTORS: SIZE OF CLASSES, TOTAL ENROLLMENT IN PROGRAM, NUMBER OF GRADUATES.

The size of the classes is about 20 students at max, which seems reasonably good. The total enrollment in the programs was good, especially the online program. The number of graduates seems consistent since 2016.

13. OVERALL PROGRAM QUALITY RATING

Based on my meetings with faculty and students and the review of the self-study report, I find that the faculty are on par with those at the same level universities in terms of their qualification, quality, dedication to excellent teaching/research/service, and commitment to the departmental excellence. Students, both recently graduated and current, praise the faculty and programs for the quality education they received, the care of their success from the faculty, and the university environment.

14. RECOMMENDATIONS

I have the following recommendations, some of which were collected from the students and faculty.

I. Some students learn better through working together with the faculty to write code in class. Faculty may take different approaches to engage students. It would be better to teach students how to solve the problems than giving them the answers.
II. If the market demand for professional certificates (like Microsoft, Cisco, Security, etc.) and faculty interest collide, the CS & CIS programs may consider offering courses.
III. Identify more quality and qualified faculty/instructors either internally or externally to teach required courses more regularly to help reduce/maintain the regular teaching load
IV. Generate evaluation metrics and/or quality control of the online courses
V. Look into approaches to proctor the exams/quizzes for the online programs. (The online program currently uses LockDown Browser, but it may not work well for all circumstances.)
VI. There are some requests from companies in the region to have advanced networking lab with network simulation, penetration test, etc. When review the curriculum, it can be put into consideration.
VII. Prevent faculty from teaching 5+ courses for consecutive semesters. It is not sustainable and may affect the health of the faculty.
VIII. Review and revise the textbook/materials used more regularly. The computer science fields change rapidly, and the out-of-date materials do not help students in the job market.
IX. Discuss in detail regarding the mathematics requirement of the programs. I would personally recommend keeping all the necessary mathematics courses as those are crucial to development of logical and critical thinking.